

Asra Audiometer

Help File

Version 5.2

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INTRODUCTION

The ASRA audiometer software is based on the Hughson-Westlake testing routine recommended by the British Society of Audiology. It has a number of additional features which combine to make ASRA a unique instrument, while still complying with the recommended procedures of the British Society of Audiology and the Health and Safety Executive. It has a windows user interface which makes it attractive and easy to use. This manual describes, among other things, the default settings in the program and the recommended steps in normal usage. It also gives a more detailed description of all the menu facilities which are provided in the program.

Note: The ctrl+alt+H key combination may be typed while that message is on the screen, or at any other time, whether the program is running or not. However, if it is typed while an audiometric test is being run, then there may be a slight change in the timings in the test while the files Acrobat Reader and audhelp.pdf are being loaded from the disk.

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INITIAL SETUP

At start-up, a dialogue box is displayed which reminds the user that there must be only one copy of the Asra program running at any one time. If the Asra icon is clicked a second or more times while it still remains visible on the screen, then two or more versions of the Asra program will run at the same time.

This is followed by a small dialog box showing the directory/folder which will be used when new audiograms are saved automatically, and the directory/folder in which the system will look for existing audiograms (referred to as Passive Files in this document since they cannot be altered) which you will want to use for comparison with the new audiogram. These directory names are read from the AUDW32.INI file. The program will then display a dialog box which shows the date when the next audiometer and earphone calibration is due. It also displays the serial numbers of the two earphones which must be used with the audiometer and with the calibration file which has been loaded automatically. It is very important that these items should be checked each time the audiometer is brought into use.

The program starts up with the default setting of parameters which are read from the AUDW32.INI file. If the system does not find this file then it uses the following default settings of its parameters:-

Port :COM1;

Maximum Response Time :1.2 seconds

Tone length :0.8 seconds

Frequency list and order :1kHz, 2kHz, 3kHz, 4kHz, 6kHz, 8kHz, 0.5kHz

Order of Testing Ears :Left Ear then Right Ear

Include additional Notes in the Results screen displays and printouts. (These will be discussed later, in the section on [Categorisation of Results](#))

Connect the serial port on the audiometer to a serial port on the computer, or to a USB port on the computer. Note that a USB port will require special facilities, which can be obtained from your supplier or from G M Instruments. The default connections are selected by settings in the file AUDW32.INI as described above.

Further entries in the AUDW32.INI file are used to set default directories for the storage and retrieval of audiogram files, as referred to earlier in this section.

For most users the set-up procedure which is provided on disk by GM Instruments, gives a satisfactory arrangement of directories. The executable program, the AUDW32.INI file and the audiometer calibration file are all installed into a directory C:\AUDIO. If this directory did not previously exist on your computer then it should have been created automatically when the above files were installed using the installation program provided by GM Instruments. A sub-directory C:\AUDIO\RESULTS\ was also created and this is set to be the default directory for auto-saving audiogram files, and for loading previous audiogram files which will be used for comparison with the present audiogram.

See section [File Menu](#) | Save, later in this Help for more information on auto-save, and section [Passive File](#) Operations | Find and Open for more information on previous audiograms.

It is of the greatest importance that all audiogram files should be backed up regularly, onto your server if you have one, or otherwise onto another storage medium such as a floppy disk, USB flash drive or a rewriteable CD. You should create directories \AUDIO and \AUDIO\RESULTS on your backup medium, and regularly copy all audiograms from the RESULTS directory on your computer, into the RESULTS directory on your backup medium.

You may have very large numbers of employees being tested, possibly from different departments whose audiograms you may like to keep in separate directories, or you may have two or more ASRA audiometers and wish all of them to have access to all previous audiograms. In these circumstances, please refer to the later section marked [Directories](#) for Saving Audiogram Files, for further advice.

CATEGORISATION OF RESULTS

The ASRA program controls the acquisition of an audiogram, along with the employee's name etc., stores them in a disk file and displays them in the Results box on the audiogram screen and on the printout. It is therefore appropriate and easy that the program should also determine the Health and Safety Executive (H&SE) categorisations for the current audiogram, and display them in a similar way. The ASRA testing program uses the categorisation scheme which was introduced in the year 2006 by the H&SE, and this implementation is described here.

The H&SE have done extensive analyses of the prevalence of Industrial Hearing Loss and its relationship to the threshold levels in an employee's audiogram. Based on the results of these analyses, the H&SE have drawn up tables of threshold levels above which Warnings or Referrals should be made. These tables are used in the ASRA program. Referrals to a General Practitioner or to a hospital audiology clinic are made in cases of poor hearing, when the thresholds are above the levels indicated in the Referral tables. Warnings are given to the employee when the thresholds indicate mild hearing impairment, as indicated in the H&SE Warning tables. These levels indicate that the employee's hearing is not as good as might be expected at his/her age. The warnings state that greater care should be taken to use appropriate protective devices when working in a noisy environment.

The H&SE recommend that each audiogram should be put into one of four categories, based on the threshold levels in the audiogram, and the age and sex of the employee. The frequencies normally used for this assessment are 1, 2, 3, 4 and 6kHz. These recommendations are followed in the ASRA program, where the four categories, as they are described on the ASRA screen, are as follows.

1. HS&E conditions indicate Acceptable Hearing Ability

This message is displayed if the sum of the levels over the 5 frequencies is less than the Warning level.

2. WARNING - Mild Hearing Impairment

This message is displayed if the sum of the levels over the 5 frequencies is greater than or equal to the Warning level but less than the Referral level.

3. REFERRAL - Poor Hearing

This message is displayed if the sum of the levels over the 5 frequencies is greater than or equal to the Referral level.

4. REFERRAL – Rapid Hearing Loss

This message is displayed if the sum of the levels in the current audiogram, over frequencies 3, 4 and 6kHz, is more than (or equal to) 30dB worse than the sum of the levels in the previous audiogram which was taken for the same employee. If that previous audiogram was taken more than 3 years and 14 days before the current audiogram, then category 4 is never assigned. If a previous audiogram is not loaded or is not available, then category 4 is never assigned.

Only one category should be assigned for any one audiogram, and the higher numbers take priority over the lower numbers.

REFERRAL for Unilateral Hearing Loss

Unilateral hearing loss refers to a difference of more than 40dB in the sum of the hearing levels between the two ears, over the frequencies 1, 2, 3 and 4kHz. If this difference is found then the H&SE recommended procedures recommend that an additional note should be made, stating that Unilateral Hearing Loss has been identified and that Referral for further examination is recommended. The ASRA program displays a Note stating that Unilateral hearing Loss has been found.

The ASRA program may add two further notes, if they are appropriate. The justification for these additional notes will now be discussed.

Firstly, it should be noted that if category 4 is assigned then it takes priority. Even if the sum of the threshold levels over the group of 5 frequencies is above the Referral Level then category 3 is ignored because category 4 takes priority. However, in the ASRA program, if the sum of the 5 levels is above the Referral level,

then a Note is added to emphasise that there is Poor Hearing and category 3 applies, even if it is obscured by category 4 in the H&SE priority scheme.

Secondly, although the H&SE recommend the use of a period of not more than 3 years and a rise of 30dB in the sum of the hearing thresholds, as an indication of Rapid Hearing Loss, it is more relevant to calculate the actual rate of hearing depreciation for the time between the previous audiogram and the current audiogram, since in certain circumstances this time may be considerably shorter than 3 years. This could be difficult for the operator if the calculation has to be done manually, but with the thresholds stored as computer data, the calculation can be done in the computer program and is fast and trivial.

As an example, we would particularly instance the situation when an audiogram is taken and category 2 is assigned. In this situation the patient is not subject to Referral, but may reasonably be requested to return for a second audiogram after just one year. If the loss in hearing summed over the three frequencies, in the time between these two audiograms, is 27dB (corresponding to an average loss of 9 dB over the three frequencies), which is nearly but not quite at the level which would trigger category 4, then no assignment of category 4 would actually take place. However the rate of hearing loss summed over three frequencies, is 27dB in 1 year or 81dB in 3 years, and is clearly a serious loss which should be notified.

In the ASRA screen display and printout, a Note is therefore added if the **sum of the losses** over the frequencies 3, 4 and 6kHz, corresponds to a rate of loss greater than 30dB in 3 years. The Note states the measured **average** loss between the two audiograms over the three frequencies, and the time interval over which this loss has occurred. It also gives the **average loss over a 3 year period to which the measured loss is equivalent**. Averages are used at this point since they correspond directly to the separation of the two audiogram lines on the chart, for current and passive audiograms.

Although these two additional notes give very useful additional information, they may be eliminated from the computer screen display and the printout using a flag in the audw32.ini file (see [File Audw32.ini](#) below), if the user wishes only the results of the strict H&SE analysis.

Return to section [File audw32.ini](#)

For further guidance to the operator and as a further explanation to the employee, two dotted lines are drawn on each of the audiogram grids, both on the screen and on the printout. These indicate the approximate level for Referral and for Warning. The slope of these lines is very approximate and indicates the likely fall off at higher frequencies which often occurs with age. However it is important to emphasise that the calculations which lead to the categorisations, are based on the sum of the levels over 3 frequencies, and this level is indicated by the point on each line where there is a thin and short vertical marker line. Note that it is the sum of the 3 levels divided by 3 which is plotted i.e. the average level over the 3 frequencies. These points indicating the Referral and Warning levels are what is important, not the slope of the lines.

File AUDW32.INI

The file AUDW32.INI is loaded automatically when the program starts to run. It contains certain parameters which are set immediately after it is loaded. If this file is not found then the operator is warned of the fact, and the program sets default values for these parameters.

The format of the file AUDW32.INI is as follows:-

One line is used for each parameter but the order of the parameters is not important.

Each line starts with a text key, which describes that parameter. The exact form and letters in this text key must be left unchanged, since it is recognised by the audiometer program to identify the parameter.

The text key must contain no spaces and must be terminated by an '=' character. This '=' character must follow immediately after the text key.

All parameters (numbers or text) must follow immediately after the '=' character. Text parameters do not require to be enclosed within inverted commas, and the new line terminates the parameter string.

e.g. The following line selects serial port COM1:-

```
COMPort=1
```

The following line sets a tone length of 1 second (that is 1000 milliseconds):-

```
ToneLength=1000
```

The following lines both set the auto save directory to c:\audio\results

```
SaveDirectory=c:\audio\results
```

```
SaveDirectory="c:\audio\results"
```

If Category678=1, then the additional Notes referred to in the [Categories](#) section, are displayed on the screen or included in the printout. If Category678=0 then the additional notes are not displayed or printed.

The following is a listing of a possible AUDW32.INI file:-

[asra]

```
MaximumResponseTime=1200
```

```
ToneLength=1000
```

```
COMPort=1
```

```
FrequencyList=1
```

```
PulseOnOff=0
```

```
Categories678=1
```

```
Title1="ASRA AUDIOMETER" (This may have been edited by your supplier)
```

```
Title2="G M Instruments Ltd." (You may edit this to your own company name)
```

```
Title3="Unit 6, Ashgrove, Kilwinning KA13 6PU" (and to your company address)
```

```
SaveDirectory=c:\audio\results
```

```
PassiveDirectory=c:\audio\results
```

Return to [Categorisation of Results](#)

NORMAL OPERATION

The menu selections which are required to set the Save directory and to set the Passive directory (as described in the section “[INITIALISATION](#)”) should be made before the first test.

Underlined characters will activate the procedure when the menu containing them is visible. Keys on the right of some items are hot keys which will activate the procedure without going through the menu stage. A button bar is included, at the top of the screen. You may click on the buttons on this bar to activate some of the most commonly used functions in the operation of the audiometer. It should be noted that, in the normal sequence of operation for registering an employee’s details, taking his or her audiogram, and saving and printing the audiogram, these buttons would be pressed in order from left to right across the screen. However, depending on the particular procedures which you are using, you may chose to omit from this sequence certain items like AutoDetails.

These instructions assume that you are following the recommended procedures for the storage of batches of audiograms, namely -- store in one directory all the files from one company taken in the course of a testing program. If more than one Company is being tested, take a different directory for each company, even if more than one company is tested on the same day.

In the above, particular circumstances may make it desirable to modify the directory arrangement, e.g. you may replace the word “company” used above, with the words “department” or “branch” within a company, but this could be inconvenient if there is a transfer of employees between departments.

If you have doubts on the most convenient arrangement in your particular circumstances, please discuss the situation with your supplier.

INITIALISATION

File : Set Save Dir (Ctrl+D)

Select the directory into which you wish to save the current audiograms of employees whom you are about to test. This directory applies when you perform an automatic [Save](#) operation, which is the recommended way of using the system.

Passive : Set Passive Directory (Ctrl+S)

Select the directory where, on a previous occasion (say 1 to 3 years ago), you stored audiograms for the employees which you are now about to re-test. You will be able to use these audiograms to determine if the category 4 applies to each employee.

Alternatively, if the audiograms are stored in sub-directories and, in addition to that, you anticipate that there will be many audiograms which are missing from the previous year's tests, then a different procedure may be better. In this case it is likely to be more convenient to set the Passive Directory to the root directory of the company for which you are about to perform tests. Doing this will make it easier to access each sub-directory to find audiograms taken in all previous years.

Return to section [Normal Operation](#)

FOR EACH EMPLOYEE

The following menu selections should be made at the start of the test on each employee, to allow the test procedure to be performed satisfactorily:-

File : New (Ctrl+N) : <New> button on control bar

This menu item is used at the start of the test for each employee.

If there is already on the screen an audiogram which has not been saved to disk, then you will be asked if you wish to save it now. Unless the audiogram is simply a trial, then you will wish to save it now, in which case press 'y'. If you have previously saved the audiogram and this question is asked, then this indicates that you have made a further change in the audiogram since it was previously saved. In this case care must be taken, since the audiogram will be resaved in a **second file** which is automatically given a **different name**. The first file will not be overwritten. If you now wish to delete the earlier file version, then this cannot be done in the audiometer program. You must use the My Computer or Explorer facilities of the Windows system.

Next you will be shown a dialogue window for Employee Details. Fill in all the details -- using the TAB key to move from one entry to the next. The <ENTER> key terminates this dialogue, so do not press the <ENTER> key until you have completed all entries. If you make the mistake of pressing <ENTER> before you have completed the entries then you can re-enter the dialogue window by pressing the key combination Ctrl+E, or by using the menu selection Edit | [Employee Details](#).

When entering the employee's date of birth information, the year must be specified with 4 digits, e.g. 1958 is correct, and 58 is wrong. If the date is not entered as a 4 digit number then it will not be accepted by the program and the H&SE assessment will apply to a different age of employee.

Alternatively you can enter only the employee's I.D.Number, or any string which is included within the employee's name. These must of course be typed into the appropriate field in the dialog box. You may then exit from this routine and use the Auto Details menu item (F4) to automatically search old audiogram files for the appropriate Employee Details and copy them into the current audiogram. See the entry below on [Auto to Details](#).

Return to [File](#) menu.

F2 or Auto-Test : Run : <Run> button on control bar

Conduct a hearing test, on the left ear first, followed by the right ear.

F10 or Passive : Find and Open : <Passive> button on control bar

Load a previous audiogram, for comparison with the results of the current test. This will allow the program to analyse the possibility of the HSE Category 4 applying to this employee.

F5 or File : Print : <Print> button on control bar

Print the audiogram on the system printer. This printout will include passive audiograms which are displayed, employee details, and the HSE categorisation results.

F6 or File : Save : <Save> button on control bar

Save the current audiogram in the directory which was selected above in the Set Save Dir menu item, generating a filename automatically from the I.D.Number.

You will be offered a Recall Date which is based on the test result. Accept or amend this date and save the file by clicking on OK.

FILE MENU

New (Ctrl+N) : <New> button on control bar

Start a new audiogram with a new employee. The existing audiogram, passive audiograms, employee details, results and comments are all removed from the screen.

See the discussion in the section [For Each Employee](#) for further information on this item.

Open (Ctrl+O)

Open an existing audiogram file from disk. The ASRA programs can use the conventional windows dialogue box, to select drive, directory, file type, and filename. Of course this is not a normal operation in the sequence of conducting an audiometric test, but it is included for completeness since there are circumstances where it will be useful if the filename is known.

AutoOpen (Ctrl+U)

The purpose of this function is to ease the search for existing audiogram files which the operator wishes to load as active (current and editable) audiograms. For instance, subsequent to an audiogram being stored on disk, a doctor may wish to inspect the audiogram and edit the Recall Date without changing any other entries in the audiogram file.

This routine starts by clearing the existing audiogram if there is one, then displaying the [employee details](#) dialog box. Either the employee's I.D.Number or his/her name segment must be entered at this point. The term "name segment" is used here to mean a string of two or more consecutive letters from the employee's name as it is entered in the employee data. The program then searches for files with the suffix .dat and with this employee's I.D.Number or name segment, depending on which has been entered. It then offers to load each of the files as an active (editable) audiogram. This search is carried out in the AutoSave directory.

A message box is displayed when the program finds a .dat file which has the specified employee's I.D.Number or name segment. This message box shows the employee name, I.D.Number, date of birth and the audiogram date which are in this file. The message box gives the following options.

Yes button or key 'y', to load the file and then exit from the routine;

No button or key 'n', to not load the file but to continue the search for another .dat file with the specified employee's I.D.Number or name segment;

Cancel button or key Esc, to exit from the routine immediately, without searching for further files.

When AutoOpen is used, the filename is remembered by the program, so that a subsequent AutoSave can offer to save the audiogram etc. to the same file, even if the Recall Date has been edited. A new filename is generated if the threshold values are retested or changed and the new data is then saved into this new file.

Save As

Save the current audiogram to a disk file which will be named by the operator. The ASRA program uses the conventional windows dialogue box, to select drive, directory, file type and filename. Prior to saving, please be sure that the file name which you are using has the suffix .dat. Only audiometric files with the suffix .dat, can be processed by the audiometer testing and batch processing programs.

Of course this is not a normal operation in the sequence of conducting an audiometric test, but it is included for completeness since there are circumstances where it will be useful if a specific filename is required.

Set Save Dir (Ctrl+D)

Set the name of the directory which will be used in the AutoSave routine (the next item in this list). A conventional windows dialogue box will be offered to permit this selection. This directory is normally named in the audw32.ini file, but it can be subsequently changed using this function.

Save (F6) : <Save> button on control bar

Save the current audiogram in the directory which was selected using the Set Save Dir menu item (or in the audw32.in file). The filename will be generated automatically from the I.D.Number. This filename is generated from the I.D.Number with two further digits appended to it. In the first instance, the digits '00' are added to the end of this filename and the suffix .dat is also added. The directory is then examined to see if this filename already exists. If the filename does already exist, then the '00' characters at the end of the filename are replaced with '01' and the directory is re-examined to see if this filename already exists. If this filename

again does exist then the two characters '01' are replaced with '02', '03', etc. in turn until a filename is found which does not already exist. If filenames are found with all the numbers from '00' up to '99' then the system invites you to type a filename yourself.

When a file is loaded as an active audiogram and the Recall Date is changed, then the (automatic) save (F6) routine will offer to save the audiogram to the original file, providing that none of the audiogram thresholds or employee details are also changed.

Return to [Initial Setup](#).

Return to [Initialisation](#).

Return to [For Each Employee](#).

Print Audiogram (F5) : <Print> button on control bar

Print the current audiogram grid on the system printer. This printout will include passive audiograms which are displayed on the screen, employee details, and HSE categorisation results, and comments if they have been entered. (See Edit: [Comments](#)).

Return to [For Each Employee](#).

Print Letter (F8)

Print a letter file on the system printer. (See [Print Letter](#) section later in this document)

This is a text file which is prepared by the operator previous to the run of this program. The file is selected from within a dialog box. Indeed several letter files may be prepared and selected as required. Letters based on templates published by the H&SE are supplied with the software, i) for each of the four H&SE categories, plus ii) for Unilateral hearing loss, and for iii) GP referrals. These can be personalised by the user (or perhaps by your supplier), to fit your personal needs, and allow data from the audiogram screen to be merged with the text using special character combinations.

Information on the special character combinations which can be used within the letter file is included below.

(See [Print Letter](#) section)

Exit (Alt+F4)

Terminate the audiometer program and return to windows.

PASSIVE FILE OPERATIONS

Open

Present the normal windows dialogue box to allow the selection of drive, directory, file type and filename. The selected file is then loaded into the passive area in the program where it cannot be edited, but it is displayed on the audiogram grid so that the thresholds can be compared to the current audiogram. Of course this is not a normal operation in the sequence of conducting an audiometric test, but it is included for completeness since there are circumstances where it will be useful if the filename is known.

Set Passive Directory (Ctrl+S)

Present the normal windows dialogue box to allow the selection of drive and directory. This drive and directory are subsequently used for the selection of files which are offered for loading as passive audiograms. It should be either the directory which contains the files which were taken previously for the employees which are about to be re-tested, or it should be the root directory for the company whose employees you are about to test. This directory is normally set in the audw32.in file, but it may be changed using this function.

Find and Open (F10) : <Passive> button on control bar

A search is made of the Set Passive Directory (i.e. the directory which has been selected because it has the files taken previously for the employees which are about to be re-tested). This search looks for files which contain the same I.D.Number as the current audiogram. Only audiograms whose dates are prior to the date of the Current Audiogram, are offered as Passive Audiograms. Note that this means that if two audiograms are taken on the same day and one is loaded as the Current Audiogram, then the other will not be loaded as a Passive Audiogram, since it has the same date.

A key is displayed at the top of the screen, showing i) a backslash in the same colour as the corresponding passive audiogram on the audiogram grid, and ii) the date of that audiogram. The audiograms are numbered in this key from 1 upwards to a maximum of 10, and the audiograms are arranged in date order within this key, with the most recent on the left up to the oldest on the right. In order to preserve this order, when a further audiogram is accepted for loading, it is inserted in the key in the correct position for its date, and the audiograms on its right in the key are moved along, renumbered and re-coloured in the key and on the audiogram display. If more than 10 audiograms are accepted for loading, then the most recent 10 are selected and the oldest one is removed from the display.

Two other operations take place while this function is running:-

1. Passive Audiogram 1 (i.e. the most recent Passive Audiogram) is used in the calculation of the H&SE assessment, for the determination of the presence of category 4.
2. The date of the most recent Passive Audiogram is displayed as the passive audiogram date in the Employee Details box.

Note that it is possible to delete one or more passive audiograms from computer memory and from the display. See [Delete Passive](#) in the Edit section. So if you wish to use an audiogram which is not the most recent, for comparison with the current audiogram to determine if category 4 is present, then the more recent audiograms can be deleted, leaving the required passive audiogram as the most recent in memory and in the display.

Return to [Initial Setup](#).

Return to [For Each Employee](#).

NOTE

Having completed the search in one directory, the program then offers to continue searching in another directory. If you select to do so then a FileOpen Dialogue box is displayed to allow you to select the directory you wish to use. The program is arranged so that, each time this FileOpen Dialogue box is displayed, it offers by default the Set Passive Directory. This is done so that, if each company has a root directory and the audiograms are stored in sub-directories, then each sub-directory will be accessed in turn with just one mouse click and the minimum of manoeuvring within the directory structure.

Return to [Edit](#)

AUTO-TEST

Run (F2) : <Run> button on control bar

Run a hearing test on the current employee, following the order of ears and the list of frequencies which have been set in the options menu. The default order is the left ear first, followed by the right ear. The default list of frequencies is 1kHz, 2kHz, 3kHz, 4kHz, 6kHz, 8kHz, 0.5kHz in that order. On the left ear only, whether it is the first or second ear to be tested, the 1kHz test is then repeated. If the level is the same as what was found on the first test then that threshold level is accepted as the true level for 1kHz and the testing proceeds onto the second ear. However, if the level is not the same as what was found on the first test then the second result is accepted as the true level for that frequency and the test proceeds to the 2kHz test on the left ear. If the level on 2kHz is the same as, or lies within 10dB of what was found previously for the 2kHz frequency, the testing proceeds onto the second ear. However if on 2kHz, the level is 10dB or more different from the previous test, then the operator is asked if he/she wishes to accept this new level and to proceed to test the other frequencies on that ear, since the results obtained so far seem to be inconsistent. If this suggestion is not accepted then the system proceeds directly to test the second ear.

Five of these frequencies (not including 0.5kHz and 8kHz) are used to calculate the Health and Safety Executive categories.

Return to [For Each Employee](#).

Right Ear

Run a hearing test on the current employee on the right ear only.

Left Ear

Run a hearing test on the current employee on the left ear only.

Single Freq (Ctrl+F) : <Single> button on control bar

A dialogue box is presented to allow selection of the left or right ear, and the selection of any one of the 12 frequencies available in the system.

When the OK button is pressed the program proceeds to a standard hearing threshold test on the selected ear and the selected frequency.

At the end of the test, the previous threshold on this ear and frequency (if there is one) is still presented as an X or O, while the new threshold is presented as a diamond (if these two thresholds are the same then one may obscure the other). A dialogue box is presented to invite the operator to accept the new threshold value, or reject it in favour of the previous value. Whichever is accepted is now plotted as an X or O with appropriate lines joining it to adjacent thresholds, and the rejected threshold is deleted.

Note

The following facility is available during the above four tests:-

If the employee being tested holds the Response Button pressed for an excessively long time, then a dialogue box appears on the screen and testing operations are paused. The message in the dialogue box requests the operator to tell the employee being tested to Release the Response Button.

If the operator then presses the Yes button within the Message Box, the test will resume and continue normally.

If the operator presses the No button then the test on the current ear will be aborted. This would be desirable, for instance, if the employee repeatedly held the Response Button pressed for too long after subsequent tone presentations and the operator therefore decided to terminate the test.

The Response Button may be replicated by a further connection to your audiometer. The purpose of this is to allow the operator to act on spoken responses from the employee being tested, or more likely to allow the operator to terminate the test, as described above, without reference to the employee who would be handling the Response Button.

Talk Right (F7)

Talk to the employee from a microphone to the right earphone. Within this facility the sound level of the speech can be increased in 5dB steps by pressing the 'y' key or pressing the mouse button when the arrow is on the Yes button. Similarly the sound level of the speech can be decreased in 5dB steps by pressing the 'n'

key or pressing the mouse button when the arrow is on the No button. The ESCAPE key or pressing the mouse button when the arrow is on the Cancel button, will exit from this facility.

Talk Left

Talk to the employee from a microphone to the left earphone. See the previous item for a description of the facilities for increasing and decreasing the sound level and for exiting from this facility.

EDIT

Employee Details (Ctrl+E)

Edit the employee details for the current test.

Fill in all the details -- using the TAB key to move from one entry to the next. The <ENTER> key terminates this dialogue, so do not press the <ENTER> key until you have completed all entries. If you make the mistake of pressing <ENTER> before you have completed the entries then re-enter the dialogue window as described at the top of this section, and complete the employee details.

When entering the employee's date of birth information, be sure to specify the year with 4 digits e.g. 1958 is correct, and 58 is wrong. If the date is not entered as a 4 digit number then it will not be accepted by the program and the H&SE assessment will apply to an employee of a different age.

Return to the section [Initialisation](#).

Return to section [File Menu](#).

Auto Details (F4) : <AutoDetails> button on control bar

When a New Audiogram has been selected in the File menu, the I.D.Number can be entered for the patient who is about to be tested, as described above. Alternatively a string may be entered in the Employee Name field, where this string is included somewhere in the employee name, which has been entered in a previous audiogram file. After exiting from the New routine, select this item. The program then searches the Set Passive Directory (i.e. the directory which has been selected because it has the files taken previously for the employees which are about to be re-tested). This search looks for files which contain the same I.D.Number or the same partial Employee Name string, which was entered as described above in the File New section.

A dialog box will display the Employee Details for each of the .dat files in this directory, which contain the I.D.Number or Name string, and will offer the option to load all of these details into the Employee Details field in the current audiogram. If the details are loaded then they will be displayed in the Details box on the screen.

See the Note at the end of the section marked "[Passive File Operations](#)". The facility noted there, is available here also.

Return to the section on [For Each Employee](#).

Return to the section [Initialisation](#)

Comments (Ctrl+C)

Fill in any comments which you wish on the current test or the current employee. The <ENTER> key terminates this dialogue, so do not press the <ENTER> key until you have completed the comments. If you make the mistake of pressing <ENTER> before you have completed the comments then re-enter the Comments dialogue box as above and complete your comments.

Return to [Print Audiogram](#) in File MenuSection.

Recall Date (Ctrl+R)

The Recall Date defaults to a date which is 3 years after the date of the current test for category 1 audiograms. It defaults to 2 years after the date of the current test for category 2 audiograms. Finally it defaults to 1 year after the date of the current test for category 3 or 4 audiograms. The operator may press buttons on the screen to override these defaults with a date which is 3 months, 6 months, 1 year, 2 years or 3 years from the date of the current test. It is also possible to type any other date, provided the format of the date is preserved.

When an existing file is loaded as an active (editable) audiogram, the Recall Date, which is displayed in the Recall Dialogue Box, is calculated from the existing audiogram date, not from the current computer date. So if the file is loaded, for inspection purposes, some time (e.g. months) after the audiogram was performed, then the Recall Date is calculated correctly from the audiogram date.

Delete Audio (DEL)

Delete the current audiogram.

Delete Passive

A dialog box is shown, asking if you wish to delete all passive audiograms. If you answer 'yes', then all pas-

sive audiograms are removed from the memory and from the display.

If you answer 'no', then another dialog box is shown repeatedly, asking if you wish to delete audiogram 1, then audiogram 2 etc., up to the maximum number of audiograms which are displayed. Each time this dialog box is shown, you may answer i) 'yes' to mark this audiogram for removal; ii) 'no' to pass immediately to the next audiogram without marking the currently displayed one for removal; iii) 'esc' to exit from this routine without marking the currently displayed one for removal. When you exit from this routine, either by pressing 'esc' or by coming to the end of the list of displayed passive audiograms, then the selected audiograms are removed from the memory, from the display and from the key at the top of the screen. The Passive Audiograms which are not deleted, remain in date order.

Return to [Passive File Operations](#) .

Update Categories

Re-calculate the HSE categorisation and display the new results in the results box.

Note that this operation is performed automatically at the end of all the automatic threshold tests which are described above, so this function will not normally be used.

VIEW

Result

Toggle between viewing and not viewing the results box.

Details

Toggle between viewing and not viewing the employee details box.

Current Audiogram

Toggle between viewing and not viewing the current audiogram.

Passive Audiograms (F9)

Toggle between viewing and not viewing the passive audiograms which have been loaded into the program.

MANUAL

In manual mode, the operator receives very little help from the software, and has complete responsibility for the test procedure.

Since the presentation of a tone over 100dB can be very uncomfortable for a subject with near normal hearing, and may even be damaging to the ear, a message box is displayed when a tone over 100dB is requested, asking if tones over the 100dB limit should be allowed. The operator must either say 'no' to indicate that tones over 100dB are not allowed or say 'yes' in which case the operator takes the responsibility for the subject's comfort and safety. This message box will also be displayed when a request is made for a tone presentation at a hearing level which is above the level which the audiometer is capable of generating – which might happen on very low or very high frequencies. The response here will initialise an overlimit flag to record that the threshold level which is recorded, may be the limit of the audiometer's capability rather than the true threshold of the employee. This situation is indicated on the audiogram grid, by drawing from the point an arrow pointing down diagonally. We will call this arrow the overpower flag.

Define the limit L on any frequency as the lower of:-

1. the 100/120dB level, whichever is selected, and
2. the maximum which the audiometer can generate on that frequency.

We must now consider four situations:-

- i) When the operator requests the plotting of a point which is below the level L, the overpower flag is never plotted.
- ii) When the operator requests the plotting of a point which is on level L, a message box is displayed asking if the operator wishes the overpower flag to be plotted.
- iii) When the operator requests the plotting of a point which is above level L, the overpower flag is always plotted.
- iv) Now consider the situation where the operator requests the plotting of a point which is at or above L, or is at or above 100dB, and no tone presentation above 100dB or above the maximum which the audiometer can generate, has previously been requested. In these cases the overlimit flag will not have been previously initialised, so the conditions ii) and iii) above cannot be recognised. In this situation, a message box is always displayed, to ask if the overpower flag is to be plotted.

The selection of the 100/120dB limit can be cancelled simply by moving the cursor onto the other ear, and if necessary then moving it back to the original ear.

Go Manual (F3)

Enable the manual mode operations, and disable the automatic threshold test operations Run, LeftEar, RightEar and Auto (single freq). Put a test point indicator on the screen at 40dB, 1kHz on the left ear, to indicate the default parameters which will be used when a tone presentation is requested.

Exit Manual (Ctrl+X)

Remove the test point indicator from the screen and disable all the operations within manual mode. Enable the automatic threshold test operations Run, LeftEar, RightEar and Auto (single freq).

Plot Point (Ctrl+P)

According as the test point indicator is on the left ear or the right ear, plot an X or an O at the position of the test point indicator, and draw joining lines to adjacent thresholds as appropriate. The overpower flag may also be plotted as described at the beginning of this section.

Incr hl (Down Arrow)

Increase the position of the test point indicator by 5dB.

Degr hl (Up Arrow)

Decrease the position of the test point indicator by 5dB.

Incr freq (Right Arrow)

Increase the position of the test point indicator to the next higher frequency. If the indicator was on the right ear and the previous frequency was 12kHz, then move the indicator to 125Hz on the left ear, and clear the

overlimit flag.

Decr freq (Left Arrow)

Decrease the position of the test point indicator to the next lower frequency. If the indicator was on the left ear and the previous frequency was 125Hz, then move the indicator to 12kHz on the right ear, and clear the overlimit flag.

Generate Tone (space)

Present a tone at the hearing level and frequency of the test point indicator, on the selected ear. The length of the tone is as set in the options menu. Pulsed tones may also be selected in the options menu.

If the level requested was above 100dB or above the level which the audiometer can generate on that frequency, then a message box is displayed asking if the operator wishes to allow tones above 100dB.

OPTIONS

Test Settings

Select to test the left ear followed by the right ear, or the right ear followed by the left ear. This selection applies when the Run command is subsequently selected. The default is left ear followed by right ear.

Set the Wait time on the slider. The Wait time is the maximum time the system will wait for a response, timed from the start of the tone. The default value is 1.2 seconds.

Set the Tone length, which is the time for which the tone is presented. The default Tone length is 1.0 second.

Select the mode where the tone is continuous during the time of the tone length, or the mode where a sequence of short tone pulses is generated during the time of the tone length.

Frequencies

Select the list of frequencies which are to be tested. The system works through the frequencies in the list which is selected, in the order in which they appear in the list. The presently available lists are:-

1. 1, 2, 3, 4, 6, 8, 0.5, 1*,2** kHz
2. 1, 2, 3, 4, 6, 8, 0.5, 0.25 kHz
3. 1, 1.5, 2, 3, 4, 6, 8, 12, 0.75, 0.5, 0.25, 0.125 kHz
4. 1, 2, 3 kHz

*The 1kHz frequency is repeated on the left ear, to check for consistency in the employee's response.

** The 2kHz frequency may be repeated on the left ear, if there is not exact agreement between the two tests at 1kHz.

The HSE categories are calculated on the basis of the frequencies which are in list 1 (excluding 0.5kHz and 8kHz), which is therefore the favoured list to be used.

Ports

Select the serial (COMm) port which is to be used for communication with the audiometer.

PRINT LETTER (F8)

Print a Letter File on the system printer. The Letter File can contain certain codes which allow information about the current employee and the current audiogram to be included in the printout. This information is read from the current audiogram. The Letter File should be a simple text file of ASCII characters, such as can be prepared on the windows utility NOTEPAD. The file must not be a formatted word processor file. It could be prepared on a word processor, but then must be stored on disk as a text file. Apart from the special codes noted below, the file is printed “as is”, with all characters, spaces and new lines transferred directly to the printer.

When the program detects a back slash character ‘\’ in the file, this character is never printed by the program. The program immediately reads the following character, which is again not printed but is used as a code to select a string from the audiogram file. This string is then printed at the current cursor position in the letter printout. The following sequences are recognised and printed. The strings will either have been entered as ‘employee details’ before the current test or they will have been determined from the thresholds obtained in the current test.

- \m :the employee’s name;
- \w :the employee’s I.D.Number;
- \b :the employee’s date of birth;
- \a :the date of the current audiogram i.e. today’s date if you are printing immediately following the test;
- \r :the recall date - which must be set either by calling the save function prior to printing a letter, or by directly calling Edit | Recall Date (ctrl+R) prior to printing a letter;
- \d :the date on which the letter was printed (which can be later than the date of the audiogram);
- \h :the word “she” if the sex of the employee was female, and the word “he” if the sex of the employee was male or undefined;
- \H :the word “She” if the sex of the employee was female, and the word “He” if the sex of the employee was male or undefined;
- \s :the word “her” if the sex of the employee was female, and the word “his” if the sex of the employee was male or undefined;
- \S :the word “Her” if the sex of the employee was female, and the word “His” if the sex of the employee was male or undefined;
- \t :the name entered in the “tester” box of the audiogram – which may be used for the signature on the letter;
- \c :the H&SE categorisation of the audiogram.

The user may edit the letter files supplied with the software (cat1.txt, cat2.txt, cat3.txt, cat4.txt, unilat.txt and gpref.txt) to suite their needs. Particular note should be made of the following points when editing:-

When one of the above code sequences is detected, it is replaced by a string which may be significantly longer than the code itself, and may result in the line extending beyond the full width of the paper. This is important in all cases, but is particularly important in the case of the employee’s name, which can extend to over 20 characters. It is of even greater importance in the case of H&SE categorisations where the insert may extend to a significant part of a line of output. It is therefore strongly recommended that the \c code should only be used at or near the beginning of a line, and should not be followed by further words on the same line unless the total space required for these words is very small.

Return to [Print Letter](#) in File Menu section.

ERROR MESSAGES and PROBLEM SOLVING

In the event of a problem arising when running ASRA, a dialog box will show on the screen in which advice on the problem will appear.

The most commonly encountered messages are:-

Problem messages and Reasons

Unable to open serial port

The Serial cable is connected to a port which is either not physically present on the PC, or to one which has already had a driver loaded to it (such as a mouse driver).

Screen shows correctly but sound output is incorrect

If the unit appears to work but does not change the frequency or intensity in the earphones (screen might look OK), then the serial cable may be in an active COM port, but not the one specified in options/ports. Alternatively the serial cable may be disconnected from the PC or the ASRA. The best way of checking this is to select manual mode, create a tone by tapping the space bar once, and then check if the light marked "Tone on" on the front of the ASRA box illuminates. It should do so each time a tone is generated. If this functions normally then the PC/ASRA link is intact.

Dialogue box with the message, "Tell patient to release response button"

The subject has pressed the response button and has held it down instead of releasing it promptly. In this circumstance, the program pauses and waits, then after a few seconds it displays the above message.

Re-instruct the subject, then press the 'y' key or click on the "yes" button to continue the test.

Tone levels rise to 100dB although patient seems to be responding.

Tones can rise to high levels if :-

a) the patient fails to respond while the tone is sounding

Please ensure that the patient understands that they must press the button as soon as they hear the tone and while it is still sounding. If they press before the tone sounds or after it stops sounding, the system reasons that they have not responded to the tone and may be pressing randomly. It therefore rejects the response.

This will result in a higher level tone sounding at the next tone presentation. If they find difficulty in doing so in the time allowed, then the tone response time can be increased (see OPTIONS | TEST SETTINGS).

b) the response button or its connection to ASRA is faulty. The light marked "Response" on the front panel of ASRA should illuminate every time the response button is pressed, and can be simply checked without having to generate a tone first, by pressing and releasing the button a few times. If the light does illuminate each time, the physical connection between the response button and ASRA is intact, and the button works.

c) the tones are not reaching the earphones.

See the section above on "Sound output is incorrect".

FURTHER INFORMATION ON DIRECTORIES FOR AUDIOGRAM FILES

As described in the section Initial Setup, the system is normally set up with the executable audiometer files in directory C:\AUDIO, and a directory C:\AUDIO\RESULTS is created for storage of all audiogram files. Further, within the AUDW32.INI file, the following two entries are made

SaveDirectory=c:\audio\results

PassiveDirectory=c:\audio\results

in order to ensure that the <results> directory is used for the normal storage and retrieval of audiogram files. Where there are large numbers of employees being tested, other arrangements may be more appropriate.

One computer is used to test several departments and it is desired to keep audiograms for each department in a separate directory

Let us suppose that you would like to keep audiograms from

- a) Managers
- b) Secretaries
- c) Machinists
- d) others

all in separate directories. This can often be very helpful, provided there is not regular transfer of employees between these different groupings. We will create these four directories as sub-directories of C:\AUDIO, and we will delete the directory C:\AUDIO\RESULTS although you would not do this last step if there were files still left in that directory.

1. Click on My Computer | C: | AUDIO, then click on the File Menu, then New | Folder and type the name Managers as the name of this folder or directory.
2. Repeat step 1 three times, typing the names Secretaries, Machinists and others.
3. If you have already stored files in the directory RESULTS, then you may choose to move these files into one or more of the directories which you have just created.
4. If you have no files left in the directory RESULTS, then you may choose to delete this directory by selecting My Computer | C: | AUDIO | RESULTS, then selecting the File Menu, then clicking Delete to remove the directory RESULTS.

Now edit the .INI file, removing the \RESULTS from the SaveDirectory and PassiveDirectory entries. So these entries should now read:-

SaveDirectory=c:\audio

PassiveDirectory=c:\audio

When the audiometer program is started, before any audiometric testing is done,

1. Select the menu item File | Set Save Directory, or press ctrl+D, and then, in the dialog box which appears, select the appropriate sub-directory for the employee(s) which you are about to test.
2. Select the menu item Passive | Set Passive Directory, or press ctrl+S, and then in the dialog box which appears select the appropriate sub-directory for the employee(s) which you are about to test.

If an employee from a different department is subsequently to be tested, then steps 1 and 2 above must be repeated.

The above directory structure should be implemented on the back-up medium as well, so that audiograms can be kept in good order.

Two or more Computers for Audiometric Tests with a File Server for File Storage

The procedure is essentially the same as in the previous section. However, if there are several computers in use for testing then only the file server can be certain to have all the previous audiograms. Further, it is important to prevent duplicate file names being generated in the automatic naming of files when saving audiograms to disk. To do this you should ensure that the computer which is to be used for the testing, has all the files from the directory of the server which is to be used for the new audiograms. We therefore strongly recommend the following procedure.

1. Before starting a testing session, all files should be copied from the appropriate directories on the server, to the directories of the same names on the computer which is to be used for testing and saving new audiograms. Of course the appropriate directories referred to above are the ones into which you will be saving audiograms.

2. At the end of a testing session, all audiogram files which have been stored on the hard disk of the computer, should be copied into the directories with the same names on the server. This will be done most easily and rapidly by copying ALL audiogram files from the directory which you have used on the hard disk of the computer, to directories of the same names on the server.

If this procedure is not adhered to rigorously, then it is possible that another computer, at a later date, may copy audiogram files from the same directories of the server without including files which have not been copied onto the server from the first computer.

Using this procedure rigorously will avoid problems which would occur if an employee had been tested on one computer, and was then tested on a different computer at a later date.

It is possible to semi-automate the file transfer process described above. Your supplier can provide a program which has been written to make the above procedure very simple for those who are not familiar with handling directories. Please speak to your IT department or audiometer supplier to seek guidance and help. Return to [Initial Setup](#).

Two final points, concerning the locating of previously acquired audiograms which are to be used as passive audiograms for the determination of category 4.

1. If a very small number of employees are transferred to other departments, then there are two alternative ways to handle their audiogram files:-
 - i) The passive directory may be changed when they are about to be tested, and changed back after the test is completed;
 - ii) Their files may be transferred from the directory of their old department to the directory of their new department. Care must be taken that there are no files already on the destination directory which have the same names as files which are about to be transferred, but this should not happen if the automatic file-naming routine has been used, since these filenames are generated from the ID Numbers which should be unique to each employee.
2. If significant numbers of employees are transferred to other departments, then the above procedure may be too long and tedious. In that case it is best to put all employees in the same directory, which would most conveniently be the directory C:\audio\results

Asra Audiometer

Batch Processing Program

Help File

Version 3.2

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INTRODUCTION

The program audprw32.exe is provided to support processing of batches of audiograms. It is anticipated that it will normally be used at the end of a period of audiometric testing, to perform certain operations on all the audiograms which were taken during that period.

The normal input to the batch program is a group of audiograms from separate files with suffix .dat. The program can then perform the following operations on these audiograms:-

1. It can generate a single [Composite File](#) which contains all the audiograms which were within the batch read by the program;
2. It can [print](#) on the system printer all the audiograms which were within the batch read by the program;
3. It can generate a [Word Data File](#) suitable for use as a WORD (wordprocessor) mail merge data file. This data file has the normal format of a Mail Merge data file, and includes a header line to define fields within each record and a line of field entries for each audiogram which was within the batch read by the program;
4. It can generate a [List File](#) which contains one line of certain information on each audiogram which is within the batch read by the program. This List File is intended for generating a list of employees due for recall and retest, although many other uses are possible;
5. It can generate [Statistical Information](#) on the Health and Safety Executive categories of the audiograms which were within the batch read by the program.
6. It can perform [Trend Analysis](#), determining the change of average thresholds on selected frequencies between the Current Audiogram and the Previous Audiogram.

The above 6 functions can be applied in diverse ways, to allow other functionality in the operations. For instance, the Word mail merge facility can be applied to generate letters which are to be forwarded to G.Ps. informing them of the results of the audiometric test on patients whose HSE category indicates that further medical investigation is desirable. Also the List File facility can be applied to the generation of lists of patients due for recall, on the basis of the date of their previous audiogram and of the HSE categorisation in the previous test.

The statistical information is always evaluated, but the other functions may be enabled or disabled in any grouping.

It was stated above that the input was a batch of audiograms from separate files with suffix .dat. However, once one or more composite files have been generated (see item 1 above) these composite files, if they have suffix .dat, can themselves be used as input files for later runs of the program.

The input files of Current Audiograms are read from a single directory which can be defined by the operator. Selection of audiograms is made on the basis that the file is in the selected directory, the category of the audiogram is among those preselected by the operator, and the audiogram date (or recall date) is within the range set by the operator. The input files of Previous Audiograms (used for determining the possible presence of HSE category 4) are read from a single directory which is again defined by the operator. This directory may be the same as the directory for Current Audiograms or it may be any other directory. Selection of audiograms is made on the basis that the file is in the selected Previous Directory and the I.D.Number, which is stored within the audiogram, is the same as the I.D.Number of the Current Audiogram. The file selected as the Previous Audiogram must be older than the Current Audiogram; however, if more than one audiogram satisfies all the selected criteria then the most recent of the older audiograms is selected as the Previous Audiogram.

Further, the directory and filenames of the output Composite file, the WORD data file and the List file may be set by the operator. Alternatively, where it has been stated that certain items can be defined by the operator, default values are read from the AUDPRW32.INI file, and the operator may therefore edit the file AUDPRW32.INI to change these defaults.

A button bar is included, at the top of the screen. The buttons on this bar may be pressed to activate the functions normally used to set up and run this program. It should be noted that, in the normal sequence of operations for setting up and running the program, these buttons would be pressed in order from left to right across the screen. Of course the last two buttons on the right would be omitted if you do not wish to view statistical information.

Further information may be obtained by contacting:-

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NORMAL OPERATION

The normal sequence of operations when running this program, is as follows. The settings which are referred to below, all have default values which are set in the AUDPRW32.INI file which is read automatically at the start of each run of the program:-

1. Select Options | Options, or

Press function key F3, or

<Functions & Categories> button on control bar.

Select the operations which you wish to perform in the current run.

Select also the categories which you wish included in the selection. The 4 HSE categories plus the Unilateral Loss (labelled U) are always available for selection, but the way in which the system displays the Categories and Unilateral Loss in the Statistical Summary, can be altered by the value of the parameter Statistics in the AUDPRW32.INI file. See the section on [Statistics](#) for a full discussion of this point.

Also the system may or may not give additional information about Categories, on the Audiogram printout, depending on the value of the parameter Category678 in the AUDPRW32.INI file. Further information on this item is given in the help file for the AUDW32.EXE program. Please consult your supplier, or GM Instruments, if you wish further information on this additional facility.

2. Select Options | Set Directories and Data, or

Press function key F4, or

<Directories & Dates> button on control bar.

Select the directory from which you wish to read the Current Audiograms. This may be done by typing the directory path and name in the box provided, or by pressing the Browse button to the right of this box and then selecting drive and directory from the dialogue boxes which appear.

Similarly select the directory from which you wish to read the Previous Audiograms. As above, this may be done by typing the path and directory in the box provided, or by pressing the Browse button to the right of this box and then selecting drive and directory from the dialogue boxes which appear.

Select the earliest date in the date range which you wish to include in the batch. This entry defaults to today's date, and it may be altered by typing the date in the box provided, or by pressing the '-' button which is to the right of this box. This button decrements the date by 1 each time it is pressed.

Subsequently it may be appropriate to press the '+' button to the right to increase the date by one, or to press the 'today' button to return to today's date. Note that if you type the date yourself, then it is essential to maintain the format dd/mm/yyyy which was presented initially. If you press the '+' '-' or 'today' buttons then this format will be maintained automatically.

In the same way, set the latest date in the date range which you wish to include in the batch.

Both audiograms with the earliest date and audiograms with the latest date will be included in the batch, along with audiograms with all intervening dates. If the earliest date and the latest date are the same, then only audiograms with that date will be included in the batch. If the latest date is prior to the earliest date, then no audiograms will be processed.

Select whether this date range will be applied to the Audiogram Date, or to the Recall Dates which is within each of the audiograms.

If a printout of all audiograms was requested, then select either 'automatic' to allow all audiograms to be printed without further prompting from the operator, or select 'single' to pause before each printout is started, and give the operator the opportunity to cancel the printout of that audiogram. These buttons apply only to the printout of the audiograms.

Return to [Introduction](#).

3. If generation of a WORD data file was selected in item 1 above, then

Select Options | Word Filename or

Press function key F5

and type the directory and name of the Word data file in the box provided. It is recommended that you give this file the suffix .txt. If the file already exists in the specified directory, then you will be prompted with the question "Do you wish to add this data to the specified file?" If you answer 'yes' then it will proceed to do so, and if you answer 'no' then you will be asked if you wish to overwrite the file contents. If you answer 'yes' then it will proceed to do so and then write the new data to this

file, and if you answer 'no' then the WORD data file will not include data on the audiograms being currently processed.

4. If generation of a List file was selected in item 1 above, then

Select Options | List File or

Press function key F10

and type the directory and name of the List file in the box provided. It is recommended that you give this file the suffix .txt. If the file already exists in the specified directory, then you will be prompted with the question "Do you wish to add this data to the specified file?" If you answer 'yes' then it will proceed to do so, and if you answer 'no' then you will be asked if you wish to overwrite the file contents. If you answer 'yes' then it will proceed to do so and then write the new data to this file, and if you answer 'no' then the List file will not include data on the audiograms being currently processed.

5. If generation of a composite file was selected in item 1 above, then

Select Options | Composite Filename or

Press function key F6

and type the directory and name of the composite file in the box provided. It is recommended that you give this file the suffix .dat, so that it can subsequently be read as an input file to this program. If the file already exists in the specified directory, then you will be prompted with the question "Do you wish to add this data to the specified file?" If you answer 'yes' then it will proceed to do so, and if you answer 'no' then the composite file will not include data on the audiograms being currently processed. You will not be given the option to overwrite the data in the composite file -- if you wish to do so, then you must delete the file using My Computer or Explorer, or you must load the file into a text editor and delete its contents.

6. **Select Run | Go or**

Press F2 or

<Run> button on control bar.

to run the program on the selected information described above.

7. **Select Statistics | Display Statistics or**

Press function key F8 or

<Display Statistics> button on control bar.

to display the statistics of the categorisations of the batch of audiograms which you have just processed.

8. **Select Statistics | Print Statistics or**

Press function key F7 or

<Print Statistics> button on control bar.

to print the above statistical data on the system printer.

These statistical facilities (7 and 8) show the number of times each category occurs in the batch just processed. It also shows the total number of Current Audiograms processed and the number of these audiograms for which at least one Previous Audiogram was found in the specified directory. Note that the numbers in categories 1 to 4 should add to give the total number of audiograms, since every audiogram will have one category in the range 1 to 4, but in certain circumstances the Unilateral Loss (labelled U) may also be flagged. See the section on [Statistics](#) for a fuller discussion of this point.

Within square brackets is shown the percentage of the total number of audiograms within which each category is present. This is normally obtained by dividing the actual number in each category by the total number of audiograms. However in the case of category 4, the divisor is the total number of audiograms for which a Previous Audiogram was found -- since it is impossible for the system to assign category 4 to an audiogram for which there is no Previous Audiogram.

9. After a first run has been completed, it is then possible to process a second batch of audiograms. These may be from a different Current Directory and/or Previous Directory, and/or from a different date range, or Audiogram Date / Recall Date. Data may be added to the previously defined Word data file, List file and Composite file, or new file names and/or directories may be specified before selecting the Run. When the run on this second batch of audiograms is started, you will be asked if you wish to delete the previous statistical results. If you answer 'yes' then the statistical information will be reset to zero before the run, but if you say 'no' then the new statistical data will be added to the previous data, to give the overall statistical distribution of the combined results.

TRENDS

When TRENDS are selected in the Options|Options dialog box, every audiogram which falls within the selection criteria, is displayed on the screen, and a dialog box is displayed with the results of the Trends Analysis

For Trends Analysis to be performed satisfactorily, category 4 must also be selected in the Options|Options dialog box. If category 4 is not selected, then a dialog box appears to warn the operator of this fact and to give the opportunity to enable category 4 temporarily at this point. Category 4 is however restored to its original state at the end of the current run.

Trends Analysis is performed on the thresholds on frequencies 3, 4 and 6kHz.

The display in the Trends dialog box shows:-

1. The average threshold on the right ear and on the left ear;
2. The shift in these average thresholds between the Previous Audiogram and the Current Audiogram.

These values are however scaled to a period of 1 year, i.e. the figures displayed are the calculated differences in average thresholds divided by the number of days between the Previous Audiogram and the Current Audiogram, and multiplied by 365. If the calculated and scaled shift is greater than 140dB or less than -140dB, then the display shows >140 or <-140 respectively.

Negative values of the shift indicate that the average threshold has improved since the Previous Audiogram.

If Trends and List File are both selected, then a dialogue box appears asking if you wish to include the Trend results in the List File. If the response is “yes”, then an additional column with the Trend results is written into the List File; but if category 4 was not enabled either in the Options|Options dialog box or later when the omission was pointed out, the Trends are not entered into the List File. If the Options are all properly set up then the figures for the shift of average threshold on right and left ears are included in the List File entry for each employee who has a Previous Audiogram.

Using the values of threshold shifts in the Trends dialog box or in the List File, it is possible to plot a distribution of the shifts for any group of employees, over a company or over a department. This distribution may be of interest to company managers.

A threshold shift of around 1 dB per year may occur due to age related factors, but a shift of more than 1dB may indicate a need for greater awareness of noise damage and a tightening of the related working practices.

It should be noted that the Trends Analysis is somewhat similar to the Note on rate of hearing loss which is given in the Results box and the printout, when the rate of loss is greater than 10dB in 3 years, averaged over 3, 4 & 6kHz. The Trends Analysis is given for all employees in the selected group.

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FILE MENU

Printer Setup

Sets up the parameters for the printer.

Exit, or

ALT + F4

Terminates the current run of the program

OPTIONS MENU -- Options F3

This function may also be accessed using

<Functions & Categories> button on control bar

The functions which will be performed during the subsequent run of the program, must be marked with an 'x'. Click on any item to switch the 'x' on/off. Also mark with an 'x' those categories which you wish to be included in the selection. As well as selecting any of the 4 H&SE categories, Monaural or Unilateral Hearing Loss can be flagged by marking the category labelled U with an 'x'.

See [LIST File](#) description below for a discussion of the handling of large groups of audiogram files to generate List files, WORD data files for Mail Merge, and Composite files. Note that there can be very significant advantages in speed when category 4 is not included in the selection criteria.

OPTIONS MENU -- Set Directories and Date F4

This function may also be accessed using

<Directories & Dates> button on control bar.

Type into the box provided, the path and name of the directory from which you wish to read the Current Audiograms -- either from single audiogram files or from composite files which have been generated in a previous run of this program. Alternatively use the Browse button to open a dialogue box which will allow you to click the mouse button on the required drive and directory.

Type into the box which is provided, the path and name of the directory from which you wish to read the Previous Audiograms. These audiograms may be read from single audiogram files or from composite files which have been generated during a previous run of this program. Alternatively use the Browse button to open a dialogue box which will allow you to click the mouse button on the required drive and directory.

Set the earliest date of the date range which you wish to use for the batch to be processed. This date may be entered by typing it in the box provided. The format dd/mm/yyyy of the date must be preserved. Alternatively one of the buttons may be used, as follows:-

Press the '-' button to decrease the date by 1 each time this button is pressed;

Press the '+' button to increment the date by 1 each time this button is pressed;

Press the 'today' button to return to today's date;

In the same way, set the latest date of the date range which you wish to use for the batch to be processed.

Use the radio buttons to select Audiogram Date or Recall Date as the date which will be examined to see if it is within the Date Range which has just been described.

If a printout of the audiograms has been requested in Options | Options, then select the radio button Automatic to print the audiograms one after the other with no further prompts to the operator. Alternatively you may select the radio button Single to force the system to display a dialogue box before each printout, giving the operator the opportunity to cancel the printout of that audiogram.

OPTIONS MENU Composite Filename F5

If the generation of a composite file is selected in Normal Operation step 1 above, then type the path and name of the file which you wish to use as a composite file. It is recommended that you use the suffix .dat for this file, so that it can be used as an input file in a subsequent run of this program. It is also possible to press the Browse button to allow selection of disk directory and filename. If the file already exists then, when the run is initiated, you will be prompted by a question asking if you wish to add the selected audiograms to the existing data in the file. If you answer 'yes' then the system will proceed to do so, but if you answer 'no' then the audiograms will not be included in any composite file.

It is not permitted to overwrite the existing composite file (but this is allowed with WORD and LIST files described on the next pages).

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Return to [Composite File](#)

OPTIONS MENU Word Filename F6

If the generation of a WORD data file is selected in Normal Operation step 1 above, then type the path and name of the file which you wish to use as the WORD data file. It is recommended that you use the suffix .txt for this file, to facilitate its use as a data file in Word Mail Merge. If this file already exists then, when the run is initiated, you will be prompted by a question asking if you wish to add the selected audiograms to the existing data in the file. If you answer 'yes' then the system will proceed to do so. If you answer 'no' then you will be prompted by a further question asking if you wish to overwrite the data in the file. If you answer 'yes' then the system will proceed to do so, otherwise the data from the current audiograms will not be added to a WORD data file.

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OPTIONS MENU List Filename F10

If the generation of a List file is selected in Normal Operation step 1 above, then type the path and name of the file which you wish to use as the List file. It is recommended that you use the suffix .txt for this file, to facilitate its possible uses e.g. for loading into the Windows utility Notepad. If this file already exists then, when the run is initiated, you will be prompted by a question asking if you wish to add the selected audio-grams to the existing data in the file. If you answer 'yes' then the system will proceed to do so. If you answer 'no' then you will be prompted by a further question asking if you wish to overwrite the data in the file. If you answer 'yes' then the system will proceed to do so, otherwise the data from the current audio-grams will not be added to a List file.

If a List file is being generated in the current run, then a dialog box will be shown, offering to give an immediate printout of the List data. If you select 'yes' in this box then the List data will be printed immediately in a format very similar to the printout from the List file. The List file will be generated on disk, whether or not the immediate printout was requested.

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STATISTICS

**Display Statistics, or
Press function key F8, or
<Display Statistics> button on control bar**

A dialogue box shows the number of times each of the 4 H&SE categories and the Unilateral Loss, occur in the batch of audiograms which have just been processed. This facility operates in two different modes depending on the setting of the item Statistics in the audprw32.ini file.

If Statistics=1, then the number of audiograms which have been assigned to each of the four categories is summed, and the total number must be equal to the number of files which have been processed. Some of these files may, in addition, display Unilateral Hearing Loss and will therefore be added to that group in the Statistic results. This follows exactly the H&SE categorisations.

However, we wish to point out that Statistics can frequently be misunderstood, and we feel that this is likely to happen with this simple processing of the H&SE data. For instance, an employer may observe that few of his employees are assigned category 3 (Poor Hearing), when in fact the situation is that many have been assigned to category 4, which has masked out category 3, since H&SE recommend that only the highest category number should be assigned. We feel that this is giving a dangerously deceptive impression and we have therefore adopted the following strategy.

If Statistics=0, then the numbers of audiograms in group 3 and in group 2 is the number who have Poor Hearing and the number who have Mild Hearing Impairment, irrespective of the fact that they may have been assigned to category 4 in the H&SE categorisation scheme. It may therefore happen that the sum of the numbers in the 4 categories is greater than the total number of audiograms which have been processed, since some of the audiograms are included in two groups of the Statistical results.

The dialogue box shows the total number of audiograms which have been processed and the number of these audiograms for which a Previous Audiogram was found. Also shown in square brackets is the percentage of audiograms which occur in each group, obtained by dividing the number of occurrences of the group by the total number of audiograms in the batch. An exception to this rule occurs in the case of category 4 where this procedure would be at fault, since audiograms for which there is no associated Previous Audiogram are not able to show category 4. In this case the divisor is the number of audiograms which have a Previous Audiogram associated with them.

When a second or subsequent run is made (normally on different data) the system prompts, asking if you wish to delete the existing Statistical Results. If you respond with 'yes' then the new run builds up its new set of statistical results, but if you respond with 'no' then the new results are added to the existing results to give the overall statistical distribution for all runs combined.

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**Print Statistics, or
Press function key F7, or
<Print Statistics> on control bar**

The above Statistical results are printed on the system printer.

Included on the printout is the name of the directory from which the Current Audiograms were read, and the date range which was used in the selection of audiograms.

**Reset Statistics, or
Press function key F9**
Clear the statistical results.

COMPOSITE FILE

The composite file contains an exact copy of each of the files which are used as input. The file contents are copied exactly, character by character. The next audiogram starts on the line immediately following the last line of the previous audiogram. The filenames are lost in this process, but all the file contents (i.e. all the audiogram results and employee details) are retained in the composite file.

See [LIST File](#) description below for a discussion of the handling of large groups of audiogram files, and the advantages in speed when category 4 is not included in the selection criteria.

Go to OPTIONS MENU | [Composite Filename](#) for a discussion of naming the Composite File.

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WORD Data File

The Word data file is used as a data file for a WORD Mail Merge. The first line has a series of words which will form the titles of the text Record Field Names. These Field Names are comma separated, and are named as follows:-

FIELD NAME	DESCRIPTION
name,	employee's name
dob,	employee's date of birth
IDNumber,	employee's I.D.Number
auddate,	date on which the audiogram was taken
category,	the HSE categories of the audiogram, or U for Unilateral Loss
doctor,	name of the employee's General Practitioner
address1,	address of the employee's G.P.
address2,	continued
address3,	continued
address4,	continued
empaddr1,	employee's address
empaddr2,	continued
empaddr3,	continued
empaddr4,	continued
employer,	name of the employer

Each of the following lines in the file contains information drawn from each of the audiograms which have been processed. The first five entries are available from the audiogram and are comma separated within the file. But the rest are not available for the audiogram, and the appropriate number of commas are inserted to fill the data record.

WORD MAIL MERGE

In order to use the Word data file, you may proceed as follows:-

Start a new document in Word, and type all or part of the document.

Select Tools | Mail Merge, select Letters for the Main Document (assuming that is what you wish) then select the Current Document for the letter.

Now select Data File | Load and select the Word data file which was created by the audprw32.exe program.

Now when you inspect the records you should find that all the Fields described above have been created, and that the first five are filled with the information from the audiogram. The other Fields are available to be filled in by the user.

The program may object that the letter does not contain any Record Fields, but you can now complete the letter by including any of the above Fields, as required. You can fill in the blank records, and add new records as required.

Consult the WORD Users' Manual for further information on the above, and for other applications of this facility.

See List File description below for a discussion of the handling of large groups of audiogram files, and the advantages in speed when category 4 is not included in the selection criteria. Use this link also for information on creating lists of employees for recall.

Go to Word Filename for a discussion of naming the Word Data File.

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LIST File

The List file is used as a data file for a list of employee names etc., which have been selected according to the preset selection criteria. The first line has a series of words which will form the titles of the columns in the list. These titles are comma separated, and are named as follows:-

Employee's Name

I.D.Number

Audiogram date

Recall date

Categories (HSE categories 1 to 4 and U for Unilateral Loss)

Trends (see section on [Trends](#))

Each of the following lines in the file contains information drawn from each of the audiograms which have been processed.

If a recall date is not available in the input file, then this entry will be given the value 1/1/1990

The entries on each line of this file are terminated by a comma, and are spaced in an attempt to form columns of data. If the file is loaded into Notepad then it can be inspected, edited and printed.

However when the List file option is selected, a dialogue box is displayed after the list file has been formed, to give the operator the possibility of printing the data from this file from within the audprw32.exe program. When this is done, the audprw32.exe program removes the commas (which it has used internally to delimit the entries) and the program ensures that the data is printed in columns. It prints header information including the selection criteria as follows:-

the directory from which the data was read,

the data range,

whether the date range was applied to the audiogram date or the recall date,

the categories for which a search was made.

the trends, if they are enabled in the Options | Options menu.

The names which are written to the output List File and optionally printed immediately, are arranged in alphabetical order of surnames. No further arrangement is made within surname groups.

When large batches of audiograms are being processed, the time to find Previous Audiograms can be long. These Previous Audiograms are necessary for the selection of category 4 employees and the calculation of Trends. However, in the current version of the program, the search for Previous Audiograms is only made if category 4 is selected in the Options | Options dialog box.

Users should therefore consider, when they are processing large batches of audiograms, whether category 4 is of strong interest to them. It should also be noted that the issue is much less important if a printout is requested for each audiogram, because the time for printout is substantially longer than the time to find a Previous Audiogram.

Users are also warned that the display of the audiograms on the screen is necessary when a printout is required, but otherwise its principal use is to make the operator aware that the computer is still processing data, and has not hung. However the time for generating this display on the screen is relatively significant when there is no printout of the audiogram. It has therefore been arranged that only 1 in 8 audiograms will be displayed on the screen when there is no printout of the audiogram.

As an example of the savings possible with the facilities described above, a batch of about 400 audiograms were processed into a List file in 35 seconds when category 4 was not selected, but the process took about 100 times longer when category 4 was included.

The above considerations apply also in the generation of Word Data files and in the generation of Composite files.

This option can be used to produce lists of employees who are due for retest.

Go to List Filename for a discussion of naming the List file in a dialogue box.

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