Articulate Assistant Advanced™ User Guide

Version 2.17.02

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Preface

Articulate Assistant Advanced (AAA) incorporates all of the recording and analysis features of the standard edition of Articulate Assistant 1.xx and many aspects of the user interface will be familiar to users of that program. However, under the surface there are major differences in how the software handles data. Articulate Assistant relied on reading in data files and converting between sample rates derived from the file headers or assumed from the file extension. All the annotation data had to be read in from separate files.

To cope with many different data types recorded at different sample rates and with more complex annotation queries, a new software structure is required. The solution is to incorporate a database as the foundation for the software.

AAA can load any number of databases, one at a time. Each database is located in a separate folder and consists of a core database file (Data.aa0) containing the records and small pieces of data such as annotations, prompts, client details etc and holds references to larger chunks of data held in separate files (Chunk_1.aa0, Chunk_2.aa0, etc) such as audio, video and EPG data. Every frame or sample of data is time stamped to the nearest 100,000th of a second (10microseconds). The software can even cope with data that does not have a regular sample rate. The only exception to this is audio data; audio data is the ground truth for all other data streams. Audio data must have regular sample intervals and has a sample rate associated with it which is taken from the recording device. Even it this rate is inaccurate, it becomes the clock to which all the other streams are synchronised. A recording must have an audio track. i.e. other data streams cannot be recorded by AAA without audio.

The AAA software allows you to

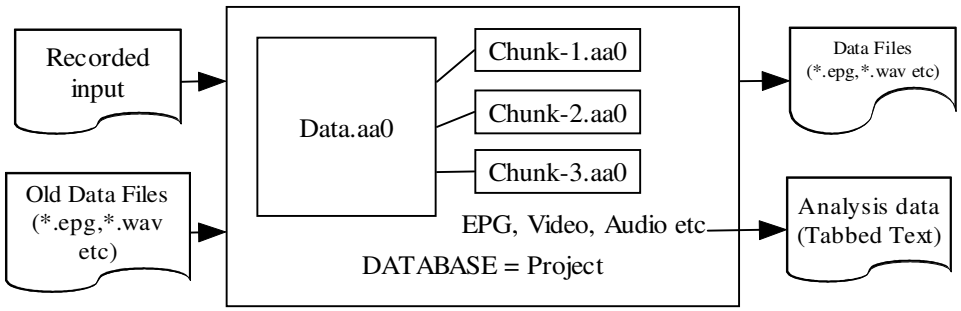
- create as many databases as you wish
- transfer data between databases
- import data in standard file formats (*.wav, *.epg, PRAAT textgrid, *.avi, etc)
- export data to standard file formats
- calculate values from data and export them and/or plot them.
- create publishable quality graphics from the data.

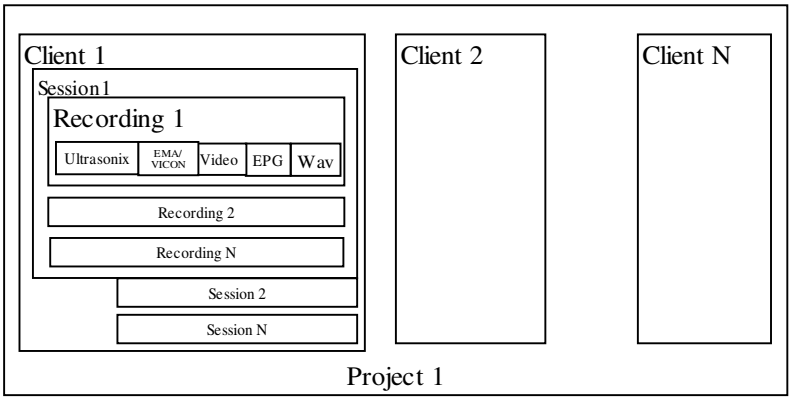
Each database is called a *project*. All data within a *project* can be compared and analysed as a group. Each recorded data channel can be filtered, smoothed, differentiated, combined with other data channels, etc. Key features like peaks, valleys, midpoints etc can be found automatically and labelled.

Data values, durations of labelled regions and many other pieces of information can be exported to Excel for charting or statistical analysis. Sophisticated queries can be carried out on labelled data to extract only the information that is required.

Movies of articulatory data can be created for use in presentations and played in slow motion if required. High quality charts suitable for 600dpi journal and book publication can be generated from the various displays.

AAA provides a powerful tool for multichannel speech analysis but we are always on the lookout to improve the utility of the software. So if you have ideas for new features please get in touch and we'll see what we can do.





WARNING: Don't copy parts of projects. When using AAA, data gets deleted and rewritten. The associated chunk files get deleted and can be reassigned as new annotations or analysis values are created. It is very risky to save time when moving projects between machines to copy only parts of a database based on date as some chunks whose date shows as old may nevertheless have been modified. Windows has a bad habit of showing the creation date and not the modification date. The result can be a corrupted database.

System Setup

Installing Articulate Assistant Advanced™ Software

To install the software, place the Setup CD in the CD player of your PC and run 'Setup.exe' from your CDROM drive. Alternatively the same setup.exe can be downloaded or run directly from our website at *www.articulateinstruments.com/Setup_215.exe*. This will install the Articulate Assistant Advanced™ software under the C:/ folder in 'AAA' folder. The program can be run from the Windows Taskbar Start Menu ('**Start:Programs:ArticAsst:AAA**').

NOTE: The demonstration software installation is exactly the same as the full version of the software. The demonstration software becomes fully activated when the USB license key is plugged in. Without the USB license key, it is not possible to record or import new data.

Registering Articulate Assistant Advanced™ Software

Articulate Assistant Advanced™ version 2.09 and later no longer requires a password to be registered before it can be used. Registration is part of the installation process.

Enabling the software with the USB key

The USB key should be plugged in AFTER Articulate Assistant Advanced™ has been installed.

Articulate Assistant Advanced™ requires a USB key plugged into the usb port of the PC in order for the software to function fully. A USB key is provided for each issued license. During installation the necessary USB hardware device drivers will be installed on the PC.

If the USB key is plugged in before Articulate Assistant Advanced™ is installed then windows will detect a new device and ask for the drivers. In this case simply insert the Articulate Assistant Advanced™ CD into the PC's CDROM drive and direct Windows to locate the drivers on the CD.

> **NB.** The USB key provided with AAA is different to the key provided with Articulate Assistant although they look the same. AAA will not work with an Articulate Assistant key.

IMPORTANT: Keep your USB key safe when not in use as **lost or stolen keys cannot be re-issued**.

Configuring EPG and Audio settings

Switch on the SPI by operating the switch on its rear panel. Observe the front panel LED marked 'POWER' to confirm that the SPI is powered. Observe the similar LED on the front panel of the EPG3 scanner to confirm that the EPG3 scanner is powered.

Run 'AAA' software by clicking on the icon installed on your Windows desktop. The display should look similar to Figure 1.

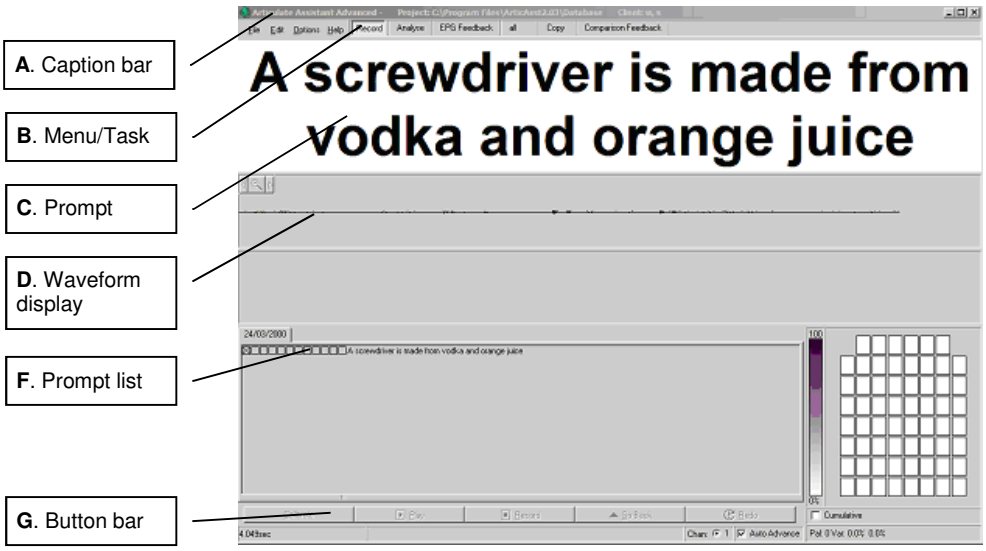


Figure 1 Record Task Window

The contact area should provide live feedback of contact between the tongue and the EPG palate. If the display does not respond, check that the handgrip is plugged in and being gripped by the client. Try pressing the RESET button on the rear of the SPI. You should hear a beep after 7 seconds and the palate display should go live. If there is still no response it may be that the communication port parameters and need to be changed from the default.

Communication port setting

To change the communication port setting:
The COM port needs to be set to the same value as determined shown in Windows Device manager for the '**Prolific USB-to-Serial Comm Port**'.

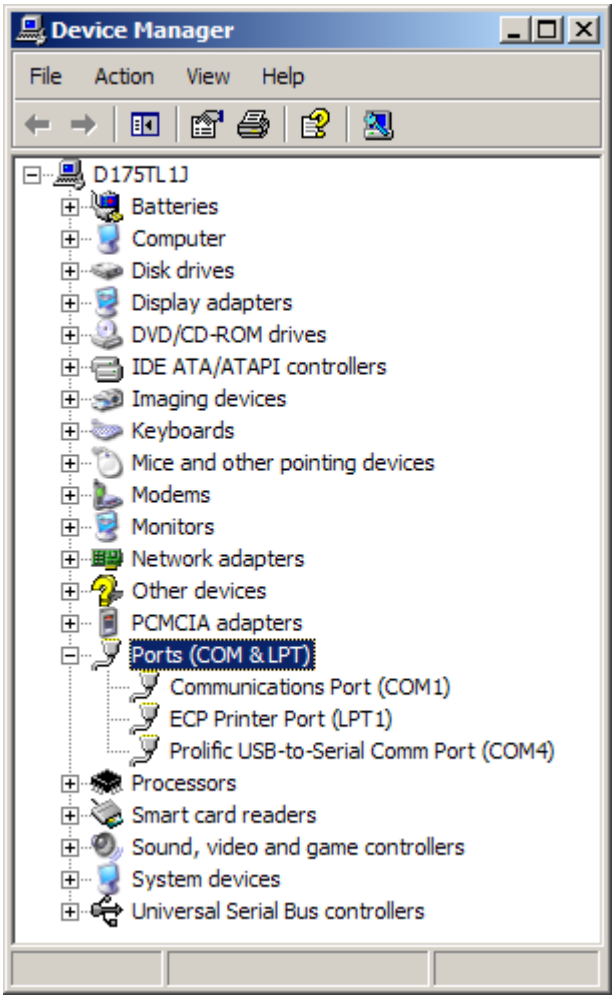


Figure 2 Windows Device Manager showing COM4 is active.

Select the menu option ‘Options’ then select the submenu option ‘Comms…’. Set the ‘COM port’ to the same setting as found in the device manager e.g. For the example in Figure 2 ‘COM4’. Alternatively, try setting the ‘COM port’ to COM4. If it reads ‘No port’ then try ‘COM5’. . If it still reads ‘No port’ then try ‘COM6’,’COM7’ and ‘COM8’.

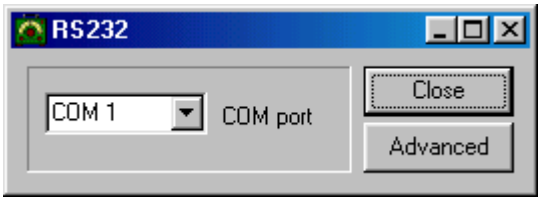


Figure 3 Com port selection dialogue

TIP: If an EPG palate is not available it is possible to check that the system is working by stroking the multiplexer socket with a coin whilst holding the chrome handgrip.

If the EPG display is unresponsive check the advanced settings (Figure 4). For an SPI V2.0 unit with USB lead the value 'Bits per sec' should be 57600. [For older SPIV1.0 systems 'Bits per sec should be 19200].
When the system is operating correctly there will be data continually streaming in the 'Receive' box on the bottom right of the dialogue.

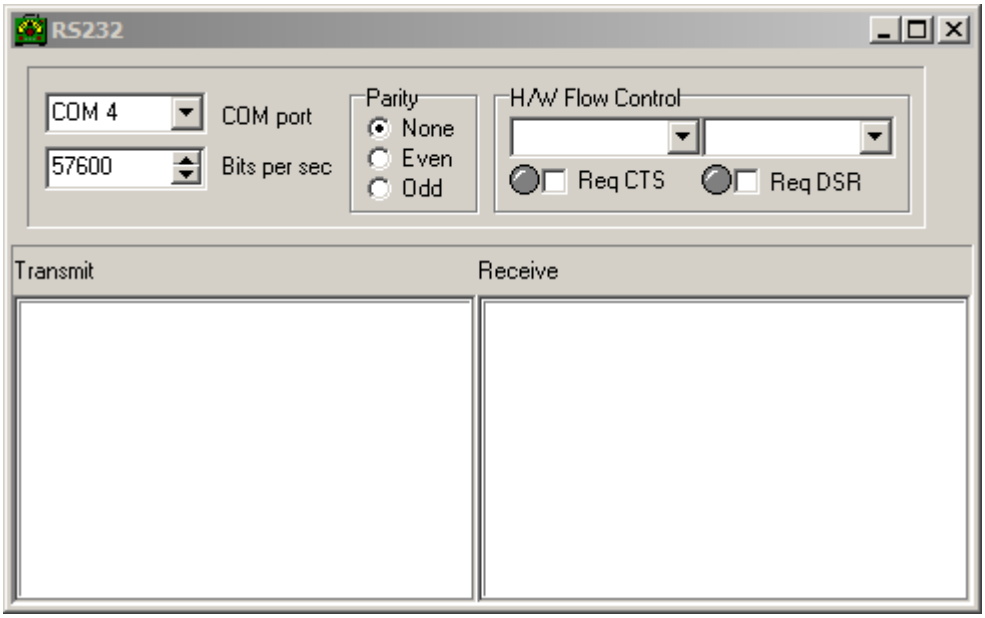


Figure 4 Advanced Comms Dialogue

If the EPG display remains unresponsive after following the instructions above then please contact Articulate Instruments for advice.

Once the EPG display is configured and responds to tongue contact, observe the display when in use by an EPG palate wearer. The contacts should switch on and off cleanly as the tongue makes and breaks contact. If the contacts appear to flicker or stay on after the tongue is removed from the palate then follow the instructions for an on-site calibration check in the Technical Details section 3 of the WinEPG manual.

Audio

Next, check the audio signal level.

If using the multichannel system refer to the Multichannel System Manual for instructions on setting the Audio.

If using EPG then refer to WinEPG Manual

If using EchoB or Micro systems then refer to installation manual for these ultrasound systems.

Using Articulate Assistant Advanced™ Software

Software Features

- **Simple data management**. The software automatically manages files, grouping files according to client and session without the need to open, save or name individual files.
- **Client-based**. Individual clients or experimental subjects can be called up and notes taken and stored along with recorded data.
- **Easy to use.** The software comes with an intuitive interface designed to be easy to operate for non-technical users.
- **Flexible**. Advanced users such as researchers can build and store display layouts to suit particular tasks. Such users can also define their own analysis values and set parameters.
- **Multilevel annotation** Data can be labelled with unlimited keywords. These keywords can be used to search and retrieve data throughout all annotated files.
- **Compatible.** All analysis values generated by the program can be exported to a tab delimited text file suitable for importing into most statistical and database packages.
- **Convenient.** Graphics and movies can be copied directly to Powerpoint for easy presentation of data.
- **Publishable quality** Charts and plots can be compiled into a high resolution graphic for publication in journals and conference presentations.

Overview

Articulate Assistant Advanced™ is a full-featured articulatory display tool for Windows XP, Vista, 7 and 8. Articulate Assistant Advanced™ is designed to allow Speech Scientists to record and analyse data produced by articulatory instrumentation such as EPG, Laryngograph and airflow. Additional modules allow integrated analysis of 3D EMA, VICON and Ultrasound / video data.

Articulate Assistant Advanced™ is designed to work on 2 levels.

- The first level requires no adjustment of parameters or technical knowledge. It is relatively straightforward to use the onscreen buttons and pre-configured task windows to achieve basic recording, therapy and analysis functions .
- The second level allows the user to design their own task windows and manipulate parameters through menu options and dialogue boxes. This allows the advanced user to define their own measurements.

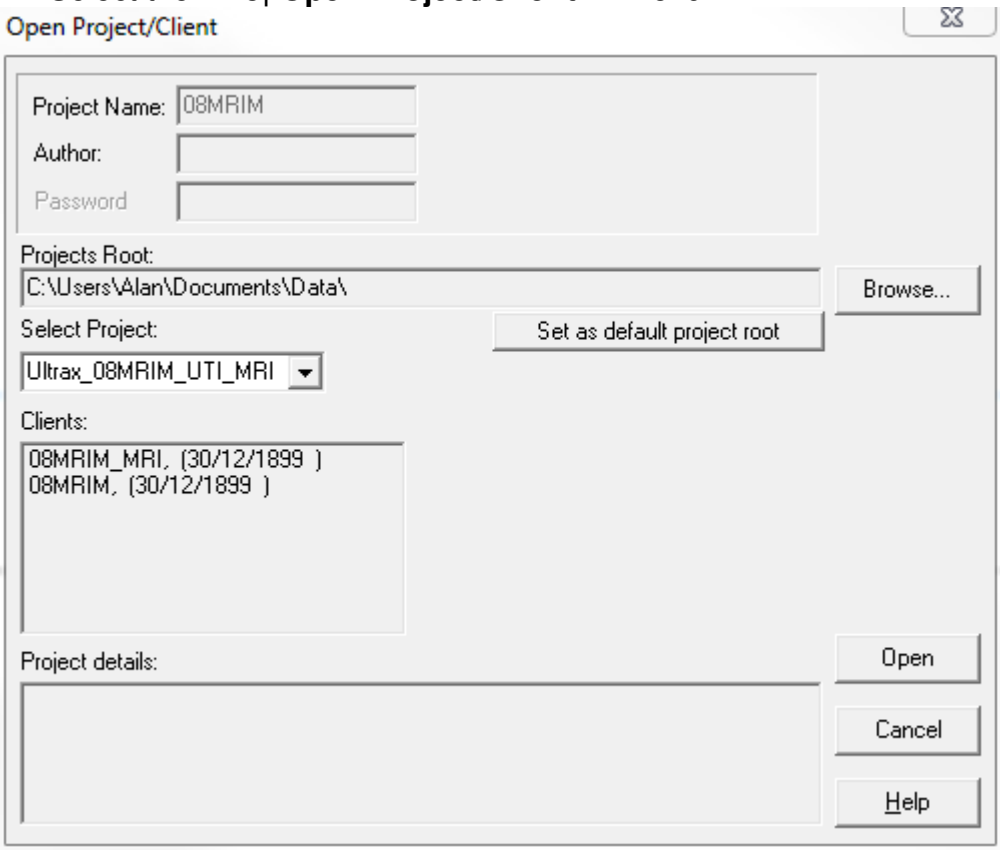
Creating a new project

Articulate Assistant Advanced™ comes with a demonstration project containing data that can be analysed but it is not possible to record new data in this project. You should therefore create your own project. You may, in time, wish to create several projects. A project is held in a folder of the same name under the projects root. By default the projects root directory is the directory from which the application is run. However, it may be convenient to

specify another directory, perhaps on another disk drive, dedicated to storing data.

To change the default Projects Root :

1. Select the '**File| Open Project/Client…**' menu

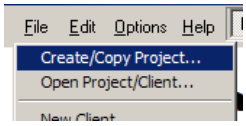


2. Use Browse to find the project folder or type the path into the "Projects Root" edit box

3. Click the 

button.

To create a new Project:

1. Select the 'File|Create/Amend Project…' menu 

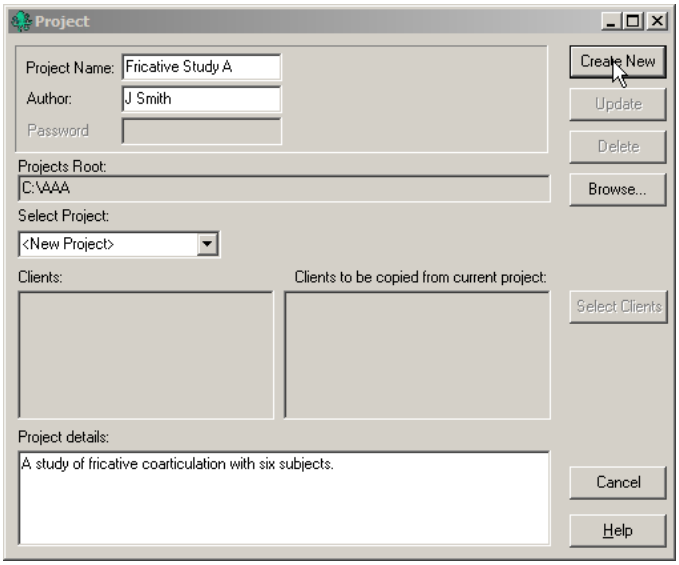
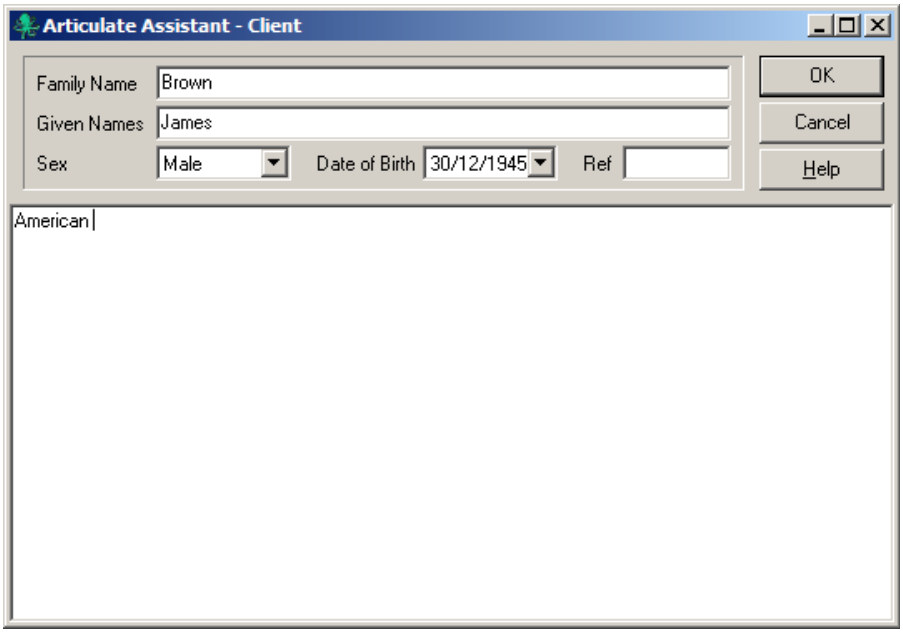


Figure 5 Create/Amend Project Dialogue

2. In the Project Dialogue, complete the 'Project Name' using alphanumeric characters. This will also be the name of the folder in which all the project data is stored. You may also specify the author and any details describing the project. In the future it may be possible to password control each project so only authorised users can access the contents. Contact Articulate Instruments to discuss this.

3. Click Create New Create the name of the initial client in this project.

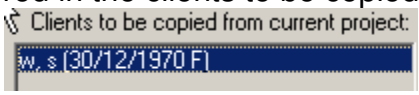


4. Click Create New to open the project.

Copying Client data to another project

It is possible to copy data from the currently open project to another project. The data can be appended to an existing project or a new project can be

created specifically for the files to be copied. You may wish to do this to create a subset of data for a particular analysis or to allow a subset of data to be given to another researcher using Articulate Assistant Advanced™. To do this, use the 'Create/Amend Project' dialogue (See Figure 5) then select the target project (i.e. the one to which recordings from the current project should be copied). Then click the 

button to open the 'Clients to Copy' dialogue. This dialogue gives the option of copying any number of clients from the current project by selecting them from the 'Client' tab window in the dialogue. It is also possible to select specific sessions from the currently loaded client using the 'Current Client Sessions' tab window. And it is possible to select specific recordings from the currently loaded client using the 'Current Session Recordings' tab window. Having selected the data to be copied, click OK to close the 'Clients to Copy' dialogue. The name(s) of the clients to be copied in full or in part will be entered in the clients to be copied listbox in the 'Create/Amend Project' dialogue. 

To add this data to the New or existing project click 

or 

as appropriate.

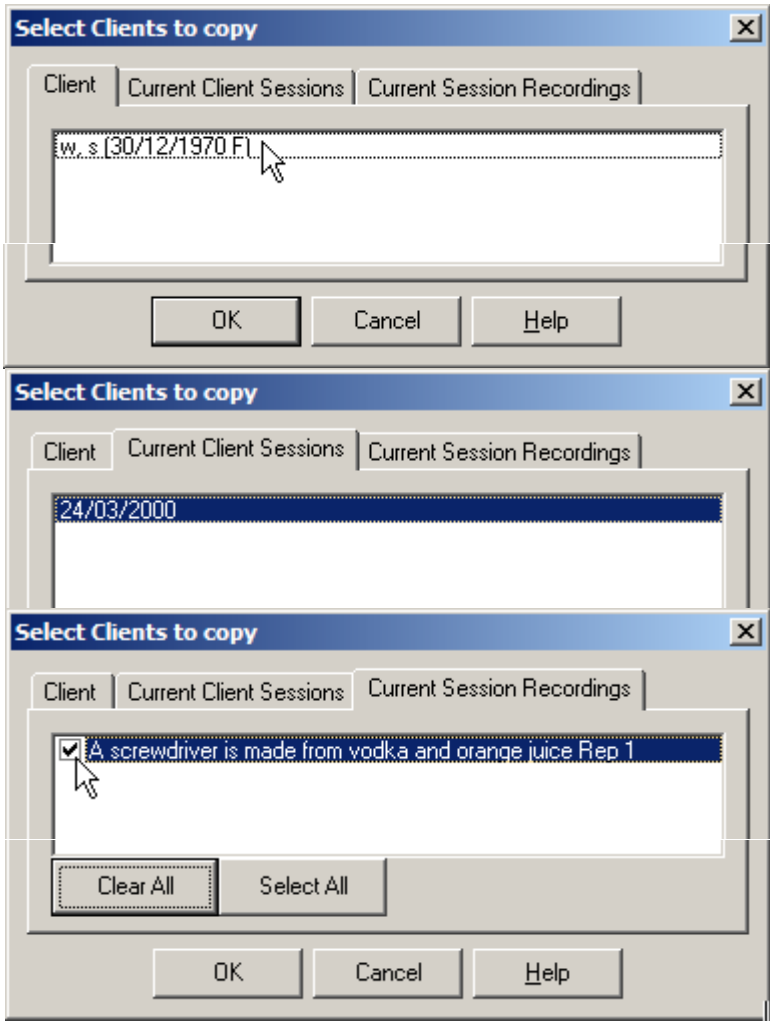
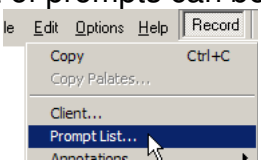


Figure 6 Clients to Copy dialogue

Creating a List of Prompts

Each recording can be prompted by text, an image, an audio or a video clip.

The list of prompts can be changed with the '**Edit:Prompt List…**' menu option, 

which calls up the 'Prompt List Editor' (Figure 7).

To edit the Default prompt list:

1. Type in the centre text box or "cut and paste" text from another application using the <CTRL>V command.

To create a new list of text prompts, select the 'List:New…' menu option in the Prompt List Editor as shown in Figure 7. Then type your prompts, one per line, into the large blank window. To save your prompt list.

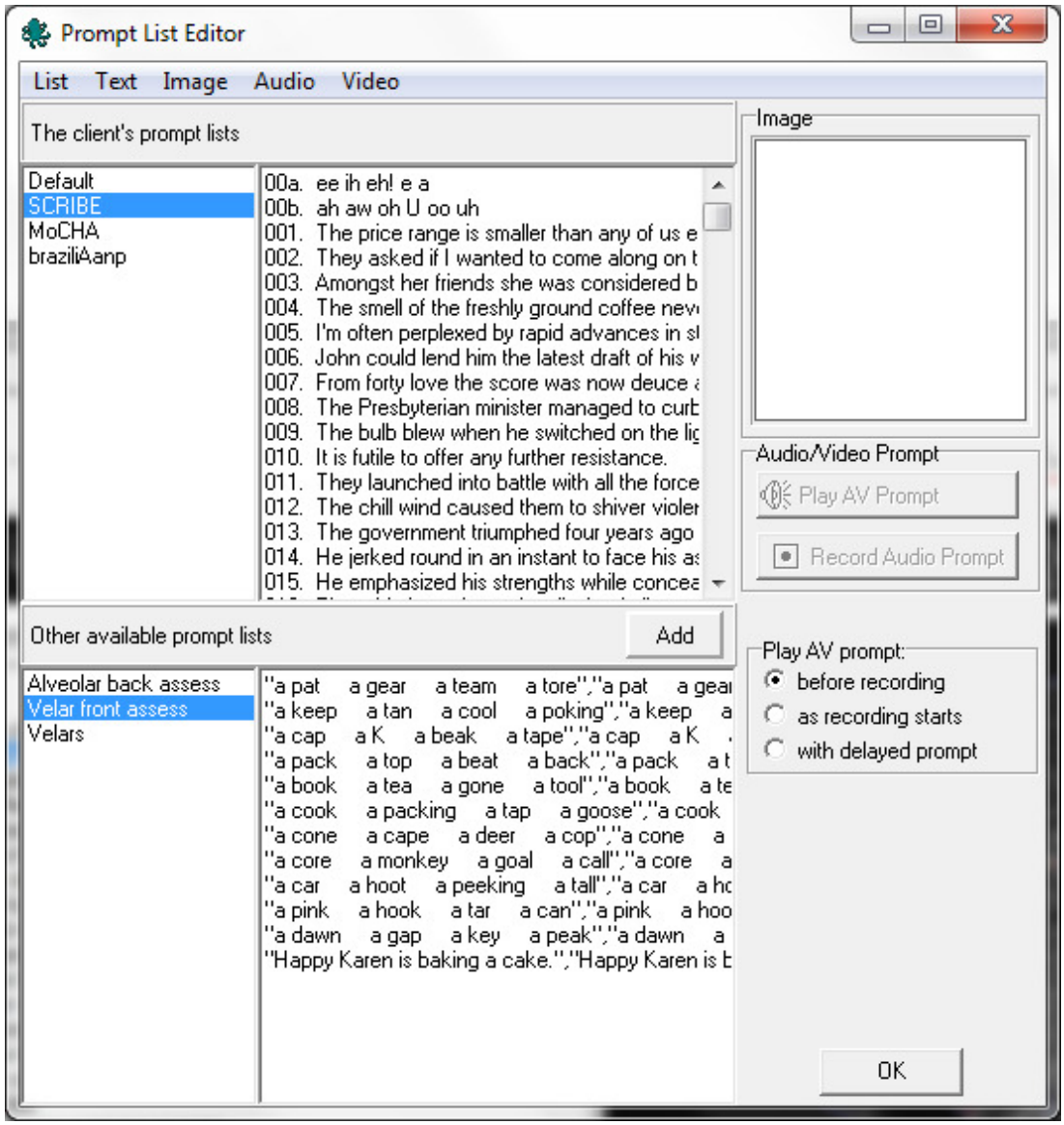


Figure 7 Prompt List Editor

TIP: If you already have a list of prompts in a text file. Simply copy the list to the clipboard using <Ctrl c> in your text editor and paste into the Prompt List Editor using <Ctrl v>

Picture Prompts

An image can be associated with each prompt. First create the image using your favourite program (e.g. Paint, Boardmaker, Adobe Photoshop etc.). This can be a drawing or a photograph. Copy the image to the clipboard from within that program. Then, from the Prompt List Editor menu, select '**Image:Paste**'.

Audio Prompts

A prerecorded utterance or sound can be associated with each prompt. To associate a recording with a prompt simply click on the line in the prompt list that contains the prompt you want to link audio to then do one of the following. Record the audio prompt using your favourite program (e.g. Windows recorder, Cool Edit, Articulate Assistant etc.) or use the built-in recorder in the Prompt editor. You can use any windows (wav) file as an audio prompt. Then, from the Prompt List Editor menu, select '**Audio:Add**' and select the appropriate wav file. You can play the file to check that it is the one you intended by clicking the Play button. Alternatively just click the record prompt button and speak into the microphone.

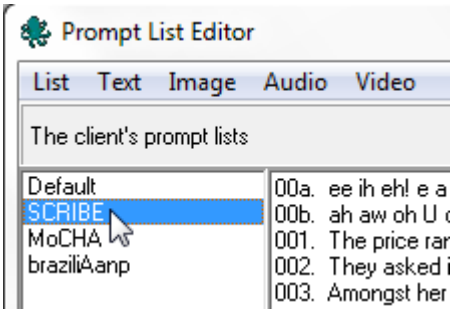
Audio prompts default to playing before recording starts. Options are available in the Prompt Editor to start playing the audio prompt when recording starts. Alternatively, it can also be set to start at a delayed point after the recording starts.

Video Prompts

Read the instructions above for Audio prompts. Video prompts must be prepared in separate video editing software and be in *.avi format. Click on a prompt in the list and then use the "Video" menu option to load the video and associate it with the recording.

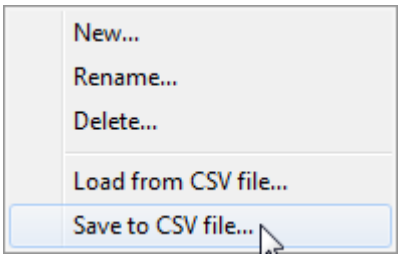
Selecting a previously stored promptlist

To select a promptlist that is stored within the project, simply click the checkbox in the top lefthand panel and close the dialogue.



Saving a previously stored promptlist as a csv file

Promptlists and their images are stored in the project database but it is possible to export them to a csv file so that they are available for importing into a different project. To do this go to the “File” option and select “save to csv file”.



A csv file and copies of all of the images and media files will be saved to the specified directory. It is recommended that these should be saved to the Prompts folder under the application directory. See following section for easy importing of external promptlists.

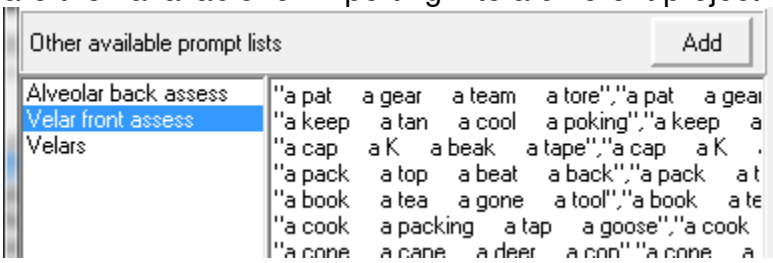
Editing a previously stored promptlist

To edit a previously stored promplist simply select the promptlist you wish to edit and type in the text box.

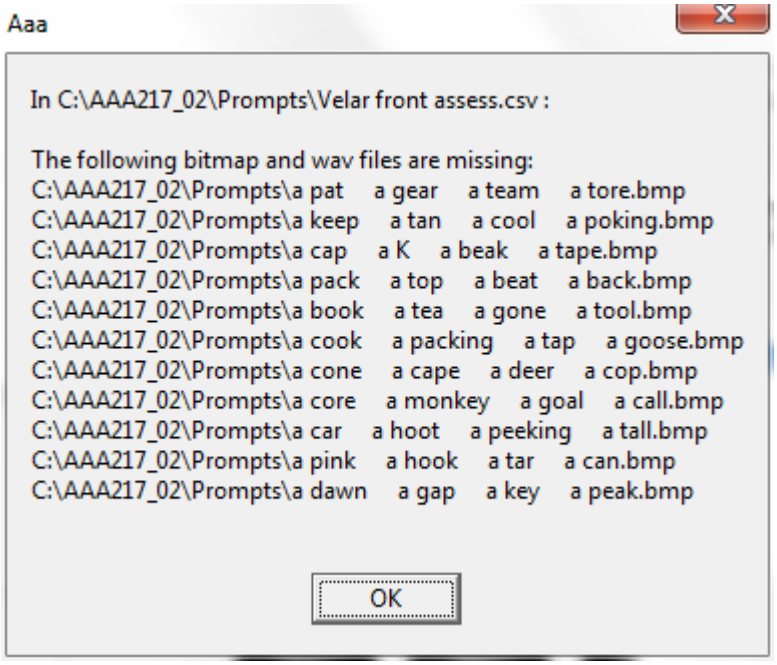
> **WARNING:** If you change a prompt that has an image associated with it, that association will be lost (even if you make as simple a change as adding a space or a comma). This is because the image is associated with the precise text on a specified line. This also means that if the exact same text is placed in another promptlist the picture will automatically be linked to it.

Selecting other available promptlists

Saving and selecting promptlists in external files is also possible. These files are then available for importing into a different project.



External promptlist files are displayed if they are saved in the “prompts” folder in the application directory. E.g. C:\AAA\Prompts.
To load, just select the external list e.g. “velar front assess” in example above and click “Add”. Note that the image and audio files must be present in the same folder or a message will warn that these files cannot be found.



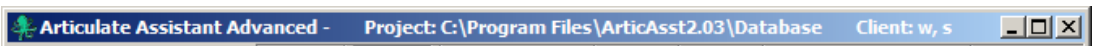
Allowing duplicate prompts

By default, any prompts typed in the list in the Prompt List Editor, will only show up once in the Prompt List Window. It is often the case that prompts need to be repeated in randomised order. To allow a randomised list of prompts to appear in the Prompt List Window, check the 

checkbox. The crosses that mark each recorded file will appear against the first instance of each repetition. This is not ideal from the point of view of keeping track of which recording in the list was last recorded. It is however a consequence of the promptlist not being linked to the data once it is stored. i.e. if you look at a recording in the database you cannot tell what promptlist was used to record it. Indeed recordings within one session can be recorded from several promptlists.

Loading a Project/Client

The first thing to do when the program is started up is to check that you have the correct client loaded. The project location and the client name (or reference number) is displayed on the Caption bar (Figure 1**A**) at the top of the main window.



To open a different project or client use the 'File|Open Project/Client…' Menu option. In the 'Open Project/Client' dialogue select the project from the dropdown list then either double-click on the client to be loaded or click on the client then click on 

.

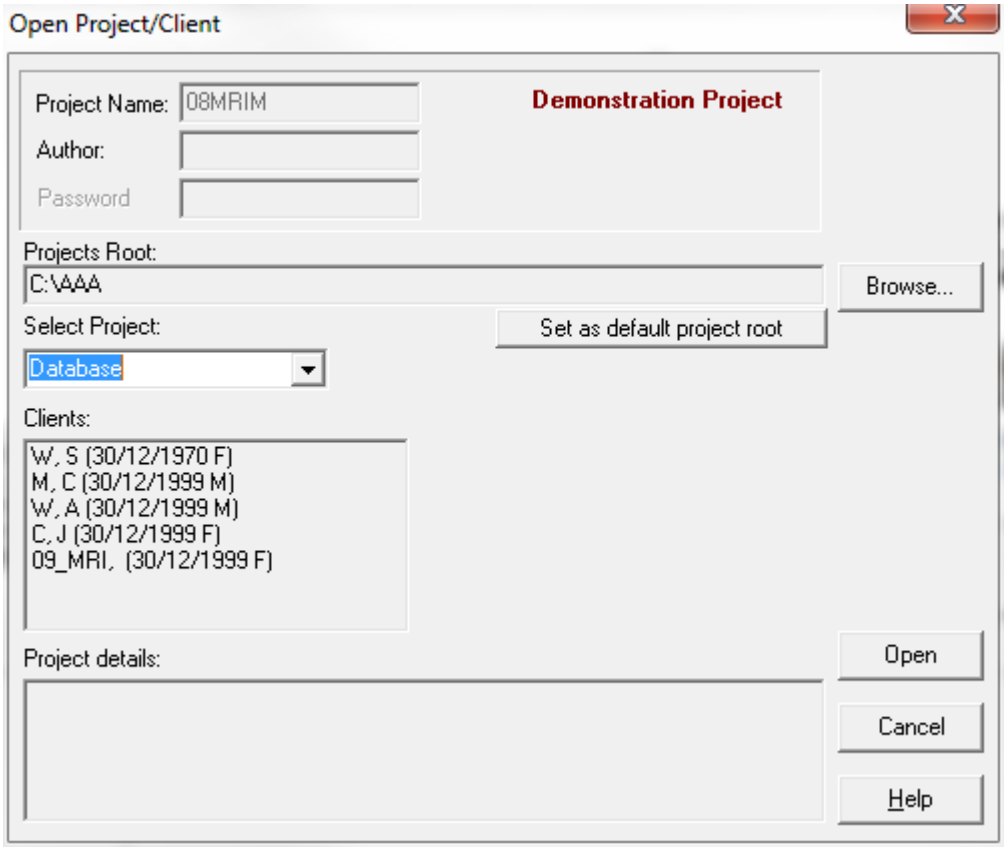
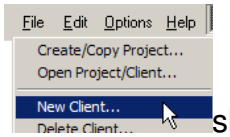


Figure 8 Open Project/Client menu option. Select the required project from the dropdown listbox then double-click on the desired client.

Adding a new client to a project

If a new client is to be recorded or analysed then the '**File:New Client…**' menu option 

should be selected and the 'Client Dialogue Box' should be filled in, in a similar manner to the tutorial client shown in Figure 9.

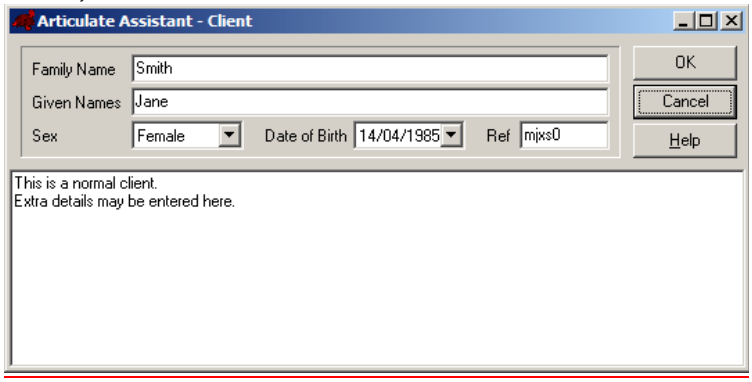


Figure 9 Client Dialogue Box

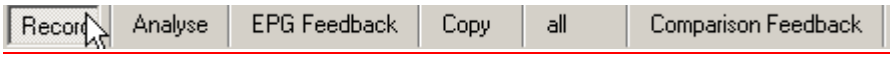
Client details need only be entered once. Thereafter, the client can be reloaded using the '**File:Open Project/Client**' menu option. Notes may be added at any future time by using the '**Edit:Client…**' menu option. For

convenience, the client data that is being worked on when the program is closed, is automatically loaded when the program is next started up.

> **NB.** All the client details and data files created in 'Articulate Assistant Advanced™' are automatically saved. The '**File:Save Client As…**' menu option provides an easy way to save a copy of the entire client data record to a backup device.

Selecting a Task Window

Within Articulate Assistant Advanced™ there are windows configured to help the user perform certain tasks like Recording or Analysing or providing EPG Feedback for therapy. A Task Window is selected by clicking on the Task Bar.



The Record EPG Task Window

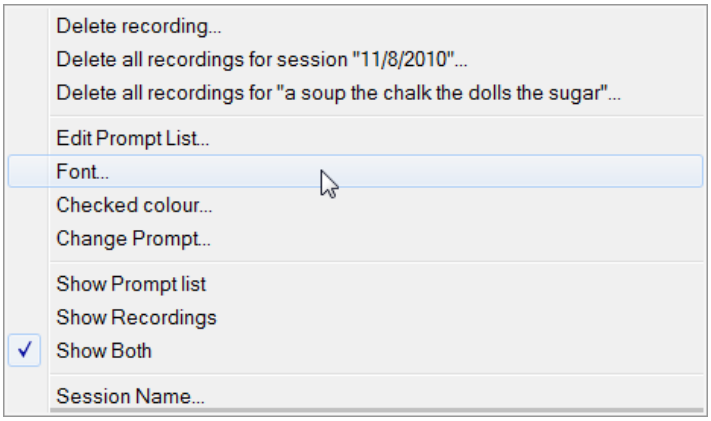
The recording Task window is shown in Figure 1. It is designed principally for the purpose of recording sets of utterances. The display provides the prompts for the speaker and provides checks on the quality of the recorded data.

Setting Prompts.

By default the prompt will show the prompt text and any image associated with the prompt. To play an audio prompt, it is necessary to right-click on the Prompt display and select "Play Audio Prompt". By default, the audio prompt will be played when the record button is pressed. (Once the audio prompt has finished playing, the recording process will progress as normal). However, it can be set to play at different times using the options in the prompt editor. To hide the text or the image or to prevent audio prompts from playing, right click on the Prompt display and uncheck the appropriate popup menu option.

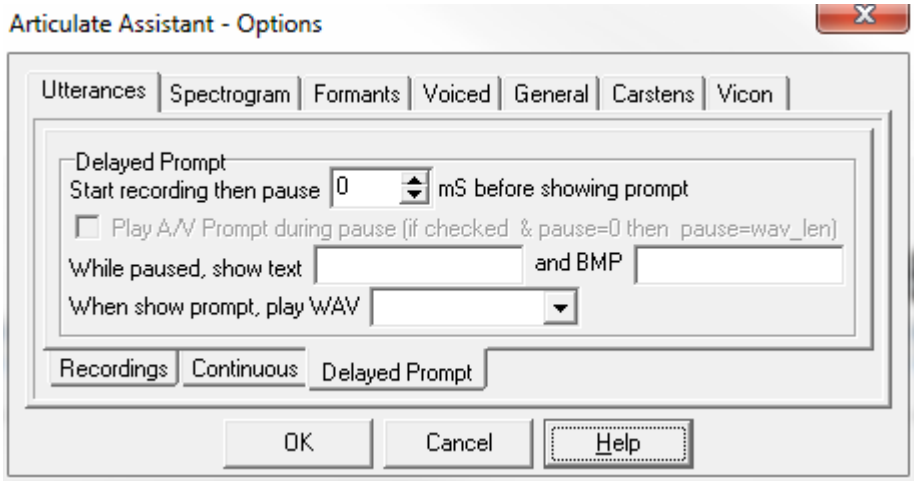
Changing Prompt Font

The Prompt font is controlled by the font set in the prompt list. Right-click on the Promptlist window to reveal the popup menu with the "Font…" option.



Delaying Prompts.

It is possible to delay the appearance of images, text and audio prompts using the Options|Settings Utterances Menu. There are actually two ways to associate audio. Either associate a different audio sample with each prompt and delay the playback using the Prompt Editor or select a sound to play with every delayed prompt (such as a beep or “Speak now” prompt) using the Settings dialogue (see below). It is also possible to show some preparatory text or image before every delayed prompt (such as “Please wait”).



Playing Audio or video prompts during delay

If the "Play AV prompt with recording" option is selected in the Prompt Editor then the AV prompt will be played during the pause. By setting the delay to zero and checking the box marked "Play A/V during pause" , the pause length will be set to the length of the AV file.

Making Your First Recording.

The first recording in a session is achieved in the following way:

1. Select the prompt to be recorded by clicking on the prompt in the prompt list (Figure 12**C**) so that the selected prompt is highlighted.
2. Check that the waveform display is live (i.e. responds to the microphone).

3. Press the Record button  .
4. Once pressed, the legend on the button changes to Stop  allowing the user to stop the recording by pressing the same button.

> **TIP:** If the Stop button is not pressed then the recording will automatically stop after 6 seconds. This default can be changed using the '**Options:Settings: Utterances:Maximum Duration**' menu option.

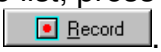
After recording has stopped, the software checks to see if the recording is too loud (clipped) or too quiet. And gives a warning. The recording has already been saved. The waveform and EPG files are displayed and can be visually checked and played back if necessary to confirm that the recording is OK.

Redoing Your Recording

If a recording is unsatisfactory because it is too loud, too quiet or the client said the wrong thing, then it is easy to re-record using the Redo button  . The Redo button is available for up to 1 minute after a recording has been made in order to provide a simple means to overwrite the last recording that was made. If a recording needs to be replaced after that time then it must be selected, deleted and recorded again.

Making Your Second Recording

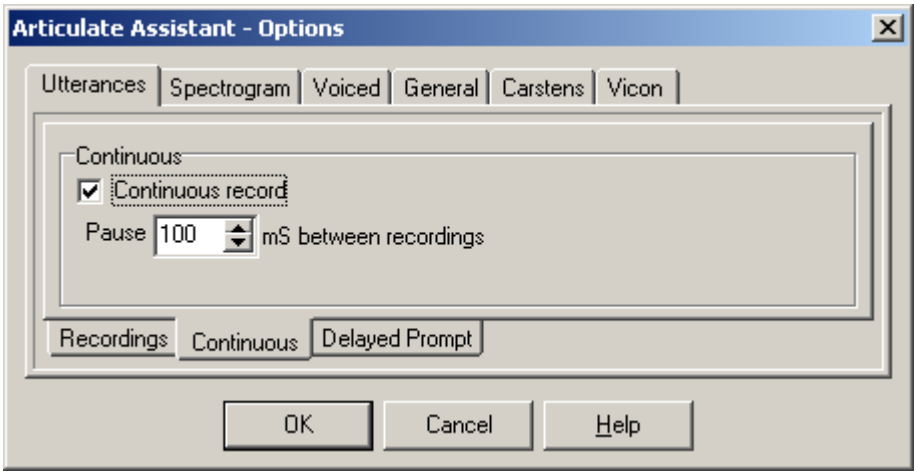
If you wish to record a second repetition of the same phrase, simply press the record button  again.

If you wish to record the next prompt in the list, press the Go Forward button  . Then press the record button  .

> **Alternatively:** You can select any prompt for recording by simply clicking on the text in the prompt list (Fig. **12C**).

Continuous recording

It is possible to set AAA so that after completing and saving one recording it automatically moves on to record the next one. To do this, use the Options|Settings Utterances dialogue. The delay between recordings can also be set.



Selecting and Playing a File

A recorded file is represented by a crossed box in the 'Prompt List' display (Figure 12**A**). Empty boxes (Figure 12**B**) are simply place markers showing than no data was recorded for a particular session or prompt. To play a file that has been recorded by the current client, simply select a file by clicking on a crossed box opposite a prompt. The crossed box will turn white.

The file will be displayed in the wave trace display, the EPG palates display and other data displays. Then click on the Play button 

to hear the whole file.

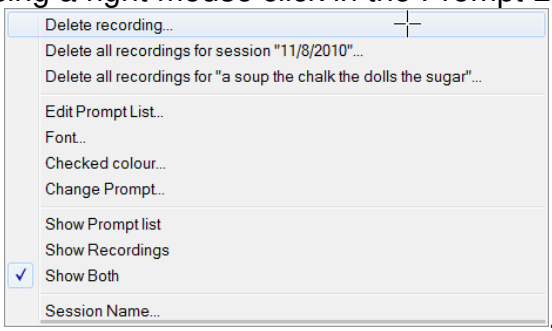
> **Alternatively:** Press the <F2> key on your keyboard to play.

> **TIP:** You can also play the file back at half speed by clicking the **right mouse button** on the waveform display and choosing the **Play Slowly x 2** option from the popup menu.

Grouping Recordings into Sessions

The date and time of a recording is automatically stored. All recordings made in one day are grouped and separated by a blue session separator line (Figure 12**D**) . If you hover the cursor over a box in the 'Prompt List' display the date and time of the recording are revealed as a 'Hint' next to the cursor. The date and time of a recorded file are also displayed in the status panel (Figure 12**H**) if a file is selected.

Deleting Files

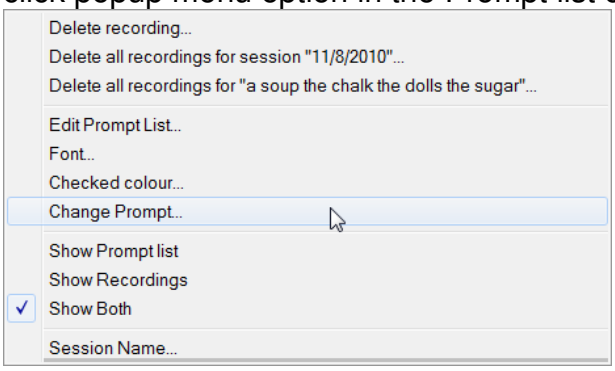
Files may be deleted by using a right mouse click in the Prompt List display to invoke the popup menu 

. There are three options for deleting files. Either:

- **Delete File**. Delete the selected file.
- **Delete All Files on <date>**. Deletes all files recorded in one session. Note. This will delete files that are not visible too. See next section.
- **Delete all Files for <prompt>**. Deletes all recordings of the selected prompt.

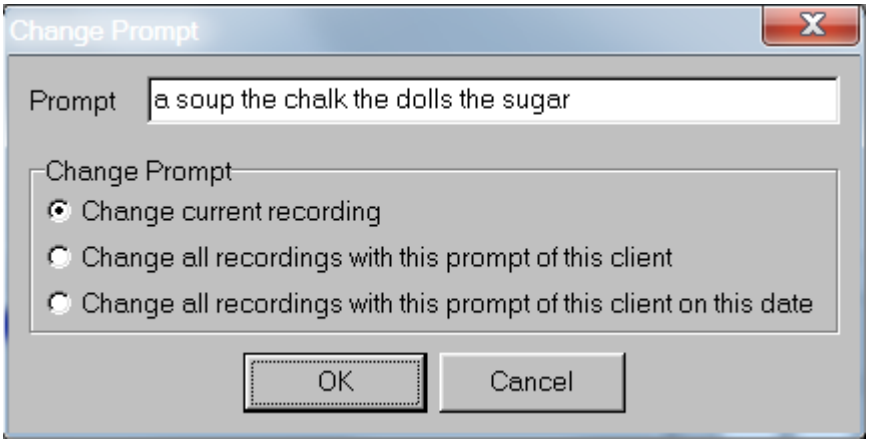
Changing the prompt after recording

The prompt text of a particular recording may be changed using the right-click popup menu option in the Prompt list display.

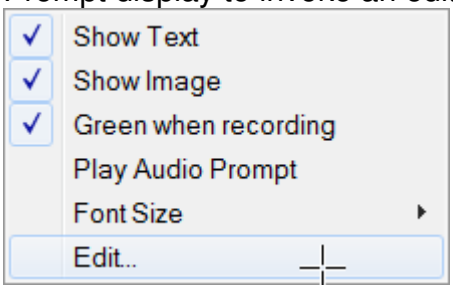


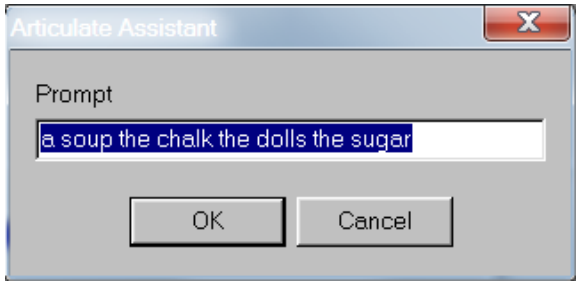
There are three options

- **Change the current prompt** – will change only the prompt text of the currently loaded recording
- **Change all recordings of this prompt of this client** – any prompt with exactly the same text as the currently loaded recording and associated with the current client will be changed.
- **Change all recordings with this prompt of this client on this date** – same as previous but restricted to the current session.



The prompt may also be changed using the right-click popup menu in the Prompt display to invoke an editor.





Controlling the Prompt List Display

The popup menu described in the previous section can be used to determine the files which are visible in the 'Prompt List' display.

- **Show Prompt list**. When engaged in the task of recording files it is advantageous to show only the prompts which you mean to record i.e. the prompts in the currently loaded prompt list.
- **Show Recordings**. When performing analysis it is only necessary to see files which have been recorded.
- **Show Both**. The default is to show both.

The default number of recordings (columns of boxes) is 50. This can be increased by using the '**Options:Settings**' menu and clicking on the tab marked **Utterances.**

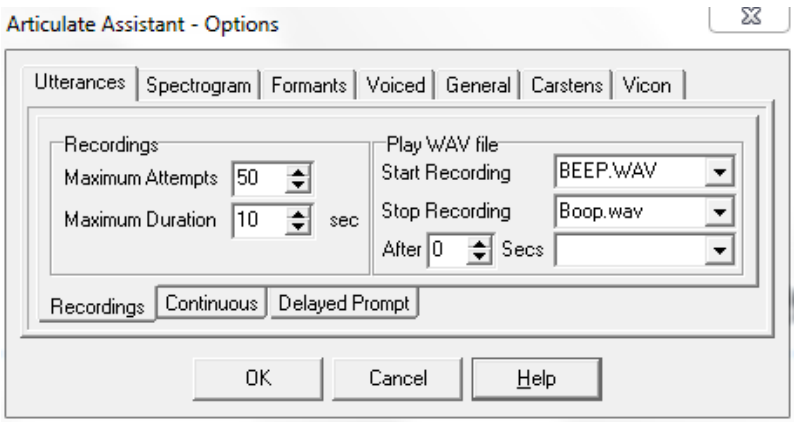


Figure 10 Options dialogue, Utterances tab.

The '**Maximum Attempts**' can be edited to increase it above 50.

With a larger number of 'Attempts' selected it may be necessary to use the scrollbar at the bottom of the 'Prompt List' display to bring the session of interest into view.
By default a "Beep" is played as the software starts recording. It is also possible to play a sound as the recording ends and at a fixed number of seconds into the recording (

Controlling the Prompt List box and font size

It is possible to increase the size of the boxes in the prompt list by selecting the '**Font…**' option from the popup menu and increase the font size. The '**Checked Colour…**' popup menu option allows the colour of the checked boxes in the Prompts list to be changed to suit.

Selecting and Zooming into a Region

To select a region, click the left mouse button and drag on the waveform display.

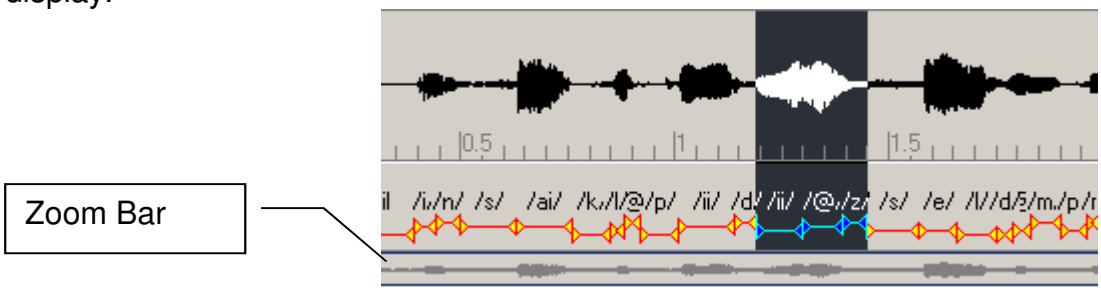


Figure 11 Zooming in on a selected region

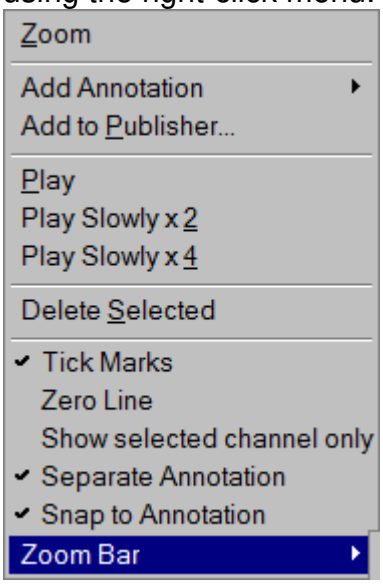
> **Alternatively:** You can use the <shift> key, click the left mouse button and drag to select in any window (except the spectrogram window).

- To **Zoom In** to the selected region, double-click on the **Zoom bar**
- To **Zoom out** to see the whole file, double-click on the **Zoom bar** with no region selected
- To move backwards or forwards through the waveform when zoomed in, click the appropriate side of the rectangle in the **Zoom bar**.
- ….or click in the middle of the rectangle and drag
- To increase the size of the zoom area, click on the edge of the rectangle in the Zoom bar and drag.

> **Note:** In is also possible to adjust the left or right extent by using the <Ctrl> key while clicking the left mouse button on the waveform and dragging.

- To zoom in incrementally, centred on the cursor, use the <crtl>i key combination
- To zoom out incrementally, use the <ctrl>o key combination
- To restore the full recording in the waveform window, use <ctrl> n

The zoom bar can be positioned above or below the waveform or hidden using the right-click menu.



Moving the cursor through the recording

The cursor can be moved by clicking the left mouse button and dragging in any window (except the waveform window). To move the cursor one EPG sample at a time, left click on the EPG palates display and use the left and right cursor keys on the keyboard.
Click on the Waveform window then use the left and right cursor keys to move forward and back at the current zoom level.

Deleting a Region of a File

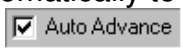
To delete a region of the file:

1. Select the region to be deleted. (This might typically be some extra speech accidentally recorded at the beginning or the end of the file.)
2. Click on the right mouse button in the Waveform window to bring up the popup menu 

and click on the '**Delete Selected**' option.

> **Warning:** There is no undo button. Once deleted, a section cannot be recovered. It is best to use the option only for deleting unwanted portions from the start and the end of a recording.

Automatic Prompt Advance

For convenience, it is possible to make the prompt advance automatically to the next one in the list by checking the Auto Advance checkbox 

(Figure 12**J**). When Auto Advance is checked, the Go Forward button is replaced by a Go Back button 

. Using the Go Back button it is possible to move back to the last recorded file.

Note: If you wish to redo a recording when Auto Advance is checked, you must press the Go Back button then the Redo button

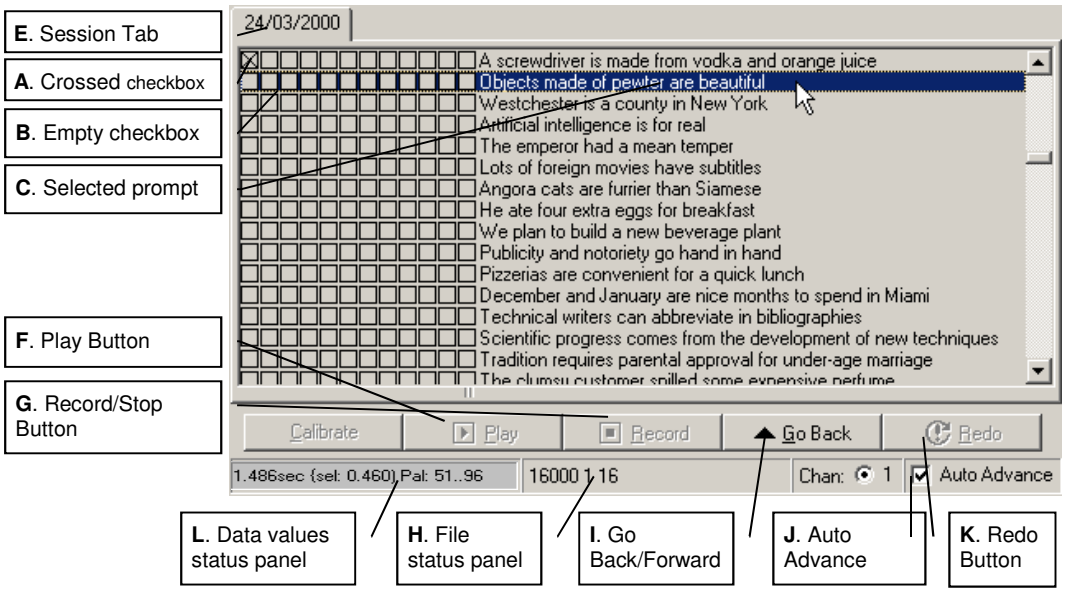
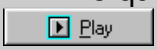


Figure 12 Recording Listbox, Buttons and Status bar

Single Palate Display

The ‘Palate Display’ shows an average contact pattern for the currently selected region of the file. Or, it shows the current palate frame if no region has been selected.

> **TIP**: To quickly scan through an EPG recording, click the 
>
> button and watch the ‘Single Palate Display’. Alternatively, click and drag the mouse along the ‘Palates Display’ (Figure 25).

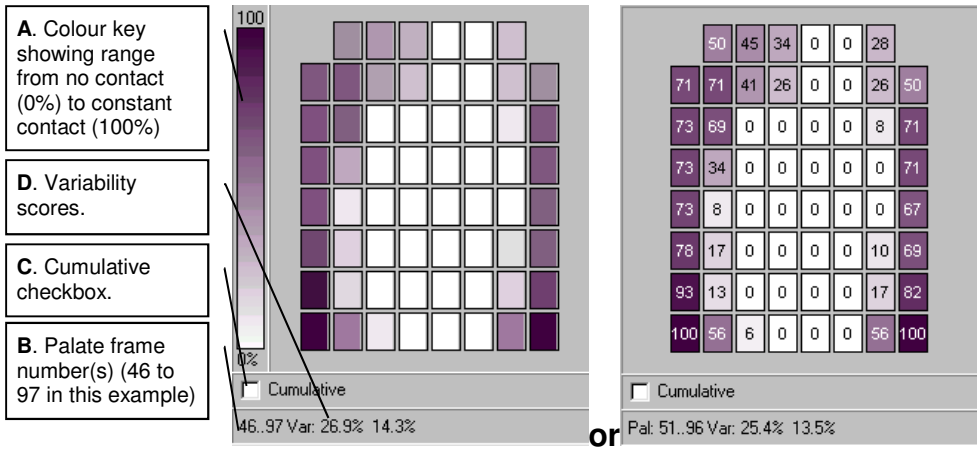


Figure 13 Palate Displays

Palate frames are numbered in sequence from the start of each file. The frame number (or numbers, if a region is selected) is displayed below the palate display (Figure 13**B**).

Palate Colour Scale

The colour key to the right of the single palate display maps the display colours to a scale which shows the percentage of selected frames for which each contact is on. For example, in Figure 13, the bottom right-hand contact is dark in colour. By reference to the colour key this indicates that this contact is on in all the frames in the selected region (frames 46 to 97). The colours of the palate can be changed using the '**Options:Colors:Palate…**' menu option to bring up the dialogue box shown in Figure 14.

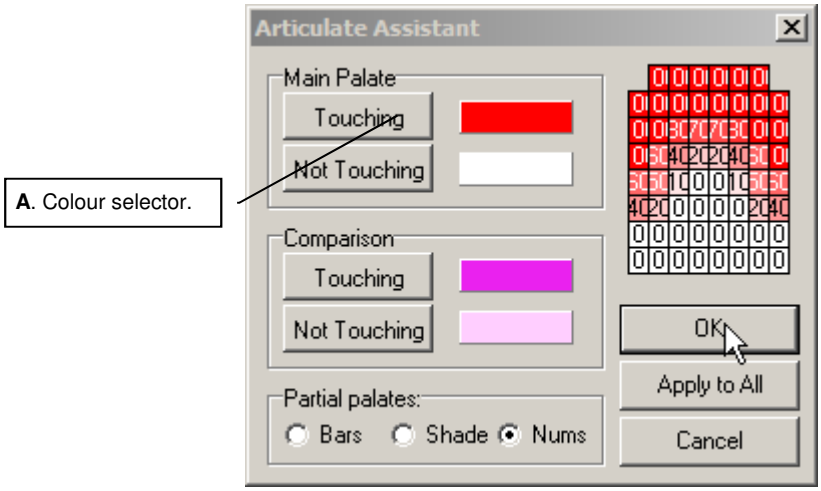


Figure 14 Palate Colours Dialogue

Click on the colour selectors to get a colour selection dialogue. The 'Main Palate' 'Touching' and 'Not Touching' selectors identify the ON and OFF colours for the live EPG input. The 'Comparison' 'Touching' and 'Not Touching' selectors control the colours in comparison to a reference palate (see section in this manual on Comparison Feedback).

For normal EPG display with no superimposed reference template:

Main Palate, Touching – EPG contact ON
Main Palate, Not Touching – EPG contact OFF
Comparison, Touching – Not used
Comparison, Not Touching – Not used

For comparison EPG display with superimposed reference template:
Main Palate, Touching – EPG contact ON (and not matching a superimposed reference pattern)
Main Palate, Not Touching – EPG contact OFF (and is also OFF in the superimposed reference pattern)
Comparison, Touching – EPG contact ON and matching a superimposed reference pattern
Comparison, Not Touching – EPG contact OFF (but is ON in the superimposed reference pattern)

The shading scale can be substituted by other visual representations for the percentage contact.

- **Bars** A bar fills each contact square. The percentage of the contact square filled represents the percentage of contact.
- **Shade** Default representation.
- **Nums** Represents as a numerical percentage.

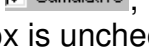
Variability Scores

The Variability Index provides a value for the stability/variability of articulatory gestures. To calculate the index, the percent frequency of activation of each contact across frames is measured. For each contact, 100% and 0% activation frequency represent invariance and are assigned a variance index of 0. The variability index increases as contact frequency approaches 50%, which is assigned a maximum index of 50. The overall variability index is calculated in two forms

1. by summing the index values for all contacts with more than 0% contact and dividing by that number of contacts.
2. by summing the index values for all contacts and dividing by 62.

These two indices are shown in this order below the Single palate Display (Figure 13**D**). An index value of 0 represents invariance, the higher the variability index the more unstable the EPG patterns (maximum index value is 50).

Cumulative Checkbox

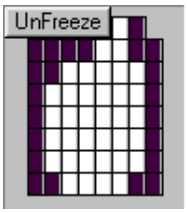
If the 'Cumulative' checkbox in the 'Palate Display' is set 

, then when a contact comes on it will stay on until the checkbox is unchecked.

> **TIP**: Checking the 'Cumulative' checkbox is a good way to check whether all the contacts on a users palate are still working OK

Freezing the Palate Display

It is possible to freeze the Single Palate Display so that the palate pattern does not change with live input or with the movement of cursors in a recorded file. Simply click anywhere on the Single Palate Display to freeze it and do the same again to unfreeze it. A label saying “UnFreeze” will appear to indicate that the display is frozen.



The File Status Panel

The file status panel (Figure 12**H**) shows the sample rate (default = 22050Hz) number of channels (default = 1 for mono recording) and the number of bits per sample (default:16). When a recorded file is selected, the file status panel displays also shows the prompt text with the date and time that the file was recorded and the full path of the wav file.

The Data Values Status Panel

The data values status panel (Figure 12**L**) shows the data values relevant to each window as the cursor is moved over it. When the cursor is over the Waveform or Palates displays it shows the time in seconds from the start of the file, the duration of the selected region and the palate number (or range of palate numbers when a region is selected). Over the Analysis Values display the time in seconds from the start of the file and the values of all the EPG parameters are shown. Over the spectrogram window the time and frequency are shown.

The Analysis Task Window

The Analysis Task window is shown in Figure 16 It is designed principally for the purpose of analysing and annotating sets of utterances. The display provides the waveform and spectrogram displays and provides means for annotating the data. Analysis values derived from the EPG data are also displayed.

Waveform Display

The use of this display in selecting regions and playing back was covered in the previous section. Additional features useful for analysis are the ability to superimpose tickmarks on the display. This can be selected using the right click popup menu in this display window. The tickmark resolution depends on the amount of zoom and is always marked in seconds.

Spectrogram Display

The spectrogram is based on a Hanning windowed FFT with 0.97 pre-emphasis. The resolution of this display can be changed using the ‘**Options:Settings:Spectrogram**’ menu option. A value of 6 or 7 bits

corresponds to a 'Wideband spectrum' which emphasises the formant structure of the speech. A value of 8 or 9 corresponds to a 'Narrowband spectrum' which emphasises the harmonic (pitch) structure of the speech. The spectrogram colours can be changed to suit using the right click popup menu to call up the spectrogram colours dialogue.

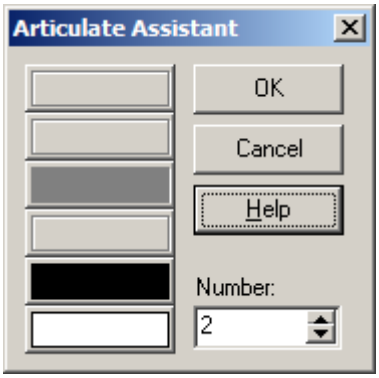
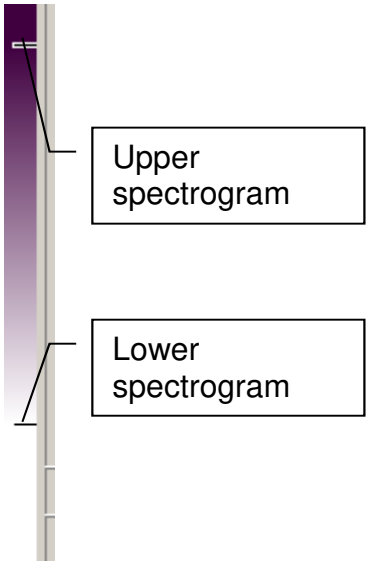


Figure 15 Spectrogram Colours Dialogue

The default colour scale is defined by only 2 colours, however it is possible to create more exiting spectrograms using a range of colours. The 'Number' box allows up to 6 colours to be chosen.

The range of spectral power over which these colours are applied is determined by adjusting the cursors on the colour bar.



The spectrogram disply can be manually refreshed by using the right click popup menu option, '**Refresh**'.

Annotation

The Analysis Task Window is shown in Figure 16. It is designed, principally, to allow the audio and EPG data to be annotated.

Annotation can be made on the basis of the audio data by observing the waveform, the spectrogram or by playback. Annotation can also be made on the basis of EPG by observing the EPG palate sequence (Figure 16**D**) or the

analysis values (Figure 16**E**) derived from the EPG such as total contacts or Centre of Gravity. Automatic annotation is also possible by selecting maximum or minimum points in a given analysis value trace (e.g. Find all the regions in a sentence where there are more than 4 contacts on in the posterior palate row).

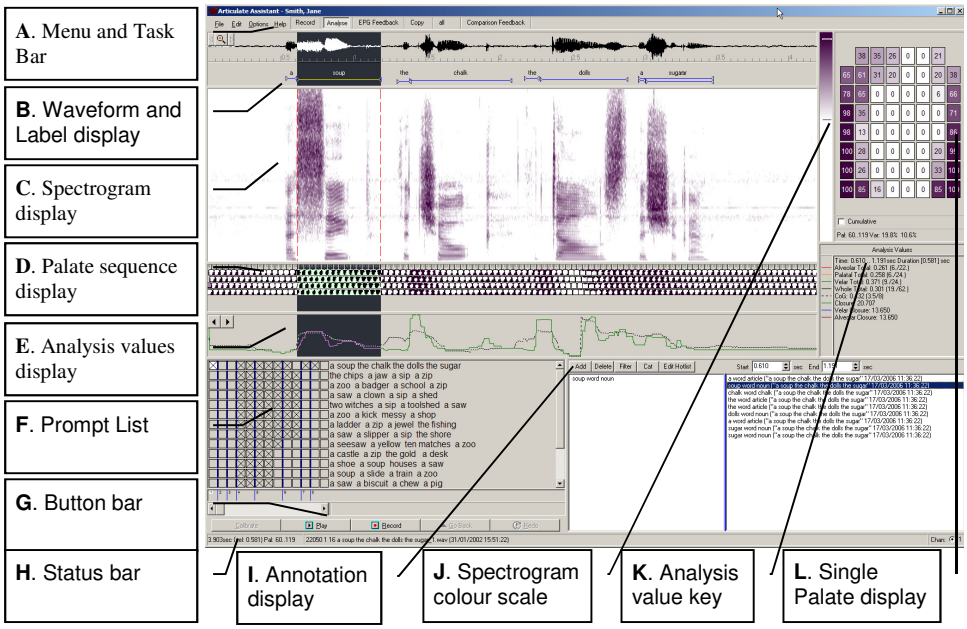
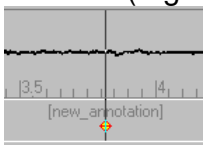


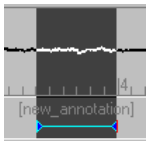
Figure 16 Analysis Task Window

Annotating the Waveform

To annotate the waveform, place the cursor at the point you wish to annotate. Then press the Add button 

in the Annotation editor (Figure 19). An annotation marker will appear below the waveform 

and the Annotation Editor will show the default text contained in the first line of the hotlist (see following section for more on Hotlists). By default this is blank. Although a label can have more than one word only the text before a blank character will be shown on the waveform display. Use an underscore to separate words if more than one is to be visible on the waveform display.

It is also possible to select a region of the waveform 

and annotate it.

Adjusting an annotation

Once an annotation has been created it is possible to adjust the start and stop times or move the entire annotation region.
To adjust the start time, hold down the <ctrl> key and

Annotating Using the Hotlist

The annotation Hotlist is a quicker way to annotate if you have a set of labels and associated keywords that you will use many times. For example, you may wish to annotate word-initial and word-final velar and alveolar stop closures for 10 repetitions of 6 sentences for 3 subjects repeated in 2 sessions.

To add an annotation using the hotlist, right click on the waveform display and select the “Add Annotation” option. A drop down ist of annotations then appears and by clicking on one of the entries the chosen annotation is automatically added for the selected region.

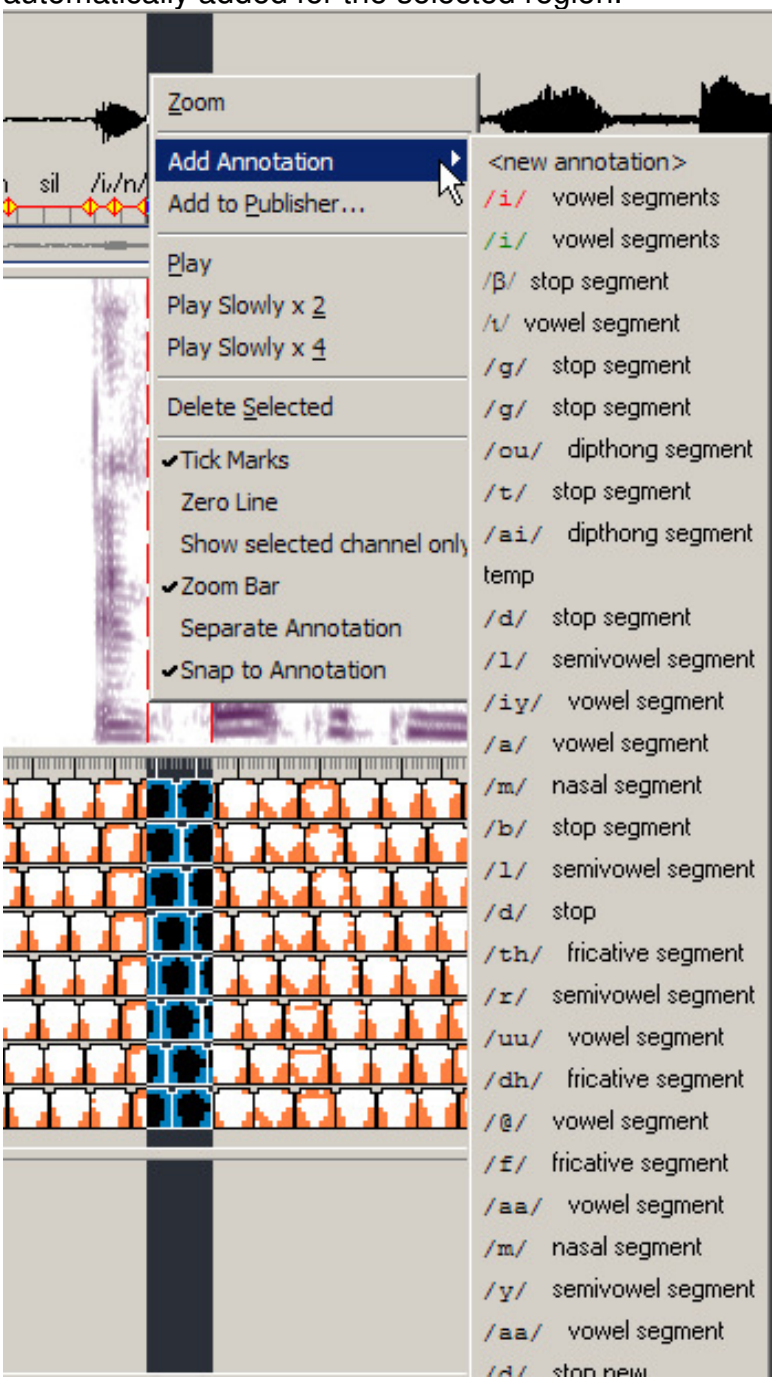
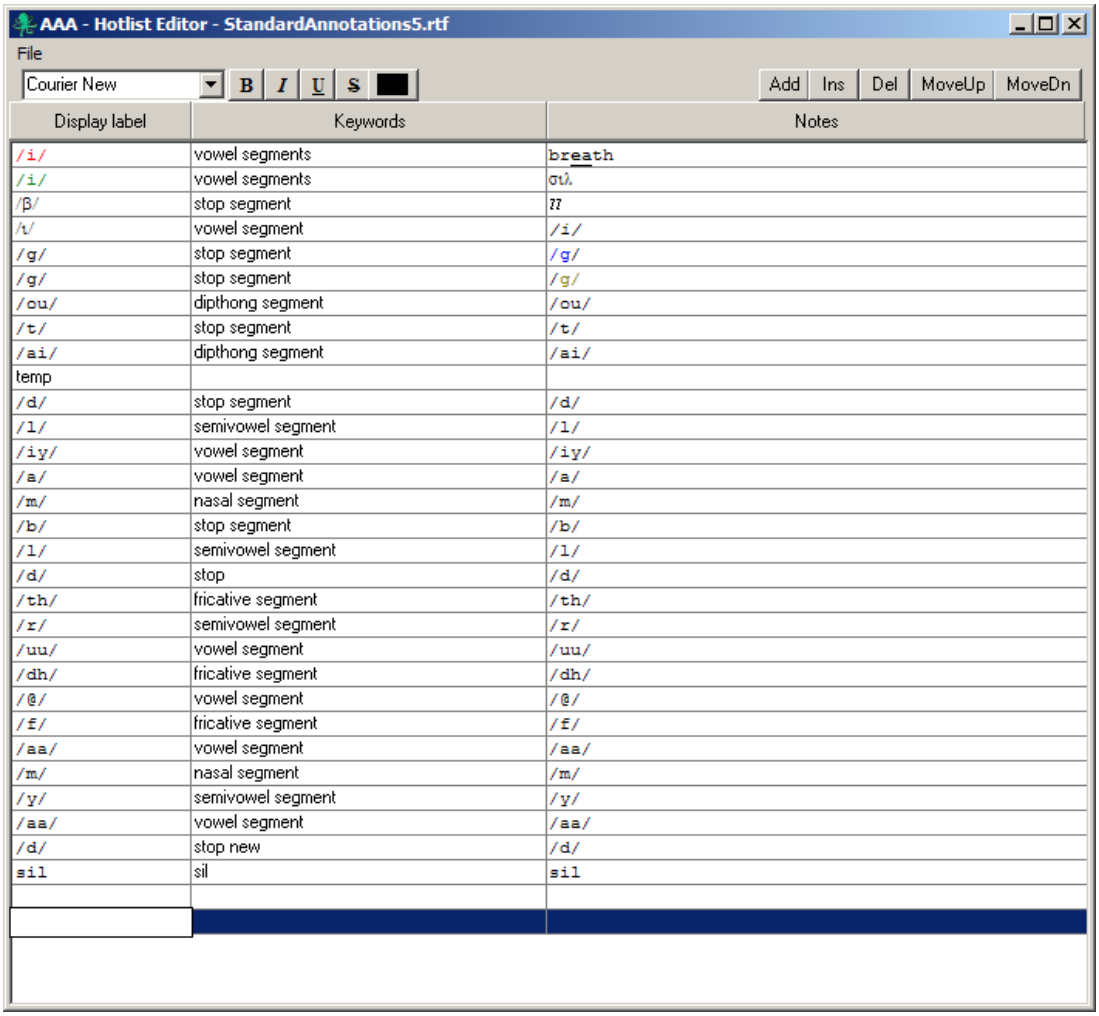


Figure 17 Adding an annotation from the dropdown hotlist

The hotlist can be tailored for each annotation task. To create and edit an annotation hotlist click on the Edit Hotlist button in the Annotation module. Then type out your list of annotations. You may wish to type them out in a word processor and then copy and paste into the hotlist editor.
Note: By default, clicking “Add” will complete the annotation fields using the data in the first field of the Hotlist.



Display label	Keywords	Notes
/i/	vowel segments	breath
/i/	vowel segments	σύ
/β/	stop segment	??
/ɪ/	vowel segment	/i/
/g/	stop segment	/g/
/g/	stop segment	/g/
/ou/	dipthong segment	/ou/
/t/	stop segment	/t/
/ai/	dipthong segment	/ai/
temp		
/d/	stop segment	/d/
/l/	semivowel segment	/l/
/iy/	vowel segment	/iy/
/a/	vowel segment	/a/
/m/	nasal segment	/m/
/b/	stop segment	/b/
/l/	semivowel segment	/l/
/d/	stop	/d/
/th/	fricative segment	/th/
/r/	semivowel segment	/r/
/uu/	vowel segment	/uu/
/dh/	fricative segment	/dh/
/@/	vowel segment	/@/
/f/	fricative segment	/f/
/aa/	vowel segment	/aa/
/m/	nasal segment	/m/
/y/	semivowel segment	/y/
/aa/	vowel segment	/aa/
/d/	stop new	/d/
sil	sil	sil

Figure 18 Editing the hotlist

Snap-to-annotation

The snap-to-annotation function allows selected regions to snap to nearby annotation boundaries. If you click near (within 4 pixels of) an annotation boundary the selected region boundary will jump to meet it. This is useful for ensuring neighbouring phonetic segments are contiguous. This feature can be switched off by right clicking on the waveform display and unchecking the Snap to Annotation option in the popup menu.

Adding Keywords and Notes to the Annotation

An *annotation keyword* is any text separated by a space character on the first line of annotation and can be used as the basis for searching through all annotated files. The first *annotation keyword* is also the label, which appears

under the waveform as described in the previous section. You can add as many *keywords* as you like. Any text typed on the second and following lines in the lefthand panel of the Annotation Editor are regarded as *annotation notes. Annotation notes* are stored and can be recalled but they are not searchable.

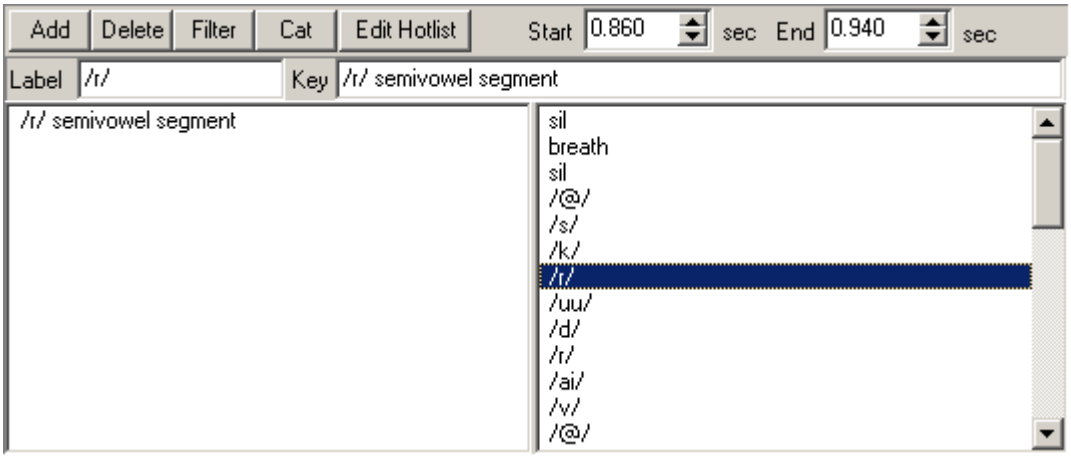


Figure 19 Annotation Editor

Searching for Annotations using the Filter

The Annotation Editor will, by default, display every annotation for the current recording. However, it is possible to control which annotations are displayed by using the Annotation Filter (Figure 21).

Filter Source

The files to be searched can be filtered according to:

- **The Client**. Shows only annotations within the current file.
- **The recording**. Shows annotations for all repetitions and across all sessions for the current prompt.
- **The Annotation**. Shows annotations for all files recorded by current client.

The Client

Recordings can be filtered to show only recordings belonging to the current client or recordings belonging to all clients in the currently loaded project. Alternatively, clients may be selected according to name, date of birth, reference number, sex or any common text specified in the notes attached to a client. Client information can be edited using the main menu option 'Edit|

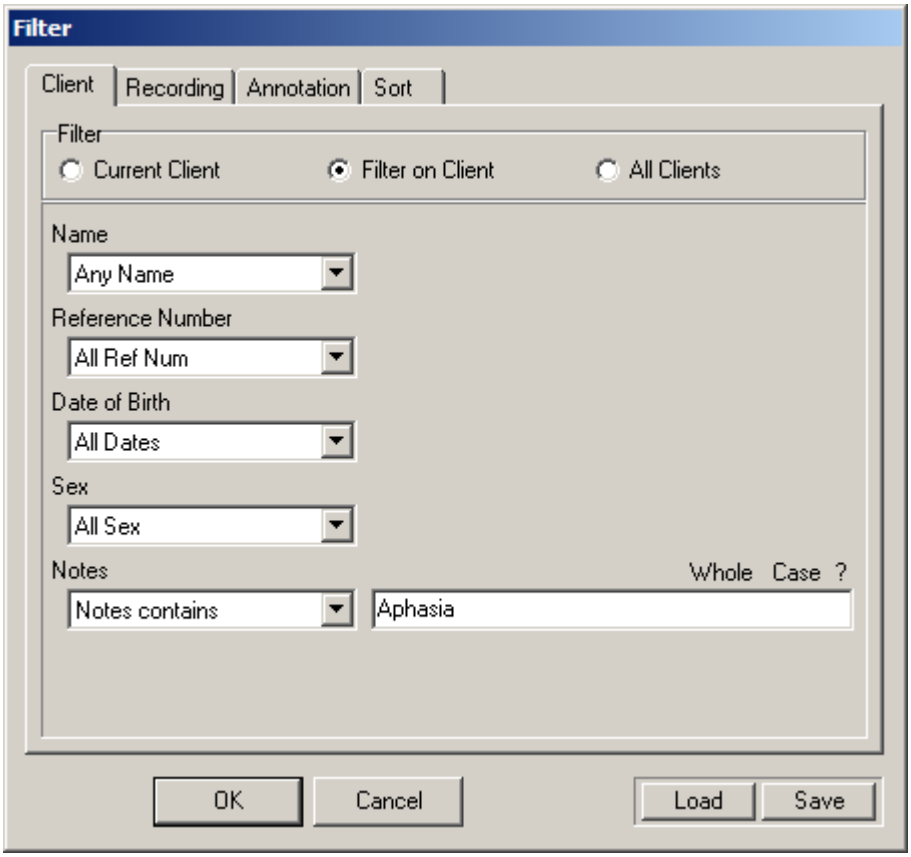
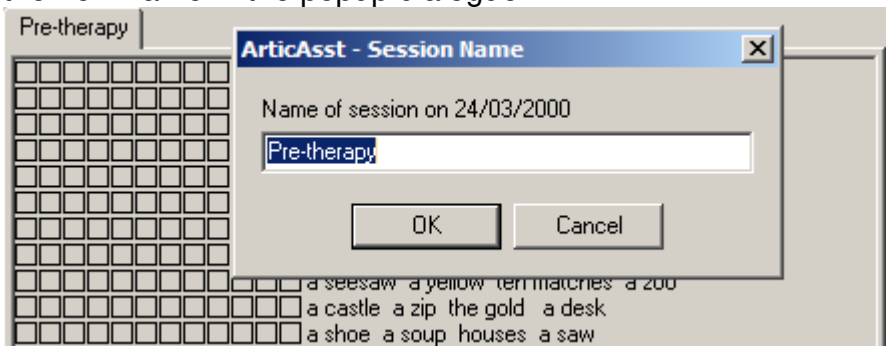


Figure 20 Filter Dialogue (Client filter) This example shows clients with Aphasia being selected from a project that contains both pathological and control subjects.

The recording

Recordings can be filtered to show only the current recording or all recordings by the selected client(s). Alternatively, recordings may be selected according to words or parts of words that appear in the recording prompt or according to the date of recording or according to the session name.

The name of a recording session name always defaults to the date on which the recordings were made and is shown as the text in the tab at the top of the Prompts list window. To change the name of a session from the default, right click on the prompts list window and select “Session name…” Then type the new name in the popup dialogue.



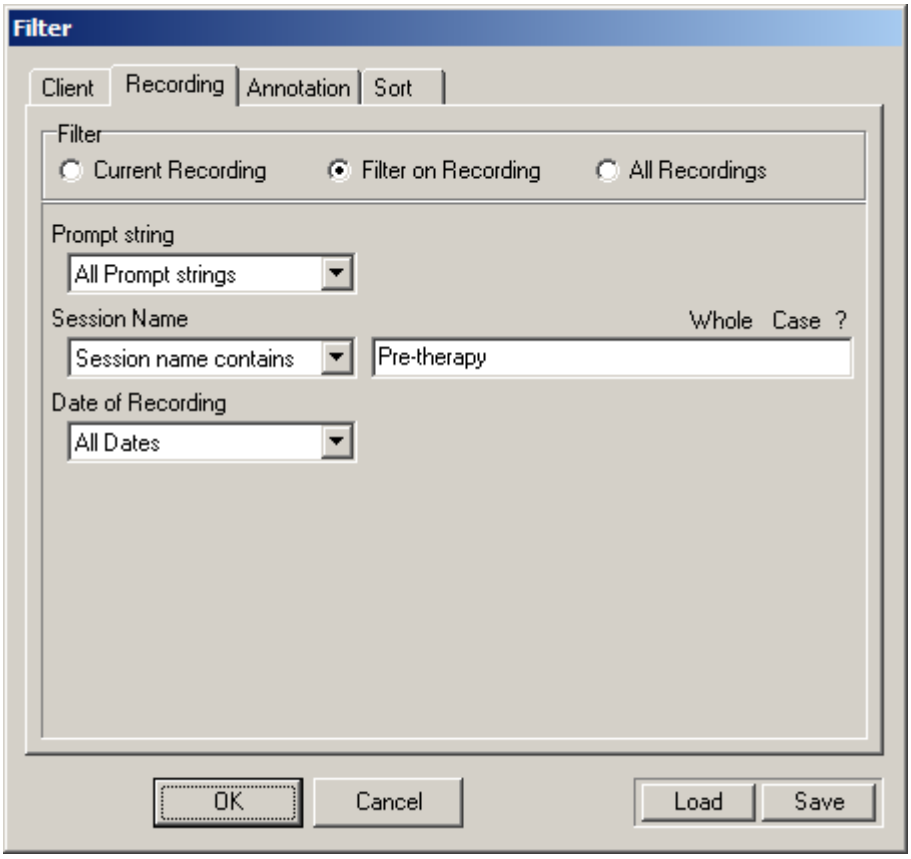


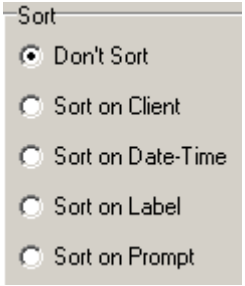
Figure 21 Filter Dialogue (Recording filter) This example shows only recordings from session named pre-therapy being selected.

The Annotation

All annotations from the filtered client(s) and recording(s) may be selected or annotations may be further filtered according to elements in the annotation; namely the Label (a rich text field which is displayed in the Waveform window); the keywords (unlimited set of plain ascii words which can be used to classify and group annotations; and notes (an additional rich text field used for making comments about the annotation).

Sorting

The order in which filtered annotations appear in the annotation window can be put in alphanumerical order according to Client name, Date and time of recording, the annotation label, the prompt to which the annotation belongs.



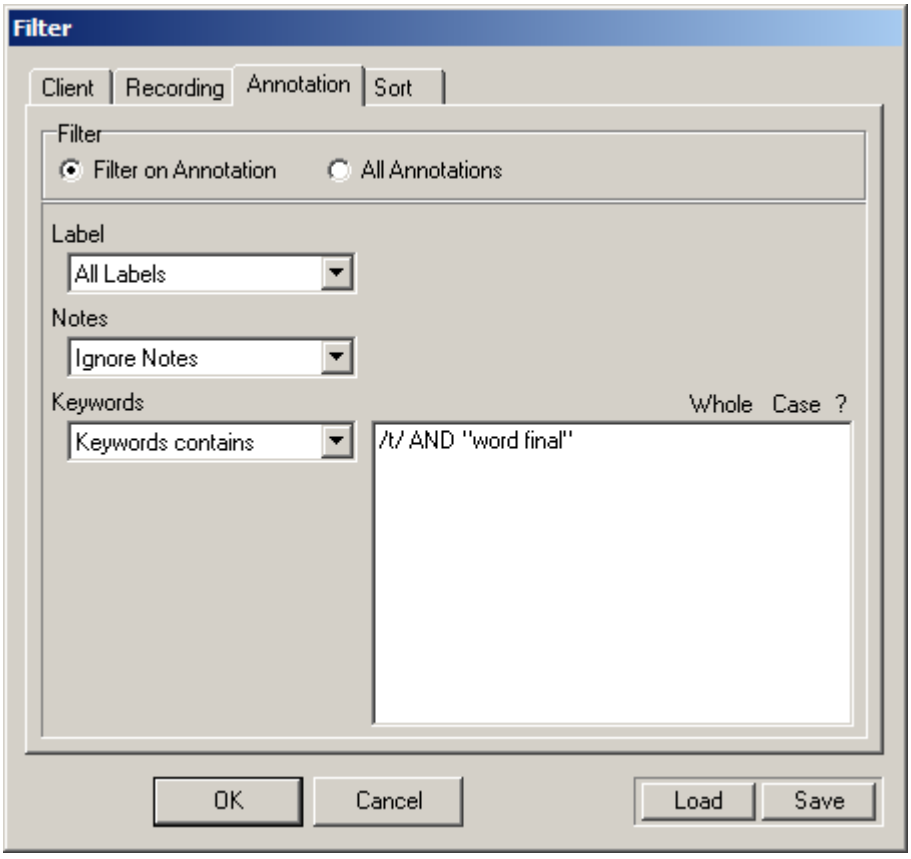


Figure 22 Filter Dialogue (Annotation filter). This example shows annotations with the keywords "/t/" and "Word Final" being selected.

Regular Expressions

Introduction
Regular expressions can be used to find special characters or groups of characters.
e.g.
To find empty labels use expression ^$
To find curly open bracket use expression \{

Regular Expressions are a widely-used method of specifying patterns of text to search for. Special metacharacters allow you to specify, for instance, that a particular string You are looking for occurs at the beginning or end of a line, or contains n recurrences of a certain character. Regular expressions look ugly for novices, but really they are very simple (well, usually simple ;)), handy and powerful tool.

Simple matches
Any single character matches itself, unless it is a metacharacter with a special meaning described below.
A series of characters matches that series of characters in the target string, so the pattern "bluh" would match "bluh" in the target string. You can cause characters that normally function as metacharacters or escape sequences to be interpreted literally by 'escaping' them by preceding them with a

backslash "\", for instance: metacharacter "^" match beginning of string, but "\^" match character "^", "\\" match "\" and so on.

Examples:
foobar matchs string 'foobar'
\^FooBarPtr matchs '^FooBarPtr'

Escape sequences
Characters may be specified using an escape sequence syntax
"\n" matches a newline, "\t" a tab, etc. More generally, \xnn, where nn is a string of hexadecimal digits, matches the character whose ASCII value is nn. If you need wide (Unicode) character code, you can use '\x{nnnn}', where 'nnnn' - one or more hexadecimal digits.

\xnn char with hex code nn
\x{nnnn} char with hex code nnnn (one byte for plain text and two bytes for Unicode)
\t tab (HT/TAB), same as \x09
\n newline (NL), same as \x0a
\r car.return (CR), same as \x0d
\f form feed (FF), same as \x0c
\a alarm (bell) (BEL), same as \x07
\e escape (ESC), same as \x1b

Examples:
foo\x20bar matchs 'foo bar' (note space in the middle)
\tfoobar matchs 'foobar' preceeded by tab

Character classes
You can specify a character class, by enclosing a list of characters in [], which will match any one character from the list. If the first character after the "[" is "^", the class matches any character not in the list.

Examples:
foob[aeiou]r finds strings 'foobar', 'foober' etc. but not 'foobbr', 'foobcr' etc.
foob[^aeiou]r find strings 'foobbr', 'foobcr' etc. but not 'foobar', 'foober' etc.

Within a list, the "-" character is used to specify a range, so that a-z represents all characters between "a" and "z", inclusive.
If you want "-" itself to be a member of a class, put it at the start or end of the list, or escape it with a backslash. If you want ']' you may place it at the start of list or escape it with a backslash.

Examples:
[-az] matchs 'a', 'z' and '-'
[az-] matchs 'a', 'z' and '-'
[a\-z] matchs 'a', 'z' and '-'
[a-z] matchs all twenty six small characters from 'a' to 'z'
[\n-\x0D] matchs any of #10,#11,#12,#13.
[\d-t] matchs any digit, '-' or 't'.

[]-a] matchs any char from ']'..'a'.

Metacharacters
Metacharacters are special characters which are the essence of Regular Expressions. There are different types of metacharacters, described below.
Metacharacters - line separators

^ start of line
$ end of line
\A start of text
\Z end of text
. any character in line

Examples:
^foobar matchs string 'foobar' only if it's at the beginning of line
foobar$ matchs string 'foobar' only if it's at the end of line
^foobar$ matchs string 'foobar' only if it's the only string in line
foob.r matchs strings like 'foobar', 'foobbr', 'foob1r' and so on

The "^" metacharacter by default is only guaranteed to match at the beginning of the input string/text, the "$" metacharacter only at the end. Embedded line separators will not be matched by "^" or "$".
You may, however, wish to treat a string as a multi-line buffer, such that the "^" will match after any line separator within the string, and "$" will match before any line separator. You can do this by switching on the modifier /m. The \A and \Z are just like "^" and "$", except that they won't match multiple times when the modifier /m is used, while "^" and "$" will match at every internal line separator.
The "." metacharacter by default matches any character, but if you switch Off the modifier /s, then '.' won't match embedded line separators.
TRegExpr works with line separators as recommended at www.unicode.org (http://www.unicode.org/unicode/reports/tr18/):

"^" is at the beginning of a input string, and, if modifier /m is On, also immediately following any occurrence of \x0D\x0A or \x0A or \x0D (if You are using Unicode version of TRegExpr, then also \x2028 or \x2029 or \x0B or \x0C or \x85). Note that there is no empty line within the sequence \x0D\x0A.

"$" is at the end of a input string, and, if modifier /m is On, also immediately preceding any occurrence of \x0D\x0A or \x0A or \x0D (if you are using Unicode version of TRegExpr, then also \x2028 or \x2029 or \x0B or \x0C or \x85). Note that there is no empty line within the sequence \x0D\x0A.

"." matches any character, but if you switch Off modifier /s then "." doesn't match \x0D\x0A and \x0A and \x0D (if you are using Unicode version of TRegExpr, then also \x2028 and \x2029 and \x0B and \x0C and \x85).
Note that "^.*$" (an empty line pattern) doesnot match the empty string within the sequence \x0D\x0A, but matches the empty string within the sequence \x0A\x0D.

Multiline processing can be easily tuned for your own purpose with the help of TRegExpr properties LineSeparators and LinePairedSeparator. You can use only Unix style separators \n or only DOS/Windows style \r\n or mix them together (as described above and used by default) or define
Your own line separators!

Metacharacters - predefined classes
\w an alphanumeric character (including "_")
\W a nonalphanumeric
\d a numeric character
\D a non-numeric
\s any space (same as [\t\n\r\f])
\S a non space

You may use \w, \d and \s within custom character classes.

Examples:
foob\dr matchs strings like 'foob1r', ''foob6r' and so on but not 'foobar', 'foobbr' and so on
foob[\w\s]r matchs strings like 'foobar', 'foob r', 'foobbr' and so on but not 'foob1r', 'foob=r' and so on
TRegExpr uses properties SpaceChars and WordChars to define character classes \w, \W, \s, \S, so you can easily redefine it.

Metacharacters - word boundaries
\b Match a word boundary
\B Match a non-(word boundary)
A word boundary (\b) is a spot between two characters that has a \w on one side of it and a \W on the other side of it (in either order), counting the imaginary characters off the beginning and end of the string as matching a \W.

Metacharacters - iterators
Any item of a regular expression may be followed by another type of metacharacters - iterators.
Using metacharacters you can specify the number of occurrences of the previous character, metacharacter or subexpression.

* zero or more ("greedy"), similar to {0,}
+ one or more ("greedy"), similar to {1,}
? zero or one ("greedy"), similar to {0,1}
{n} exactly n times ("greedy")
{n,} at least n times ("greedy")
{n,m} at least n but not more than m times ("greedy")
*? zero or more ("non-greedy"), similar to {0,}?
+? one or more ("non-greedy"), similar to {1,}?
?? zero or one ("non-greedy"), similar to {0,1}?
{n}? exactly n times ("non-greedy")
{n,}? at least n times ("non-greedy")
{n,m}? at least n but not more than m times ("non-greedy")

So, digits in curly brackets of the form {n,m}, specify the minimum number of times to match the item n and the maximum m. The form {n} is equivalent to {n,n} and matches exactly n times. The form {n,} matches n or more times.

There is no limit to the size of n or m, but large numbers will chew up more memory and slow down r.e. execution. If a curly bracket occurs in any other context, it is treated as a regular character.

Examples:
foob.*r matchs strings like 'foobar', 'foobalkjdflkj9r' and 'foobr'
foob.+r matchs strings like 'foobar', 'foobalkjdflkj9r' but not 'foobr'
foob.?r matchs strings like 'foobar', 'foobbr' and 'foobr' but not 'foobalkj9r'
fooba{2}r matchs the string 'foobaar'
fooba{2,}r matchs strings like 'foobaar', 'foobaaar', 'foobaaaar' etc.
fooba{2,3}r matchs strings like 'foobaar', or 'foobaaar' but not 'foobaaaar'

A little explanation about "greediness". "Greedy" takes as many as possible, "non-greedy" takes as few as possible. For example, 'b+' and 'b*' applied to string 'abbbbc' return 'bbbb', 'b+?' returns 'b', 'b*?' returns empty string, 'b{2,3}?' returns 'bb', 'b{2,3}' returns 'bbb'.
You can switch all iterators into "non-greedy" mode (see the modifier /g).

Metacharacters - alternatives
You can specify a series of alternatives for a pattern using "|" to separate them, so that fee|fie|foe will match any of "fee", "fie", or "foe" in the target string (as would f(e|i|o)e). The first alternative includes everything from the last pattern delimiter ("(", "[", or the beginning of the pattern) up to the first "|", and the last alternative contains everything from the last "|" to the next pattern delimiter. For this reason, it's common practice to include alternatives in parentheses, to minimize confusion about where they start and end. Alternatives are tried from left to right, so the first alternative found for which the entire expression matches, is the one that is chosen. This means that alternatives are not necessarily greedy. For example: when matching foo|foot against "barefoot", only the "foo" part will match, as that is the first alternative tried, and it successfully matches the target string. (This might not seem important, but it is important when you are capturing matched text using parentheses.) Also remember that "|" is interpreted as a literal within square brackets, so if you write [fee|fie|foe] you're really only matching [feio|].

Examples:
foo(bar|foo) matchs strings 'foobar' or 'foofoo'.

Metacharacters - subexpressions
The bracketing construct (...) may also be used for define r.e. subexpressions (after parsing, you can find subexpression positions, lengths and actual values in MatchPos, MatchLen and Match properties of TRegExpr, and substitute it in template strings by TRegExpr.Substitute). Subexpressions are numbered based on the left to right order of their opening parenthesis. First subexpression has number '1' (whole r.e. match has number '0' - You can substitute it in TRegExpr.Substitute as '$0' or '$&').

Examples:
(foobar){8,10} matchs strings which contain 8, 9 or 10 instances of the 'foobar'

foob([0-9]|a+)r matchs 'foob0r', 'foob1r' , 'foobar', 'foobaar', 'foobaar' etc.

Metacharacters - backreferences

Metacharacters \1 through \9 are interpreted as backreferences. \<n> matches previously matched subexpression #<n>.

Examples:
(.)\1+ matchs 'aaaa' and 'cc'.
(.+)\1+ also match 'abab' and '123123'
(["']?)(\d+)\1 matchs '"13" (in double quotes), or '4' (in single quotes) or 77 (without quotes)
Etc

Modifiers
Modifiers are for changing behaviour of TRegExpr. There are many ways to set up modifiers. Any of these modifiers may be embedded within the regular expression itself using the (?...) construct. Also, you can assign to appropriate TRegExpr properties (ModifierX for example to change /x, or ModifierStr to change all modifiers together). The default values for new instances of TRegExpr object defined in global variables, for example global variable RegExprModifierX defines value of new TRegExpr instance ModifierX property.

i
Do case-insensitive pattern matching (using installed in you system locale settings), see also InvertCase.

m
Treat string as multiple lines. That is, change "^" and "$" from matching at only the very start or end of the string to the start or end of any line anywhere within the string, see also Line separators.

s
Treat string as single line. That is, change "." to match any character whatsoever, even a line separators (see also Line separators), which it normally would not match.

g
Non standard modifier. Switching it Off You'll switch all following operators into non-greedy mode (by default this modifier is On). So, if modifier /g is Off then '+' works as '+?', '*' as '*?' and so on

x
Extend your pattern's legibility by permitting whitespace and comments (see explanation below).

r
Non-standard modifier. If is set then range à-ÿ additional include russian letter '¸', À-ß additional include '¨', and à-ß include all russian symbols.

Sorry for foreign users, but it's set by default. If you want switch if off by default - set false to global variable RegExprModifierR.
The modifier /x itself needs a little more explanation. It tells the TRegExpr to ignore whitespace that is neither backslashed nor within a character class. You can use this to break up your regular expression into (slightly) more readable parts. The # character is also treated as a metacharacter introducing a comment, for example:
(
(abc) # comment 1
| # You can use spaces to format r.e. - TRegExpr ignores it
(efg) # comment 2
)
This also means that if you want real whitespace or # characters in the pattern (outside a character class, where they are unaffected by /x), that you'll either have to escape them or encode them using octal or hex escapes. Taken together, these features go a long way towards making regular expressions text more readable.

Perl extensions
(?imsxr-imsxr)
You may use it into r.e. for modifying modifiers by the fly. If this construction inlined into subexpression, then it effects only into this subexpression

Examples:
(?i)Saint-Petersburg matchs 'Saint-petersburg' and 'Saint-Petersburg'
(?i)Saint-(?-i)Petersburg matchs 'Saint-Petersburg' but not 'Saint-petersburg'
(?i)(Saint-)?Petersburg matchs 'Saint-petersburg' and 'saint-petersburg'
((?i)Saint-)?Petersburg matchs 'saint-Petersburg', but not 'saint-petersburg'
(?#text)
A comment, the text is ignored. Note that TRegExpr closes the comment as soon as it sees a ")", so there is no way to put a literal ")" in the comment.

Selecting Annotated Regions to Play, Analyse or Edit

There are two ways to select an existing annotated region.

1. Click on the annotation marker on the waveform display (or). If there are several markers close together then you will be given a choice.
2. Click on the annotation listed in the 'Annotation Editor' (as in Figure 23). This has the added advantage that it will automatically load the correct file.

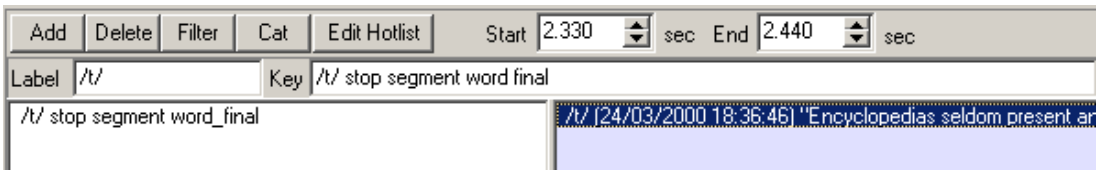


Figure 23 Result of filter settings shown in Figure 22 for the tutorial client

Editing and Deleting Annotations

Select the annotation by one of the methods shown in the previous section. The annotation details appear in the left hand window of the Annotation Editor. These may be edited. The selected annotation can be deleted by clicking on the button marked 'Delete' in the Annotation Editor.

All the filtered annotation (i.e all annotations collected in the right hand window of the Annotation editor can be deleted in one go. To do this, right mouse click on the Annotation editor and select 'Delete Filtered Annotations'. Alternatively, select 'Edit|Annotations|Delete Filtered Annotations…' from the application menu. Note, as a safeguard, confirmation is required after this option is selected, however, once deleted, annotations cannot be restored.

Changing Start and Stop times

Select the annotation by one of the methods shown in the previous section. The annotation start and stop times appear at the top of the display. These times can be edited. Start and stop times can also be adjusted by clicking near the end of the selected annotation on the Wave display, holding the <Ctrl> key down and dragging the cursor.

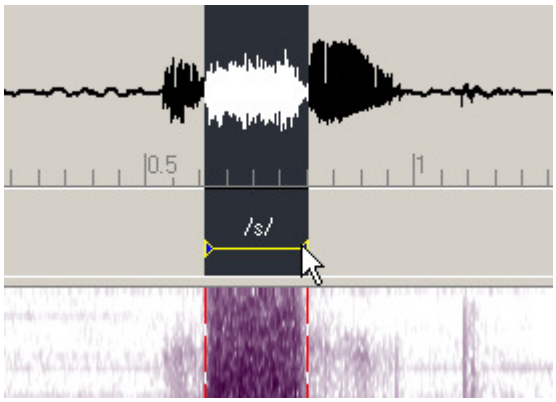


Figure 24 Hold <Ctrl> key and click (and drag) near selected annotation boundary to adjust boundary

> **TIP**: Keep the Snap-to-annotation feature on when adjusting annotation boundaries to make it easy to align sequential annotations.

Concatenating annotated regions

All the currently filtered annotations can be concatenated together and stored temporarily by pressing the Cat button. The button changes to a Back button that conveniently takes you back to where you were before the concatenation. The data is stored in a client folder called "catenated, files" and overwritten every time a new concatenation is performed.

This facility assumes that all the wav files are in the same format. If a wav file containing a filtered annotation does not match the format then a warning

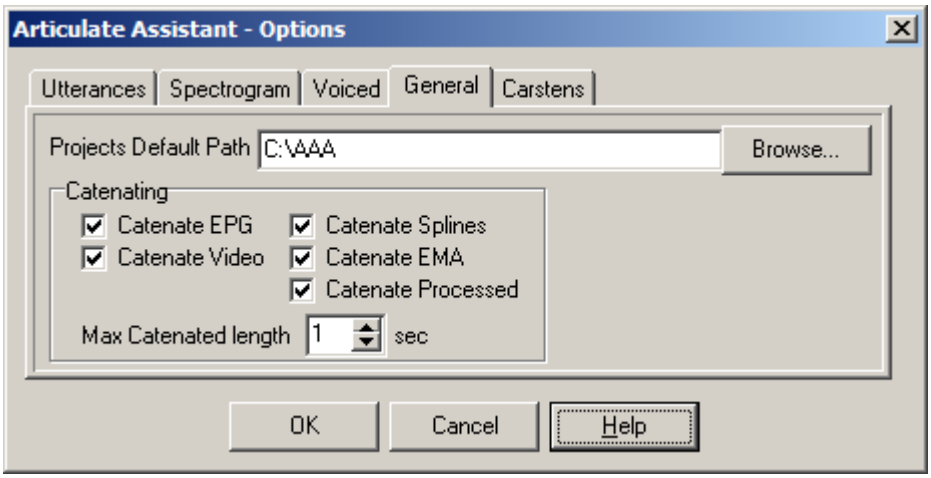
dialogue will be shown and the annotation will be excluded from the concatenation.

> **NB.** You must select an entry from the right-hand Annotation Editor window. All subsequent wav files will be checked to see if they match the format of this selected entry.

Concatenation can be used to calculate values calculated by selecting a region. For example the variability of all maximum contact EPG frames in target consonants can be calculated by concatenating all such annotated frames then selecting the whole concatenated file. The variability score will be displayed under the palate display window as described on page 32 of this manual. By applying the max threshold detection to this same selection the overall maximum contact pattern could be found easily.

Concatenating Options

The option to switch off concatenation for certain types of data can be found in “Options|Settings”. This can be used to limit the size in memory and the time to create concatenated recordings, particularly if concatenation is used to quickly view all annotations of a particular type to make sure they all look homogeneous in the spectrogram display.



EPG Analysis

The EPG Palates Display

The ‘EPG Palates’ display has tickmarks running along the top of the display (Figure 25**A**). Each tickmark corresponds to an EPG palate but there is only room to display a few of the palates. The long tickmark (Figure 25**C**) that is connected to each displayed palate, indicates the moment in time that the palate was recorded. To see a sequence of EPG palates it is necessary to zoom in or resize the EPG palates display. See the following section on resizing displays. Reducing the height of the EPG Palates display will increase the number of displayed palates. Note that if there are tick marks

between the palates that are displayed. Then zooming in or resizing the display will reveal them.

Figure 25 EPG Palates Display

If zooming in or reducing the size of the EPG Palates display is undesirable, there is another way to view all the palates. Using the right mouse button, click in the EPG Palates window to reveal the popup window 

. Then click on the '**Multiple Rows**' option. The 'Multiple' EPG palates display (Figure 26) will then create as many rows as necessary to show all the palates.

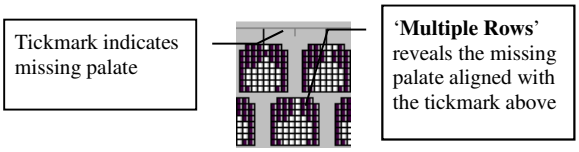
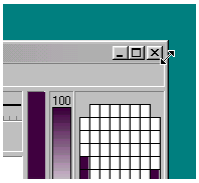


Figure 26 EPG Palates Display (Multiple Rows)

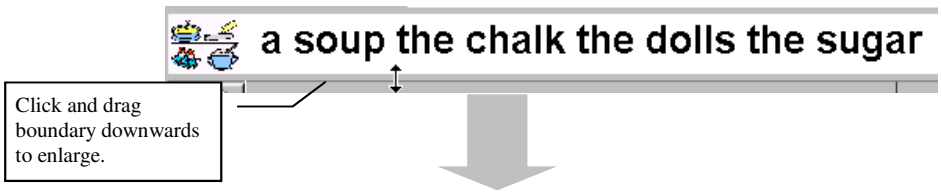
Resizing Displays

As with any Windows program, task windows and dialogues within Articulate Assistant Advanced™ may be resized by moving the cursor over the edge of the window and clicking and dragging with the left mouse button.



Articulate Assistant Advanced™ also allows most displays within a task window to be resized. That is to say that some parts of a task window may be made larger at the expense of others. This is mostly a matter of personal preference but you may wish to resize in order to:

- Make the contents of the Prompt display more visible Figure 27.
- To show more palates (See previous section)
- To format a window in preparation for printing.



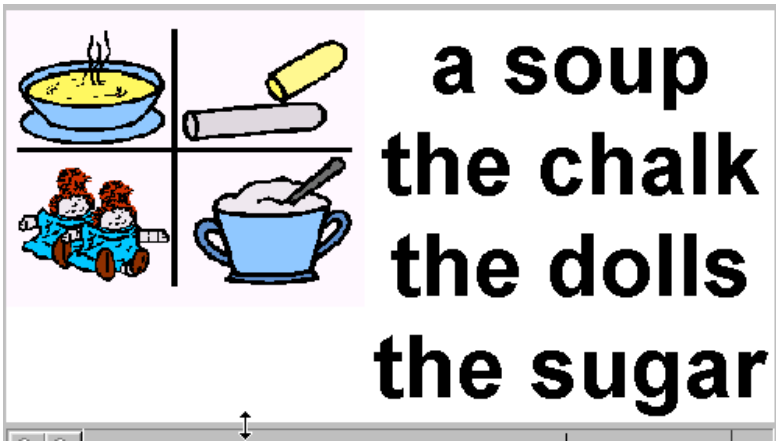


Figure 27 Resizing the Prompt display

To resize any display:

1. Move the cursor over the boundary to the left, right, top or bottom of the display you wish to resize until it changes to look like this or this .
2. Click and drag with the left mouse button in the direction of the arrows

EPG Analysis Values

It is very useful to be able to observe how contact patterns change with time by observing the whole palate but for objective analysis it is useful to be able to extract a single value which represents the feature of change that is of interest. Common values used to analyse EPG dynamics are:

1. Palate Contact Totals over
   - The Whole Palate (All contacts)
   - The Alveolar region (First two rows)
   - The Palatal Region (Rows 3-5)
   - The Velar Region (Rows 6-8)
2. A Centre of Gravity Measure (CoG) which indicates whether the contact is at the front of the palate or at the back.

See the following section for an explanation of how these values are calculated.

Analysis Value Charts

Analysis values can all be displayed in the ‘Analysis Values’ display (Figure 28).

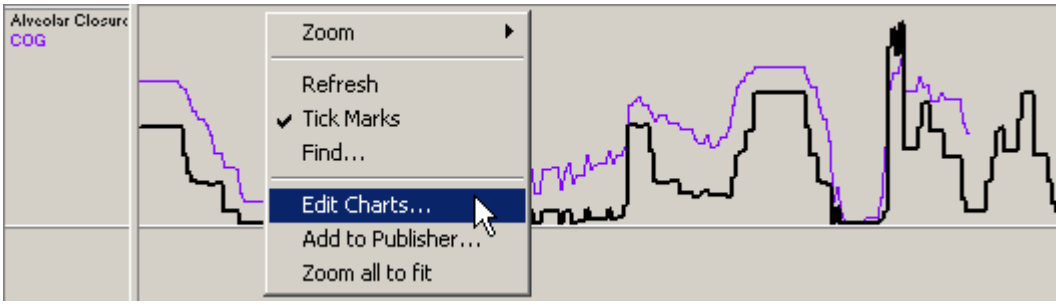


Figure 28 The EPG Analysis Values Chart

Edit Charts Dialogue

It is possible to select which values to display by clicking the **right mouse button** in the 'Analysis Values' display and 'Edit Charts' in the popup menu. Tickmarks can also be toggled on or off using this menu.

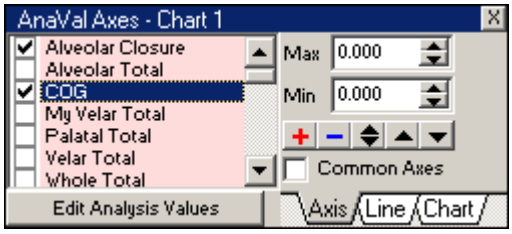


Figure 29 Edit Charts Dialogue

Select a chart from the lefthand column and display pre-defined analysis values by checking items in the central list. Additional charts can be added or deleted.

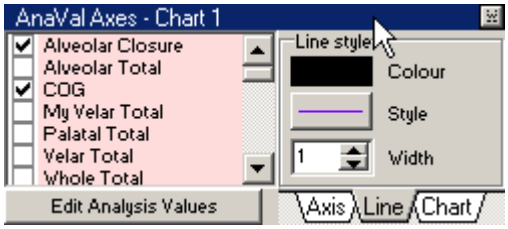


Figure 30 Edit Chart - Line style

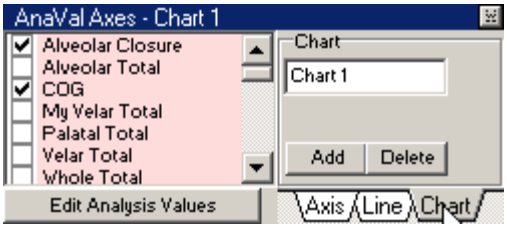


Figure 31 Edit Charts - Add charts

Find script for finding and labelling analysis value features

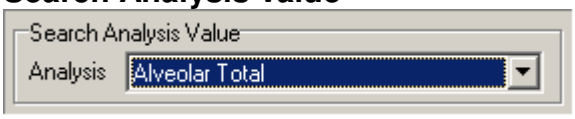
It is possible to find maxima, minima values above or below a specified value of any Analysis Value using the '**Find…**' option in the Popup menu in Figure 28**.**

The 'Find… Dialogue' box shown in Figure 32 allows the user to identify points or regions of speech automatically by looking at features of a given analysis value. The find function is configurable by the user but also comes with preloaded examples of common tasks such as: finding the next EPG frame of maximum contact; finding EPG closure regions etc. These find functions are built from the following ten building blocks

1. Search Analysis Value
2. Find Peak/Valley
3. Find Threshold
4. Find Shoulder
5. Create Region
6. Point from Region
7. Set Search Area
8. Set Selection
9. Get Selection
10. Set V(ariable)

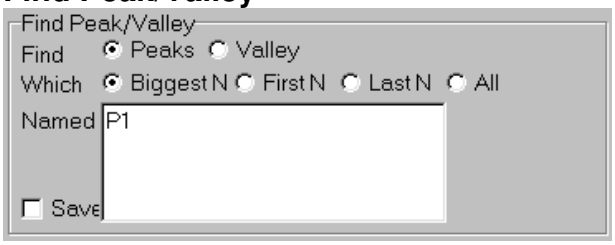
Each building block will now be described:

Search Analysis value



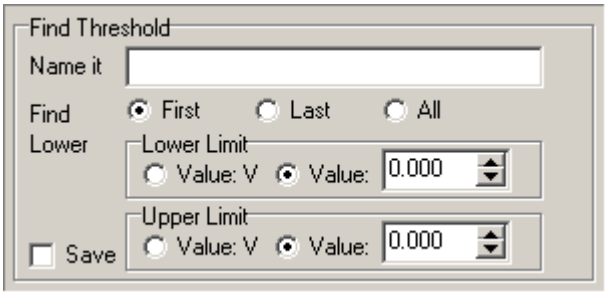
Each Find function should start by defining which Analysis value to base the function on.

Find Peak/Valley



Finds a peak or valley in the '*search area'* the previously specified '*search analysis value'*. It can be named to be used later on in the function. If the 'Save' checkbox is checked then the point will automatically be annotated and labelled with the 'Name'. If there are N lines in the 'Named' edit box with names then N peaks or valleys will be found.

Find Threshold



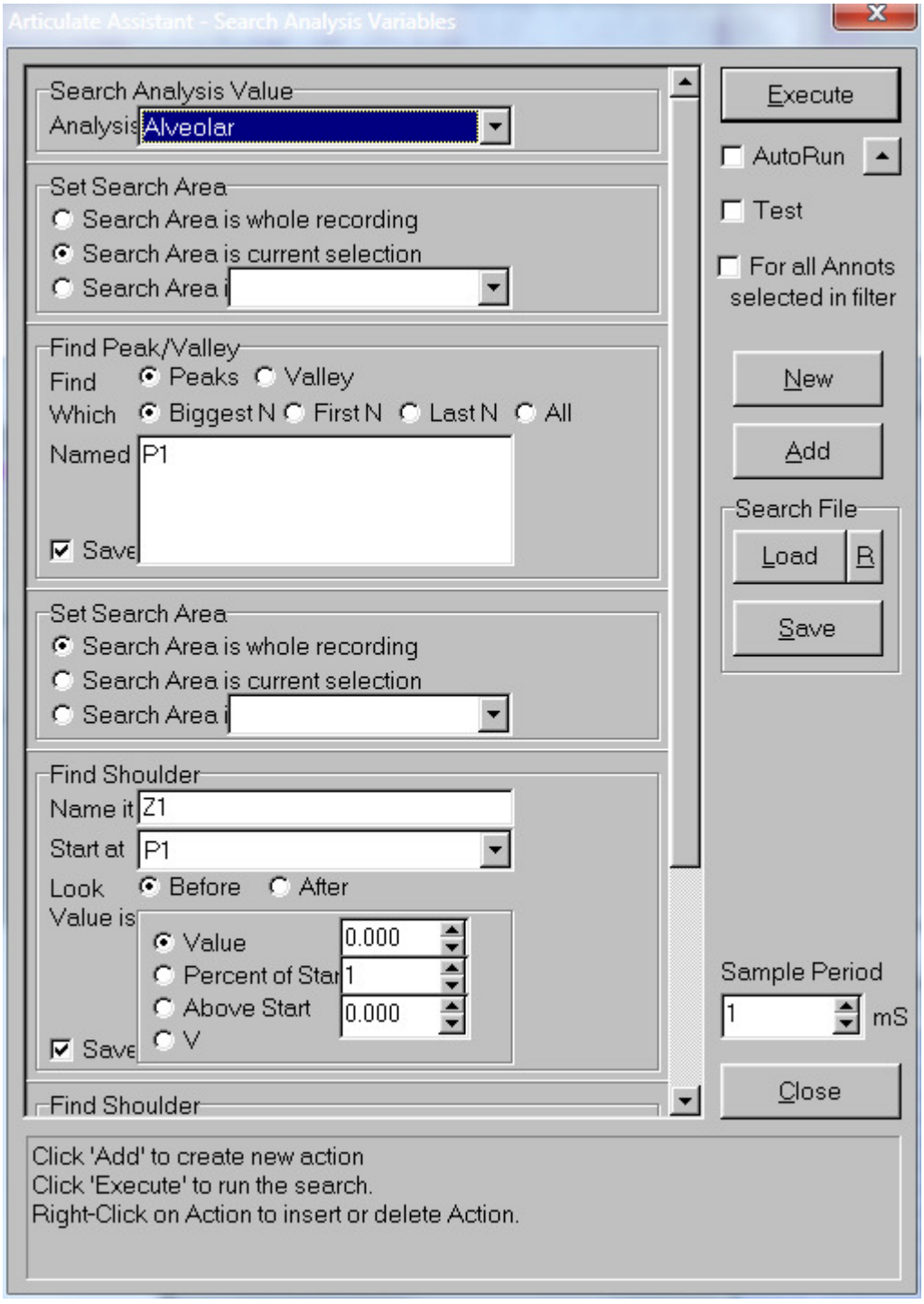
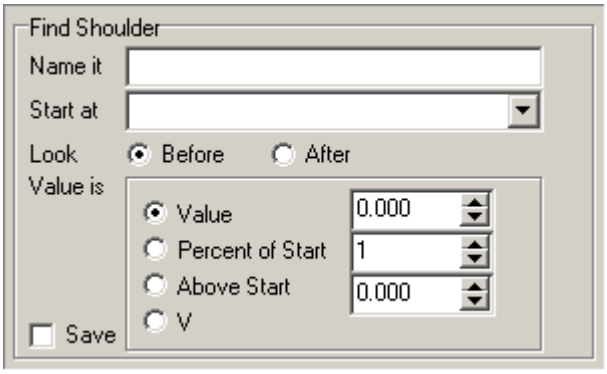


Figure 32 The Find… Dialogue

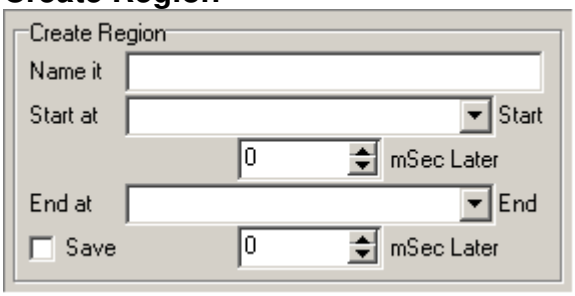
Finds a region within the 'search area' for which the 'search analysis value' remains within a specified range. It can also operate on an internally defined variable, V (see Set V). The threshold region can be named for use later in the function. . If the 'Save' checkbox is checked then the threshold region will automatically be annotated and labelled with the 'Name'.

Find Shoulder



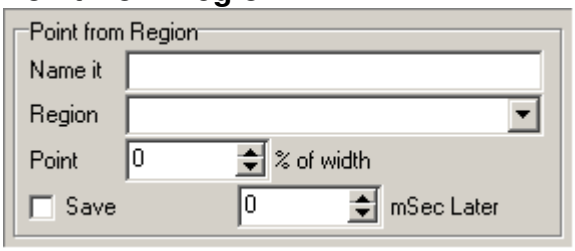
Finds a point within the 'search area' by reference to a previously defined point

Create Region



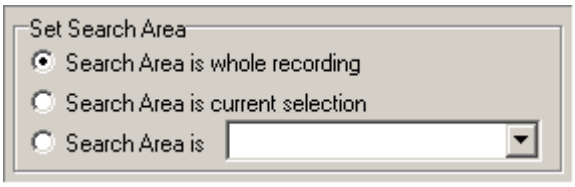
Create a region from two previously defined points

Point from Region



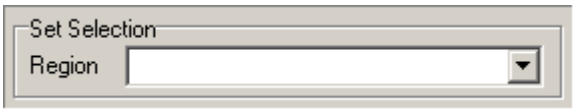
Creates a point from a specified region. E.g. finds start, midpoint or end of a region.

Set Search Area



Defines the region over which a subsequent search is carried out

Set Selection

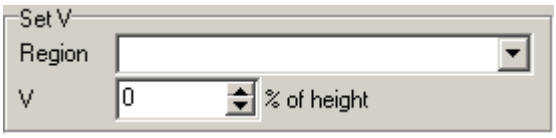


Sets the selected region on the 'analysis values display'

Get Selection

Allows the region selected on the analysis values display to be named and used as a region in subsequent stages of the function.

Set V



Sets an internal variable (V) to be the value of the 'search analysis value' defined as follows:
Region start value + X% of (region end value-region start value)

To insert one of the above specified function blocks right click on a block and click the right mouse button to get the popup menu in Figure 33.

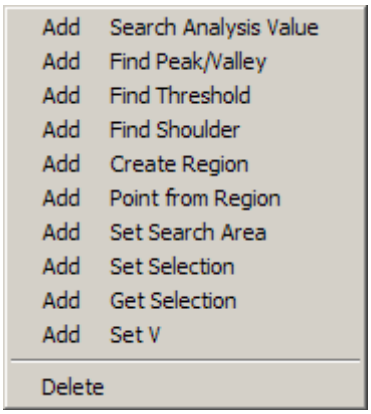


Figure 33 Popup menu in Find Dialogue

To run a find function click the 

button.

If **Autorun** is checked then the function will run every time a point or region is selected in the analysis display.

If **Test** is checked then the function will execute without generating any requested annotations.

If the **For All Annots** is checked the function will be applied to every annotation in the annotations filtered list. For this option assume that for each annotation the annotation region will be selected. Therefore a **Set Search Area** building block should be set to the **Selected Area** to take advantage of this setting. Note that the Annotation Filter must have "Filter on annotation" selected.

The minimise button hides most of the dialogue just leaving the 'search analysis value' and 'Autorun' options visible.

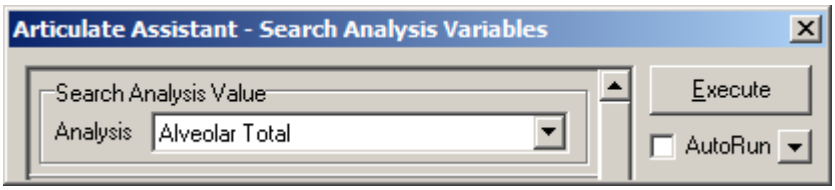
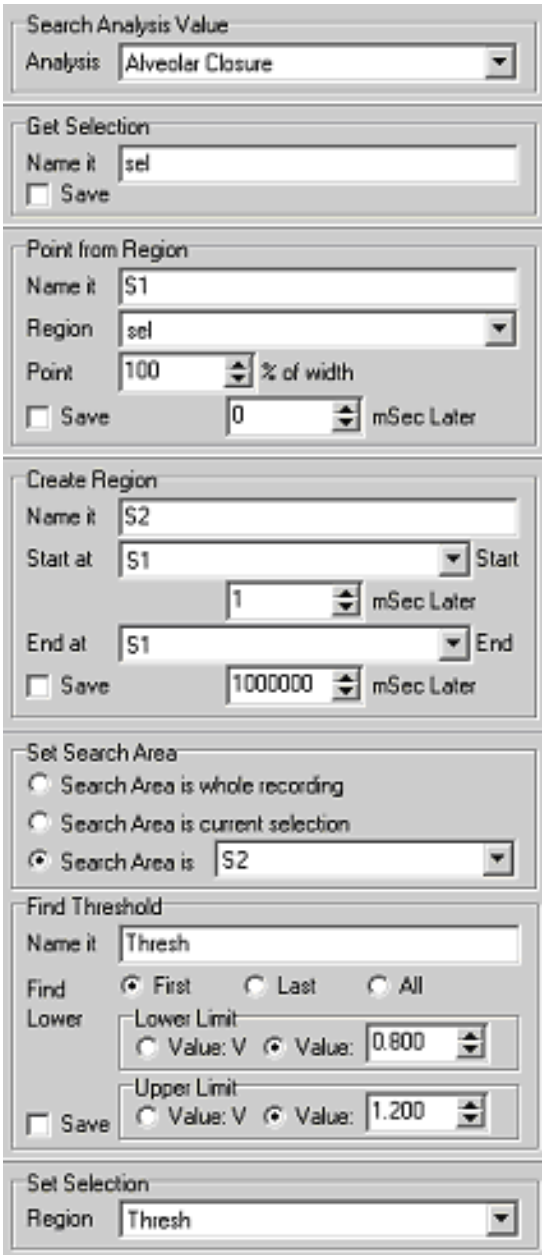


Figure 34 Minimised Find... Dialogue

Closure detection

A new analysis value has been developed which measures the connectivity between the right and left sides of the palate. It is more sophisticated than simply counting the number of contacts in each row. It considers the amount of contact and also considers closures consisting of contacts on more than one row.

To **detect stop closures** using the closure value, set the threshold in the range 80% -100%




```
Ver=4
New Panel
SearchAnalysisValue=6
cbAnaV=Alveolar Closure
End
New Panel
GetSelection=10
cbSave=0
edNewRgn=sel
End
New Panel
PointfromRegion=1
sePercent=100
cbSave=0
seLater=0
edNewRgn=S1
cboldRgnName=sel
End
New Panel
CreateRegion=3
cbSave=0
seStartLater=1
edNewRgn=S2
cbStartRgnName=S1
cbEndRgnName=S1
seEndLater=1000000
End
New Panel
SearchwithinRegion=2
rgSearchInRgn=2
cboldRgnName=S2
End
New Panel
FindThreshold=8
rbFirst=1
rbLast=0
cbSave=0
rbAll=0
sfLower=0.80
sfUpper=1.20
rgLower=1
rgUpper=1
edNewRgn=Thresh
End
New Panel
SetSelection=9
cboldRgnName=Thresh
End
```

Figure 35 Script for finding Alveolar closure regions from the EPG data (to the right is the contents of the Threshold.srh file that corresponds to the graphical script)

The script finds a region of the recording, beyond the cursor position, for which the alveolar closure value is above 0.8 and below 1.2 (i.e. complete closure).

1. The script starts by identifying the analysis search value as the Alveolar Closure value.
2. Next the script uses the currently selected point or region of the recording as its starting point and names it “sel”.
3. Then a single time point is identified as the last point in the selected region and named “S1”.

4. Then a new region (S2) is defined, starting 1ms after the last point in the selected region and ending 1000 seconds later i.e. beyond the end of the recording.
5. The search area is then set to be this newly defined region.
6. Within the search area, a region named 'Thresh' is identified as the first region where the Alveolar closure value goes above 0.8 and below 1.2 and remains in this numerical range.
7. Finally , the selected region of the display is changed from the original cursor position to the selected region defined by 'Thresh'.
8. It will be necessary to lower the threshold for velar stops that don't have complete closure

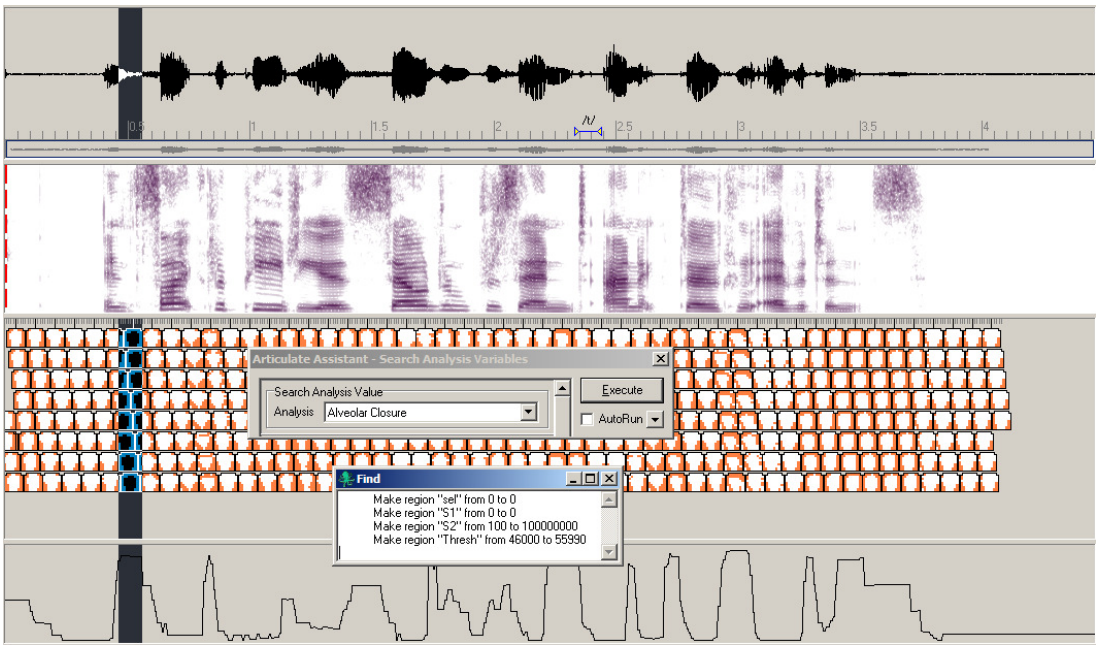


Figure 36 Result of running the 'Threshold' script on the example recording.

To **detect sibilants** using the alveolar closure value, set the threshold in the range 0.4 – 0.8.

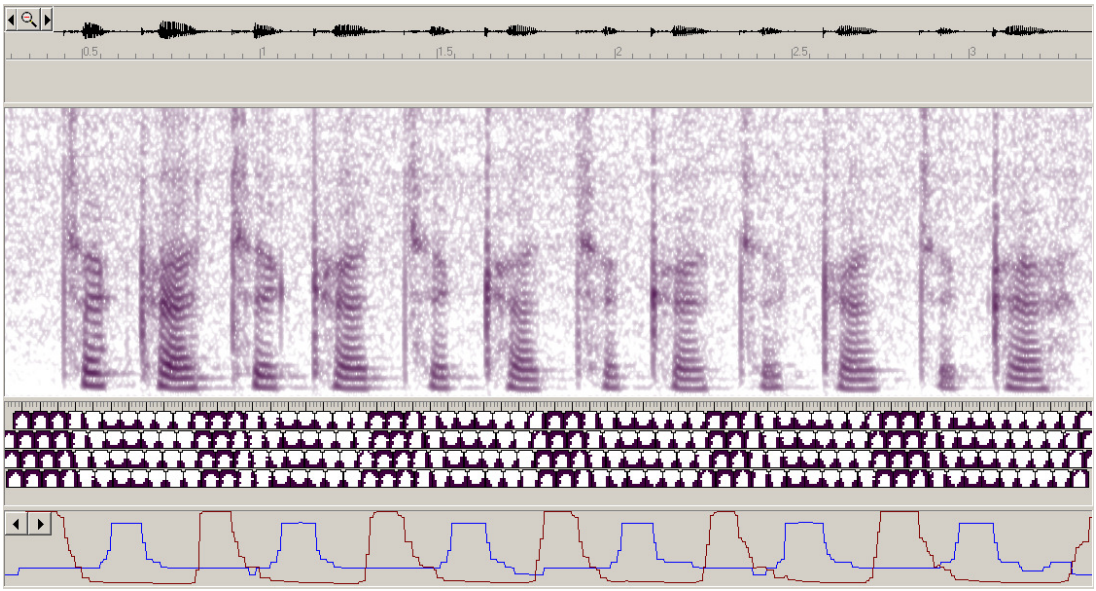


Figure 37 Alveolar and Velar closure measures for the sequence /t/ /k/ /t/ /k/...

Defining your own EPG analysis values

The EPG analysis values such as 'Alveolar Total' and 'COG' can be created and modified easily within the program. To create a new EPG analysis value, first select **Options:Analysis Values…** from the menu to bring up the Analysis Values dialogue box (Figure 38).

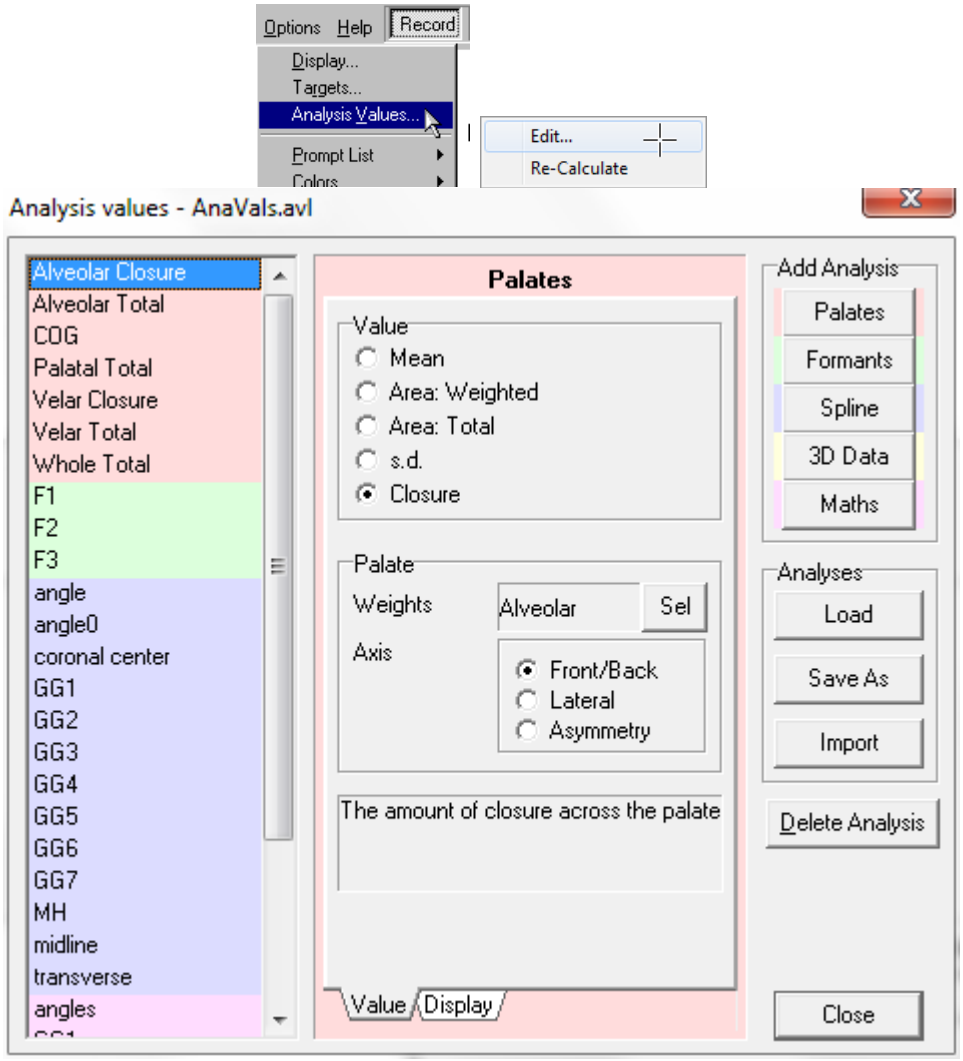
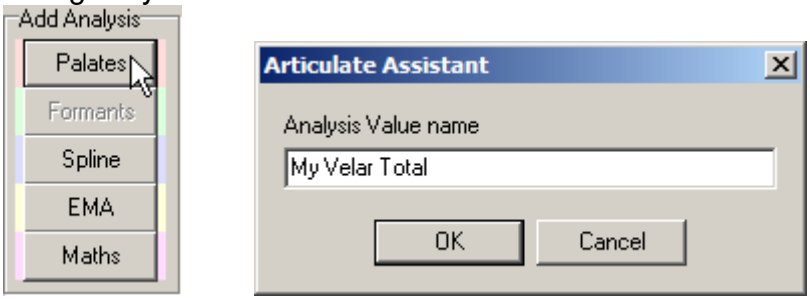


Figure 38 Edit Analysis Values Dialogue

Defining your own Velar Total

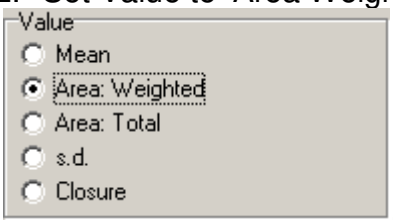
Let's create a new analysis value called 'My Velar Total' based on the posterior 2 rows rather than the 3 rows defined in the default 'Velar Total' value. To do this:

1. Open the analysis values dialogue box, click and type the chart name e.g. "My Velar Total"



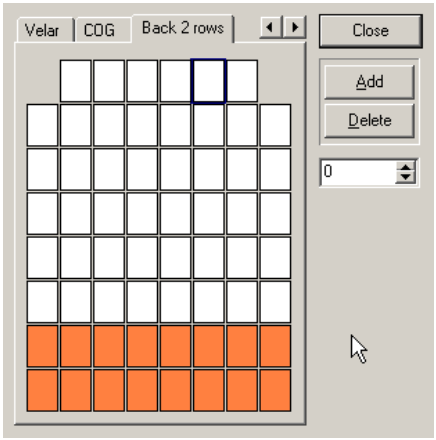
'My Velar Total' will now be added to the list on the left (colour coded pink)

2. Set Value to 'Area Weighted'

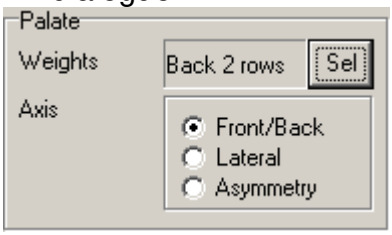


3. Open the weights dialogue by clicking on 

Click add and type the weights pattern name e.g. "Back 2 rows" The Weights value should now show 'Back 2 rows '.



4. Set the weights values so that the posterior 2 rows are ON (100%) and the remaining rows are OFF(0%) then close the Weights dialogue.



5. Ignore axis setting
6. Close analysis values dialogue

See following sections for a fuller explanation of each of these stages. Now, if you Right Click on the Analysis Values Display in the Analysis Task Window the value 'My Velar Total' will appear as an option. Click on it to make it appear in the Display.

Selecting Palate Contact Weights

Any pattern of palate contact weights can be chosen to form the basis for an analysis value. For example the anterior 2 rows of contacts might form the basis for the calculation of an alveolar total contact.

Click on the 

button in the Analysis Values Dialogue box to get the Weights dialogue.

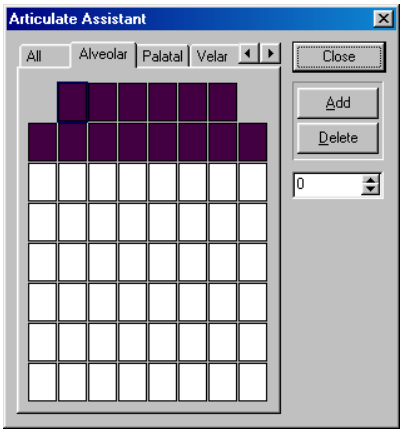


Figure 39 The Weights dialogue

For most analyses, weights are set to be either ON or OFF and are used to define the area of the palate that you wish to analyse. So for example, the default Alveolar Total display is based on the weights selection shown in Figure 39 where the contact weights are ON (100%) for the anterior 2 rows and OFF (0%) for the posterior 6 rows.

There are four ways to change the value of a single contact weight.

1. Clicking on a contact toggles the weight ON or OFF
2. Right clicking on a contact gives the options of 0%, 25%, 50%, 75% or 100%
3. Clicking on a contact and typing an integer value between 0 and 100 in the text edit box, to the right of the palate, sets the weight to the corresponding %
4. Clicking and dragging on a contact slides the weight value up and down

It is also possible to change several contact weights to the same value at the same time. To do this:

Press the <shift> key while clicking and dragging across a range of contacts then type in the value you want these contacts to be in the text edit box to the right of the palate.

The mean Front/Back (COG) measure

The mean (aka. Centre of Gravity, COG or centroid) calculation for front/back axis is as follows

$$1-\frac{\sum_{m=1}^{8}(m-0.5)R_m}{8\sum_{m=1}^{8}R_m} \text{ where } R_m=\sum_{n=1}^{8}c_{m,n}W_{m,n}$$

$= $ weighted sum of contacts in Row m

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

Weight values are specified in % {0..100%} but are applied to the formula as fraction in the range 0..1 in steps of 0.01. Normally, weight values are specified as 0 or 1 (i.e. 0 or 100%)

Assuming the weights are set to 100% for all contacts, this formulation results in a maximum COG value of 0.9375 if only 1st (anterior) row contacts are on and a minimum COG value of 0.0625 if only the 8th (posterior) row.

Defining your own COG measure

You may wish to define your own COG based for example on only the middle four columns of the palate. By doing this, the lateral contacts which are on for high vowels and consonants are ignored thus making the COG measure more sensitive to the midsagittal contact which is more important in defining consonant articulation. To do this:

7. Open the analysis values dialogue box, click add and type the chart name e.g. “My COG”
8. Open the weights dialogue, click add and type the weights pattern name e.g. “Midcourse”
9. Set the weights values so that the central four columns are ON (100%) and the outer columns OFF(0%) then close the Weights dialogue.
10. Set axis to Front/back
11. Set Graph to mean
12. Close analysis values dialogue

The mean Lateral measure

The mean calculation for the lateral axis is designed to indicate whether there is more contact close to the midline of the palate or more contact towards the sides and is calculated as follows.

$$\frac{\sum_{n=1}^{8} abs(n-4.5)C_n}{4\sum_{n=1}^{8} C_n}$$ where abs is the absolute (unsigned) value

$$C_n = \sum_{m=1}^{8} c_{m,n} W_{m,n}$$

= weighted sum of contacts in column n

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

The mean Asymmetry measure

This mean calculation for the lateral axis is designed to indicate whether there is more contact towards one side or the other and is calculated as follows.

$$\frac{\sum_{n=1}^{8}(n-0.5)C_n}{8\sum_{n=1}^{8}C_n}$$ where $$C_n = \sum_{m=1}^{8} c_{m,n} W_{m,n}$$

= weighted sum of contacts in column n

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

The Standard Deviation (SD) measure.

Standard deviation measurement is applied to all mean measures and can be displayed as a band around the mean by choosing the "mean+SD" graph tab in the analysis values dialogue box.

The Standard deviation indicates whether the EPG pattern is spread across the whole palate (large SD) or concentrated around the mean (small SD. It is calculated for the different axes as follows:

Front/Back Standard Deviation

$$\frac{1}{8}\sqrt{\frac{\sum_{m=1}^{8}\left((m-0.5)-\frac{\left(\sum_{m=1}^{8}(m-0.5)R_m\right)}{\sum_{m=1}^{8}R_m}\right)^2 R_m}{\sum_{m=1}^{8}R_m}}$$ where

$$R_m = \sum_{n=1}^{8} c_{m,n} W_{m,n}$$

= weighted sum of contacts in Row m

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

Lateral Standard Deviation

$$\frac{1}{4}\sqrt{\frac{\sum_{n=1}^{8}\left(abs(n-4.5)-\frac{\left(\sum_{n=1}^{8}abs(n-4.5)C_n\right)}{\sum_{n=1}^{8}C_n}\right)^2 C_n}{\sum_{n=1}^{8}C_n}}$$

$$C_n = \sum_{m=1}^{8} c_{m,n} W_{m,n}$$

= weighted sum of contacts in Column n

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

Asymmetric Standard Deviation

$$\frac{1}{8}\sqrt{\frac{\sum_{n=1}^{8}\left((n-0.5)-\frac{\left(\sum_{n=1}^{8}(n-0.5)C_n\right)}{\sum_{n=1}^{8}C_n}\right)^2 C_n}{\sum_{n=1}^{8}C_n}}$$ where

$$C_n = \sum_{m=1}^{8} c_{m,n} W_{m,n}$$

= weighted sum of contacts in column n

$c_{m,n}$ = contact value in m^{th} row and n^{th} column {0,1}

$W_{m,n}$ = weight value in m^{th} row and n^{th} column {0..1}

The Area Measure

There are two measures that evaluate the contact area.
AreaW measures the total number of contacts as a fraction of the total weights

$$AreaW = \frac{\sum_{m=1}^{8}\sum_{n=1}^{8} c_{m,n} W_{m,n}}{\sum_{m=1}^{8}\sum_{n=1}^{8} W_{m,n}}$$

AreaT measures the total number of contacts as a fraction of the whole palate (62 contacts)

$$AreaT = \frac{\sum_{m=1}^{8}\sum_{n=1}^{8} c_{m,n} W_{m,n}}{62}$$

In general the weight values will either be ON or OFF (1 or 0).

Example

The Area measure can be used to calculate the total contacts in the alveolar region of the palate. To do this

- Set the weights to 100% for rows 1 and 2 and to 0% for rows 3-8.
- Select AreaW

The resulting value will have a maximum of 1 when all the contacts in the first two rows are ON and a minimum of 0 when they are all off.
If AreaT had been selected instead of AreaW then the values would have a maximum of 14/62 when all 14 contacts in the first two rows were ON rather than 1.

Notice: All of the above values are normalised to the range 0-1. In the research literature, these values are sometimes unnormalised. For comparable values use the following multipliers.

AreaT	multiply by 62
Front/back mean and S.D.	multiply by 8
Lateral mean and S.D.	multiply by 4
Asymmetry mean and S.D.	multiply by 8

The Maths Analysis Value

After creating an EPG analysis value or any analysis value based on other data sources, it is possible to combine it with other values, smooth, differentiate, integrate, scale it by creating a Maths value using a cobination of a formula and a filter. The filter is capable of smoothing, differentiation and integration of the result of the formula. The formula can be expressed using a range of operators typically found on a scientific calculator.

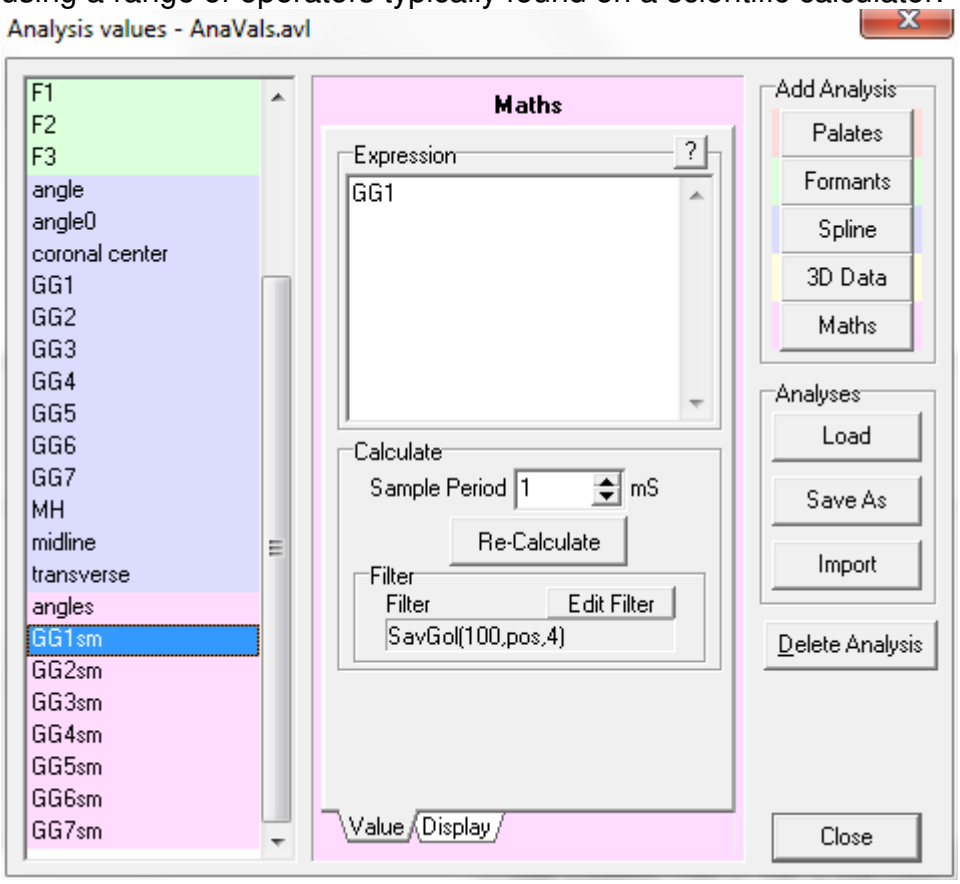


Figure 40 Maths analysis values allow arithmetic sums to be calculated from other analysis values and smoothing, velocities, acceleration and integration of analysis values

Expressions may contain:
- constants
- analysis values
- arithmetic operators:
  - + plus,
  - - minus,
  - * multiply,

/ divide,
\ remainder e.g. 2\3 = 0.5,
^ power e.g. 2^3 = 8 = 2 cubed

comparison operators (result is 1 or 0)
<= less than or equal to,
< less than,
= equal to,
!= not equal to,
<> not equal to
> greater than
>= greater than or equal to

bit operators
not
and
or
xor

brackets
( )

Maths functions
abs Absolute value i.e. unsigned value
sin Sine
cos Cosine
tan Tangent
arcsin
arccos
arctan
arctan2
deg Radians to degrees i.e. multiply by 180/π
rad Degrees to radians i.e. multiply by π/180
ln Natural log i.e. Ln(n) = $\log_e N$
exp Exponent i.e exp(n) = e^n
log Common Log i.e. log(n) = $\log_{10} n$
sqrt Square root
trunc Rounded down e.g. trunc(2.54) = 2
round Rounded to nearest e.g. round(2.54) = 3
frac The fractional part i.e. frac(2.54) = 0.54
max Maximum of two numbers e.g. max(2.3,6.6) = 6.6
min Minimum of two numbers e.g. min(2.3,6.6) = 2.3
random Random number generator
pi 3.14159265

Euclidean diatance functions
dist(x1,x2) i.e. sqrt($(x1-x2)^2$)
dist(x1,y1,x2,y2) i.e. sqrt($(x1-x2)^2$ + $(y1-y2)^2$)
dist(x1,y1,z1,x2,y2,z2) i.e. sqrt($(x1-x2)^2$ + $(y1-y2)^2$ + $(z1-z2)^2$)

The filter applies to the result of the expression.

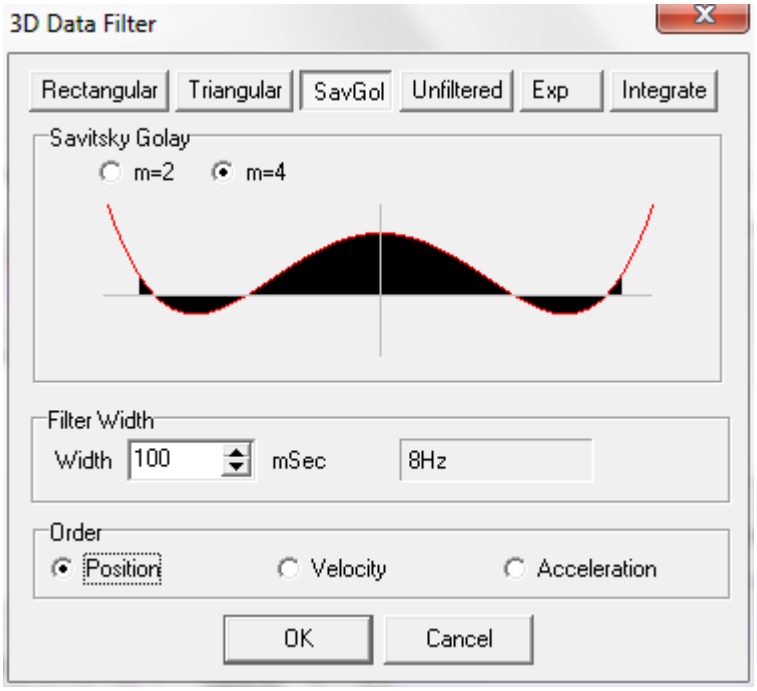


Figure 41 Using the filter

Use the "Unfiltered" button if no further processing of the expression is needed.

The *rectangular, triangular* and *exponential* windows are used for moving average smoothing but can usually be ignored as they are inferior to Savitsky-Golay window. They are included for the sake of completeness.

Use the SavGol button for smoothing. The Savitsky-Golay is available as a 2nd order or 4th order polynomial. m=4 is recommended. The width of the window determines the equivalent low-pass frequency cutoff for the smoothing. The bigger the window the lower the cutoff frequency and the more smoothing. A 20ms width (40Hz) seems to be about right for EMA data while a 100ms width (8Hz) seems better for ultrasound tongue spline movement.

Velocity and *Acceleration* options will calculate first and second order differentials respectively and then perform smoothing.

The "Integrate" button will integrate the result of the expression.

Recalculate maths values

Use the Re-Calculate button or the menu option “Options | Analysis values| Re-calculate” to force a recalculation of stored maths values. If any underlying data upon which an analysis value might depend is changed (such as a spline) then any dependent values such as smoothed or velocity calculations need to be updated using this button.

Saving and Retrieving Your Analysis Values Setup

Configuration of the analysis values (particularly the maths ones) can be quite elaborate but once it has been determined the configuration can be saved in an *.avl file using the 'Analyses' within the 'Edit Analysis Values' dialogue box 

. 'Save As' button will bring up a dialogue which allows the name of the configuration setup file to be selected. Prior to version 216 this file could be saved anywhere but from 216 onwards it must be in the current project folder. Any changes to the dialogue will automatically overwrite the currently open analysis values specification. The 'Open' button allows previously saved configurations to be loaded. Use the 'Save As' button to create a new analysis values setting file which can be modified while leaving the original file unchanged and available to be reloaded if needed in the future. The *.avl file can be copied from one project folder to another if it is required to be used for another project or the 'Import' button can be used to do this within AAA.

The EPG Feedback Task Window

The 'EPG Feedback Task Window' (Figure 42) is designed for live feedback using the EPG. It allows the client's production in the clinic to be compared with typical productions or a previously saved 'best effort' by the client.

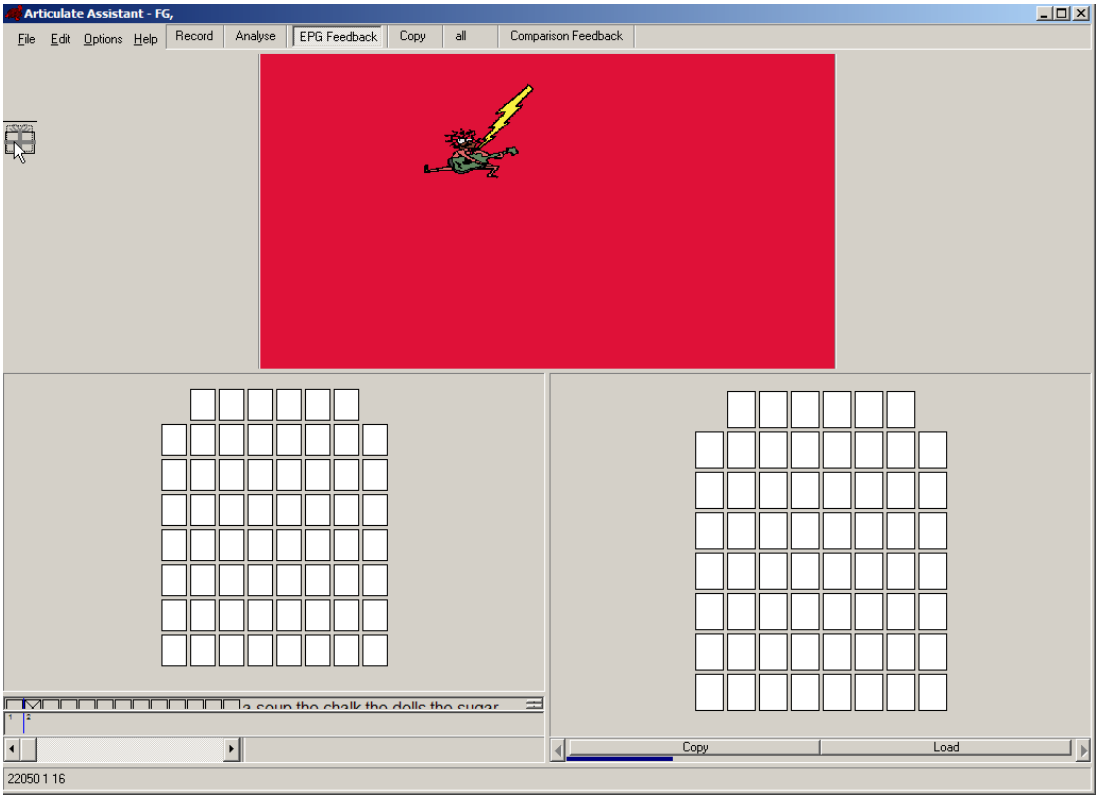


Figure 42 EPG Feedback Task Window

Comparing EPG Patterns

The 'Reference Palate Display' (Figure 43) is used to show a palate pattern (or sequence of patterns) for the client to try to imitate.

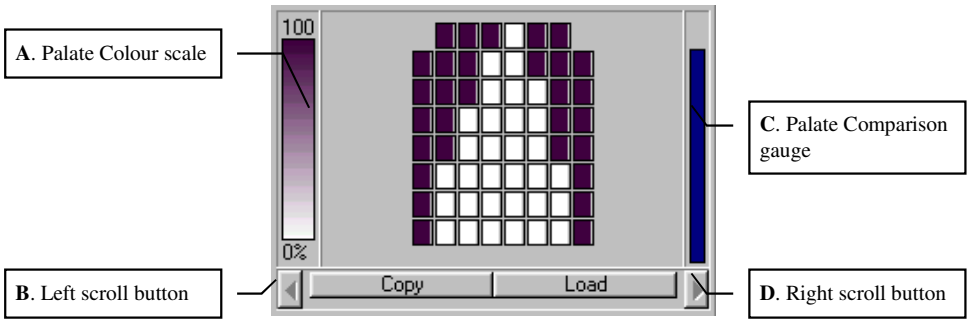


Figure 43 The Reference Palate Display

Two buttons at the bottom of the display are used in the following way:

Copy Will copy whatever pattern is showing on the live EPG palate display at the instant that it is clicked.

Load Click on this to select a pattern or sequence from a library.

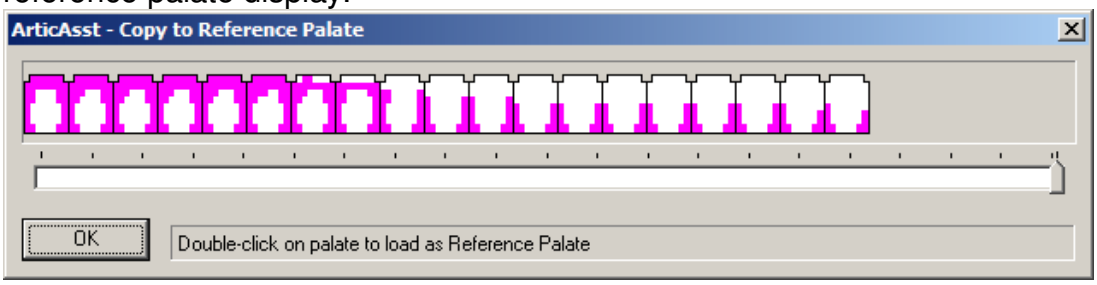
The 'Palate Colour Scale' (Figure 43**A**) on the right of the palate display indicates the meaning of the palate colour ranging from 0% (no contact) to 100% (full contact).

The 'Palate Comparison Gauge' (Figure 43**C**) on the left of the 'Reference Palate Display' shows how similar the live palate is to the reference palate.

The left and right scroll buttons (Figure 43**B**, Figure 43**D**) allow the user to scroll through a palate sequence if an EPG sequence rather than a single EPG frame is loaded.

Copying EPG Patterns to Reference Display

The Copy button provides an easy way to transfer a pattern from the live palate display on the left of the EPG Feedback Task Window. During a live feedback session with a client, click on the copy button immediately after the client produces the palate pattern you want to copy. The following copy dialogue box will pop up. Use the scrollbar to search through the last two seconds of palate patterns from the subject until you see the pattern you want to copy. Then double-click on the desired pattern to copy it to the reference palate display.



Loading Reference EPG Patterns

The 'Reference Load Dialogue' (Figure 44) provides three sources for reference palates

- **General Reference**. A set of typical patterns or sequences of patterns perhaps generated by the user.
- **Client Reference**. A set of reference patterns saved from previous EPG feedback sessions with the client.
- **Annotations**. Any annotation may be loaded as a reference. See annotation section for help on filtering

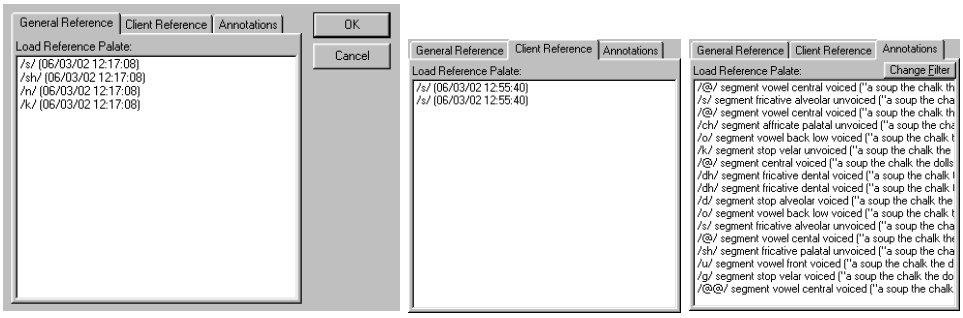
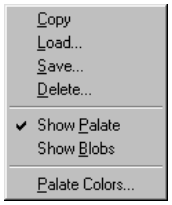


Figure 44 The Load Reference Dialogue

Saving Reference EPG Patterns

It is possible to save the pattern displayed on the 'Reference Palate Display' by clicking the right mouse button in the 'Reference Palate Display' window

to reveal the popup menu 

then selecting the '**Save…**' option. The 'Save Reference Dialogue' (Figure 45) allows the pattern to be saved as:

- a general **Reference** (available to any client)

or

- the **Client's Reference** which is stored along with all other notesand files relating to the current client and which will only be accessible in the future when the current client is loaded.

The **Keywords** edit box allows the reference pattern to be labelled.

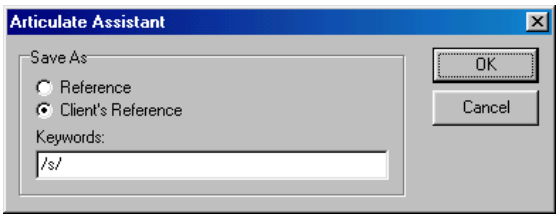


Figure 45 The Save Reference Dialogue

Comparing the Live Palate to the Reference Palate

The 'Palate Comparison Gauge' (Figure 43**C**) is a vertical gauge comprising a blue bar which rises to the top of the gauge when the live palate display and the reference palate display match exactly. The match is based on the percentage of contacts which are ON in the reference AND ON in the live palate out of the total number of contacts which are ON in the reference pattern.

Reward Display

The 'Reward Display' at the top of the Feedback Task Window (Figure 42) shows cartoons. Just click on the  button on the left to play a cartoon. To hide this display and make the palate displays bigger, click and drag the divider at the bottom of the Reward Display as shown in Figure 46.

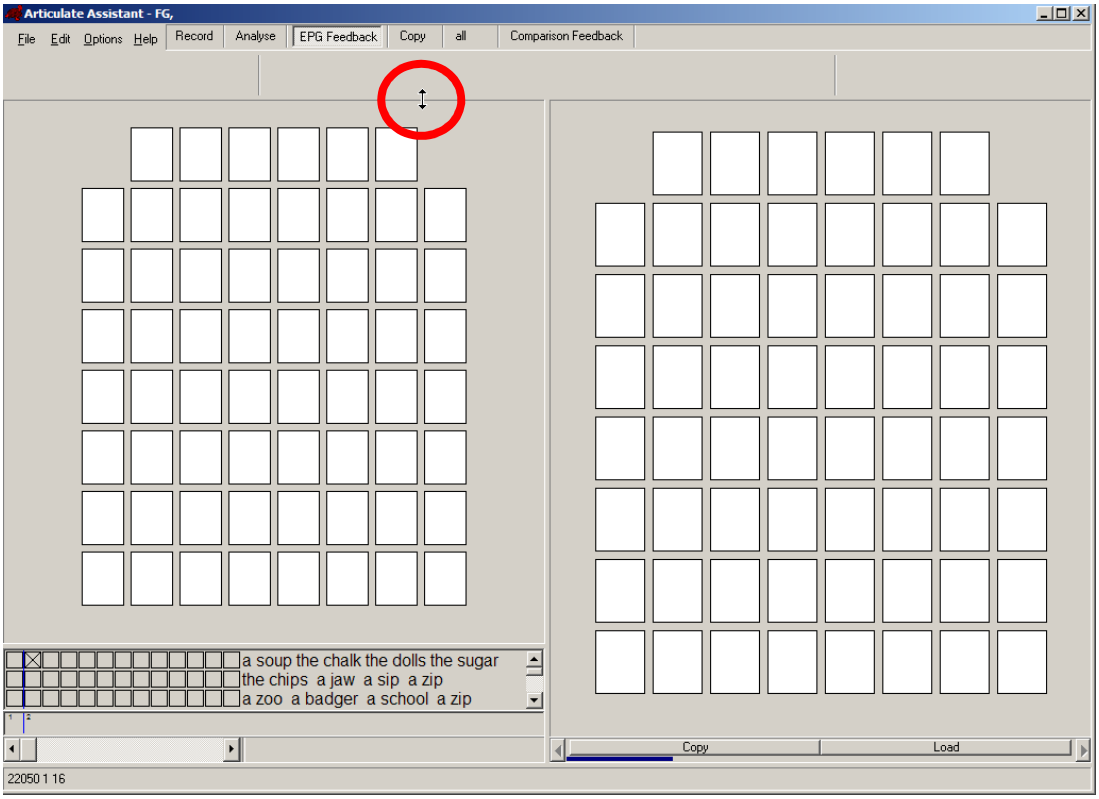


Figure 46 Hiding the reward display and making the Palates bigger

The Comparison Feedback Task Window

This task window is very similar to the EPG feedback task window but with two extra features.

1. An extra reference palate (red) which can be used to indicate to the client where NOT to make contact with the palate
2. The reference palate is superimposed on the live display. In the default display (Figure 47) the reference is shown as light pink which turns bright pink where the live input contact matches the reference and grey where it doesn't. These colours can easily be changed to suit (see earlier section on changing palate colours).

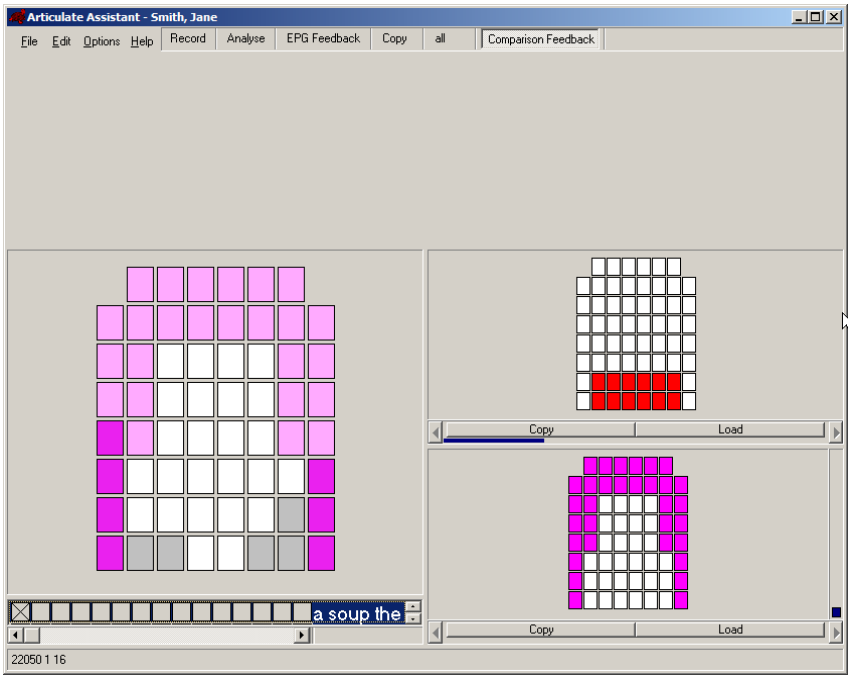
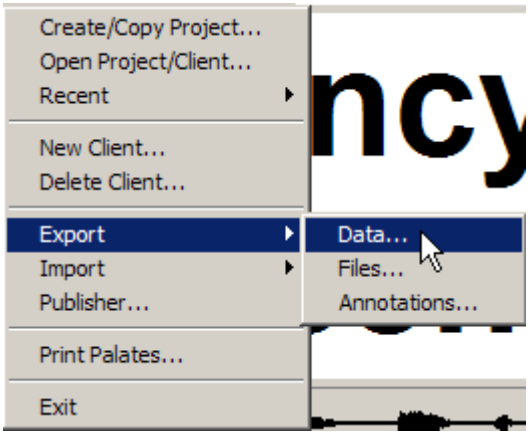


Figure 47 Comparison Feedback Task Window (Backing /t/ example)

Exporting Data

Specifying the Export File

Articulate Assistant Advanced™ provides the means to export data to a tab-delimited text file, which is suitable for importing into most spreadsheets (e.g. Excel), databases and statistical packages.



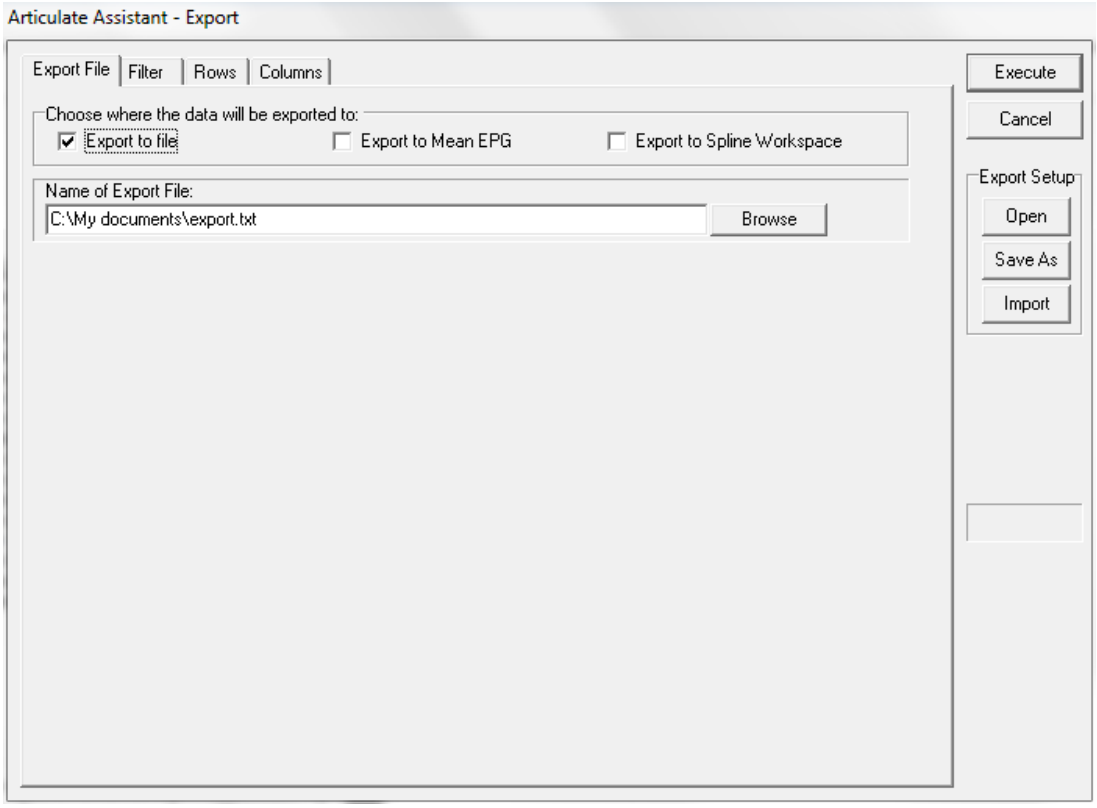


Figure 48 The Export Dialogue Box – File Name

The 'Export Dialogue Box' (Figure 48) can be invoked using the '**File|Export > Data…**' menu option. The tabs at the top of the dialogue box can be clicked on to reveal four pages of the dialogue:

- **File**. Choosing the name of the exported text file and its location.
- **Filter**. Selecting which annotated recording segments to export.
- **Rows**. Choosing what each row of the export file contains.
- **Columns** Choosing what each column of the Export file represents.

The '**File**' page shown in Figure 48 allows the name and path of the export file to be specified. The Browse button provides an easy way to search your computer for the folder you wish to save the exported file in. As well as exporting a tab delimited text file, execution of the export dialogue can be set to provide data on the **mean EPG** pattern for the selected time points.

Specifying the source of the data to Export

Each row of the export file corresponds to an EPG frame. The frames chosen for export are defined using the '**Rows**' page of the dialogue (Figure 50).

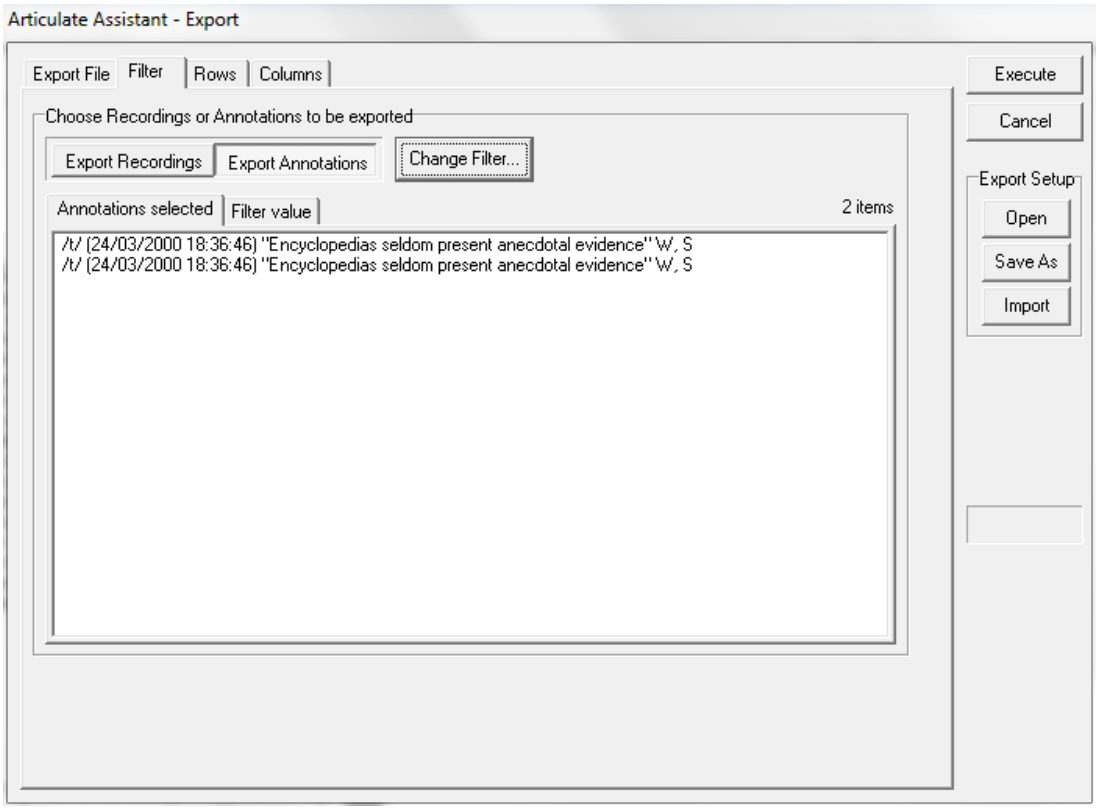


Figure 49 Export Dialogue - Filter

The 'Export Dialogue' uses the current 'Annotation Filter' setting but for convenience the '**Filter**' button is provided to allow the setting to be changed within the Export Dialogue.

The 

button opens the same filter dialogue as found in the annotations window. Note that the filter setting is not stored in the setup file. See section on Annotation for instructions on use of the '**Filter Dialogue**'.

The 

button will display the recordings selected by the current filter setting.

The 

button will display the annotations selected by the current filter settings.

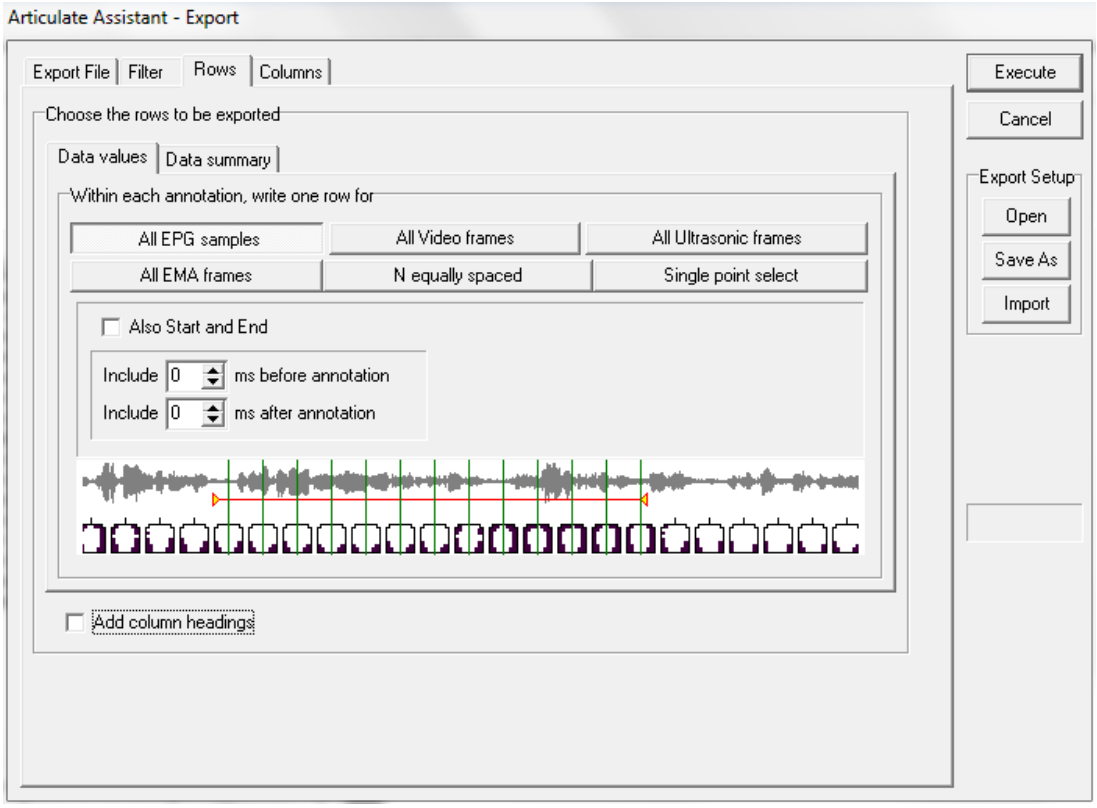


Figure 50 Export Dialogue – Rows selection – All EPG frames

In the '**Rows**' page, it is possible to specify which time points within each annotated region are exported. The Choices are:

- **All EPG samples**. All time points corresponding to the start of each EPG frame in each annotated region. Timing information is accessible to the nearest 100th of a millisecond. If the 'Start and End Points' check box is checked then also included are time points corresponding to the start and end of the annotated region (which do not necessarily coincide with the start of an EPG frame).
- **All EMA samples** as above
- **All ultrasonic samples** as above

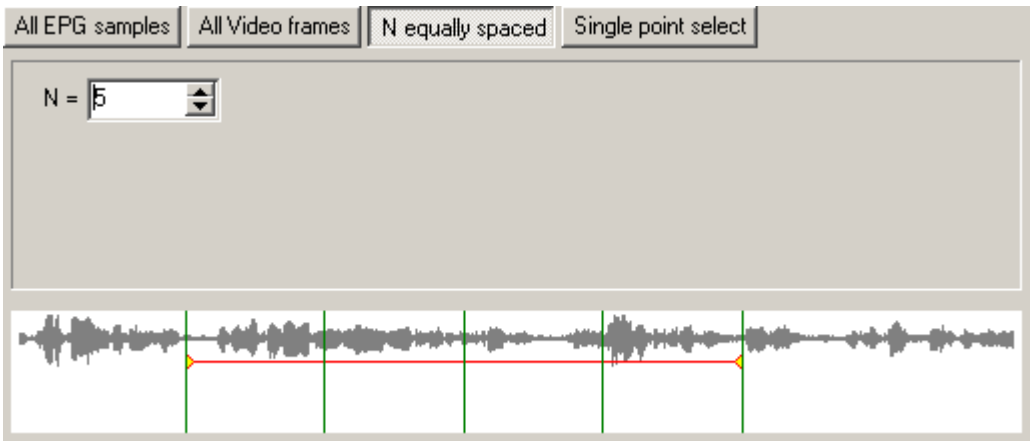


Figure 51 Export Dialogue – Rows - Equally spaced time points throughout each annotated segment

– **N equally spaced**. The minimum value for N is two, in which case only the start and end point of a region are exported. If set to 3 then the midpoint will also be exported. Etc. NB. If N is set higher than the number of EPG frames within a given annotation then some rows will share data from the same EPG frame.

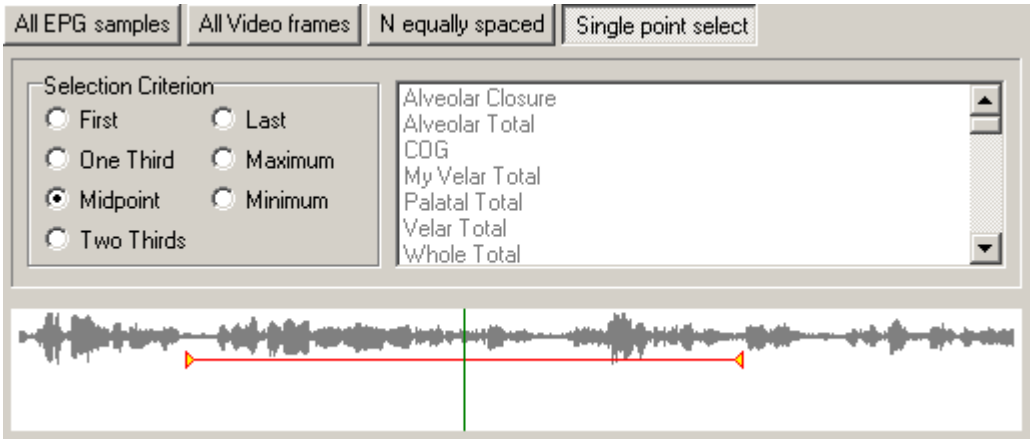


Figure 52 Export Dialogue - Rows - Single point in each annotated segment.

– **Single point select**. Use the 

button to call up the threshold dialogue that allows you to specify a single time intstant within each annotation based on analysis values or time.

- **First** The first time point in each annotated region
- **One third** The time instant one third of the way through the annotated region
- **Midpoint**. The temporal midpoint of the annotated region
- **Two thirds** The time instant two thirds of the way through the annotated region
- **Last** The last time point in each annotated region
- **Maximum** The first instance of the maximum value of the selected Analysis Value
- **Minimum** The first instance of the minimum value of the selected Analysis Value

Data Summary

It is sometimes desirable to export information about the annotated region rather than simply the data associated with a given time point.. The 'Data summary' tab allows the user to choose whether to also export data about the annotated region. Summary data values include:

- **Mean**. Mean value of a given analysis value (as defined in each column)

- STANDARD DEVIATION**. STANDARD DEVIATION OF A GIVEN ANALYSIS VALUE (AS DEFINED IN EACH COLUMN)**
- **Difference between start and end values.**
- **Maximum value.**

- **Minimum value**
- **Difference between max and min values**
- **Number of samples**

The summary information is added as extra rows after the time point data from a given annotation. The summary data is derived from all of the data samples of a particular analysis value that occur within the annotated region. Note that it is not a summary of the data from the time points selected for export. That is to say that if the user has selected to export the first middle and end point of each annotation, then the summary data is not a summary of those three points but of all the sample points in the annotation.

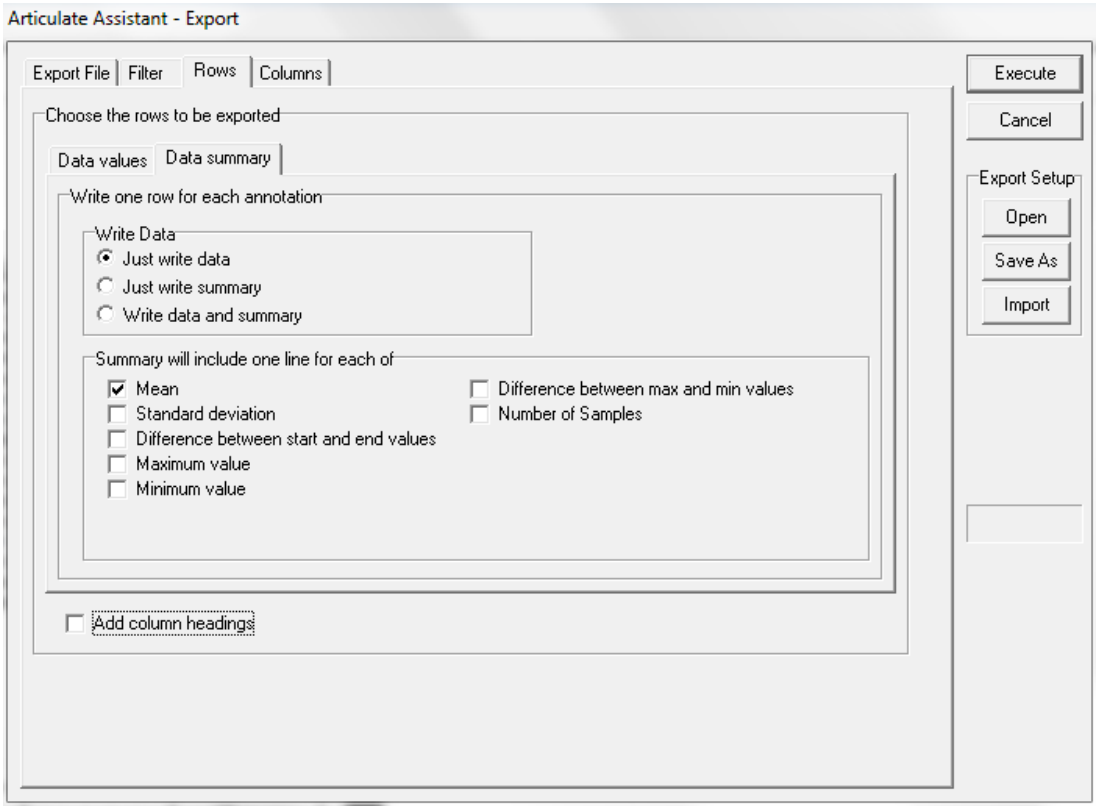


Figure 53 Export Dialogue - Rows - Data Summary

Specifying which Data Values to Export

The '**Columns**' page of the 'Export Dialogue' (Figure 54) allows the user to specify which values are to be exported for each EPG frame. The 'Export Value List' (Figure 54**B**) shows the values listed in the order that they will appear in the export file. Buttons below this window have the following function:

- Add. Adds another value to the list.
- Delete. Deletes the currently selected value from the list.
- Swap. Moves the currently selected value to the bottom of the list.

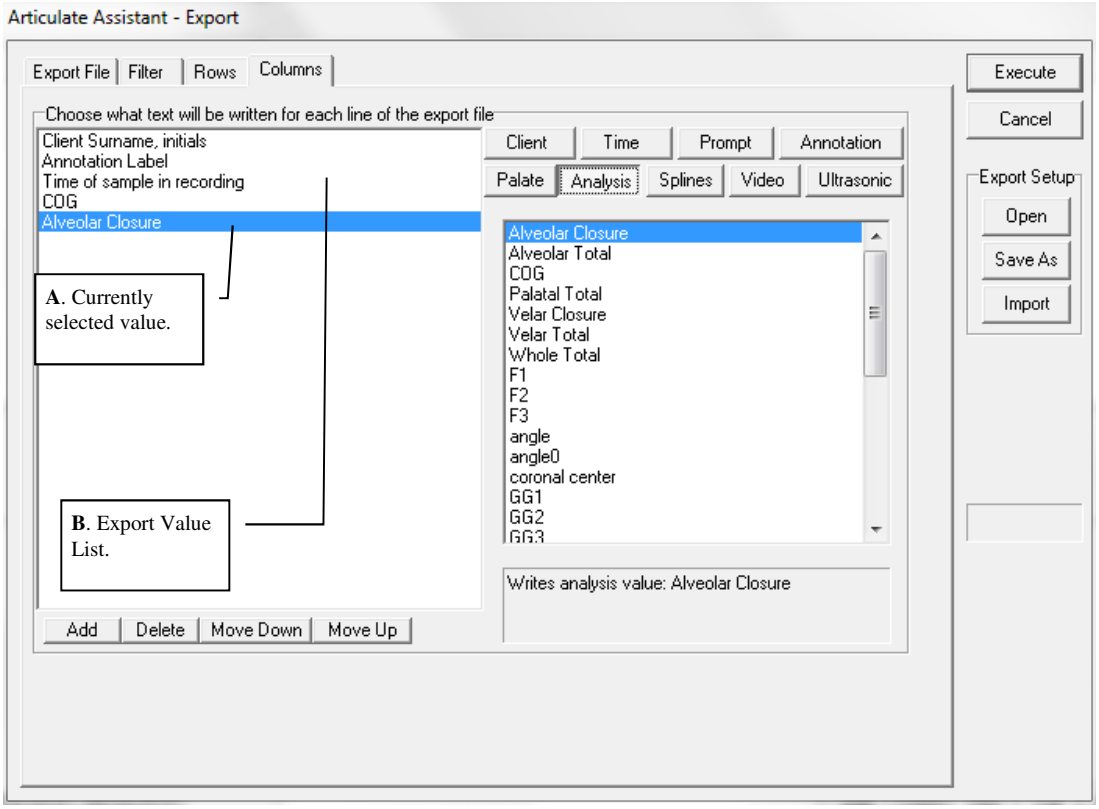


Figure 54 Export Column Definition

The buttons 'Client', 'Time', 'Prompt', 'Annotation', 'Palate', 'Analysis' and 'Audio Data' on the righthand side of the '**Columns**' page change the currently selected value when clicked on. The buttons' function is explained in the memo box (Figure 54**C**) in the bottom righthand side of the '**Columns**' page. Note that it may be necessary to use the scroll bar to see the whole description.

The options are:

Client

- **Surname**
- **Surname,Given names**
- **Surname,Initials**
- **Reference number**
- **Date of Birth**
- **Sex**

Time

- **Sample time of row within annotation** writes time in seconds of the annotation point/frame relative to the start of the annotation.
- **Sample time of row within recording** writes time in seconds of the annotation point/frame relative to the start of the recording.
- **Date/Time of recording** writes date/time that the recording was made.
- **Session Name of the recording**

- **Duration of region** writes the duration in seconds of the annotated region/selected region to the nearest wav sample.
-

Prompt Writes the word or phrase spoken

Annotation

- **Keywords** writes all keywords for the annotation if selected
- **Title** writes the label title.
- **Sequence number** writes the index of the annotation taken from the order in which they appear in the annotation list box.

Palate

- **Palate values** writes a 1 or 0 in 62 columns each representing a palate contact. The contact order is left to right from front to back of the palate.
- **Palate rate** Sample rate of the EPG data
- **Palate variability** exports the variability score calculated across ALL EPG frames within a given annotation. Hence the vale will be the same for all rows

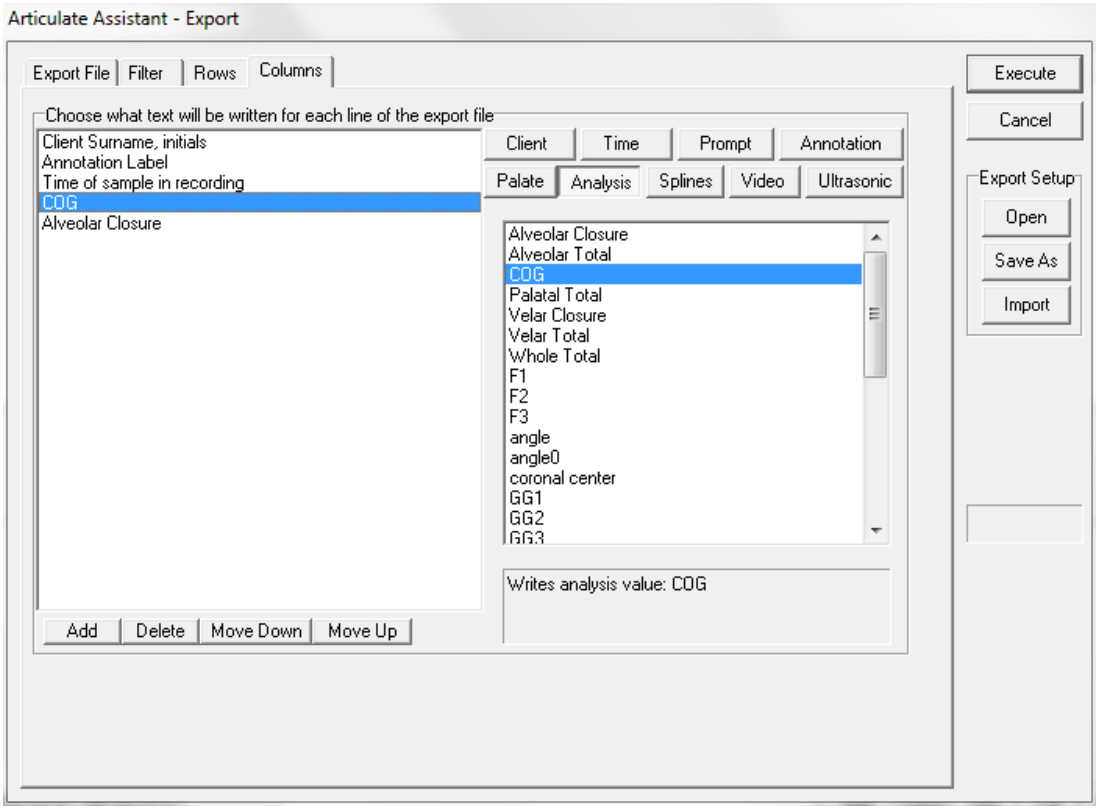


Figure 55 Analysis value export

Analysis

Writes Analysis values

- **Calculate value for each row** writes the analysis value for the selected time instant (row)

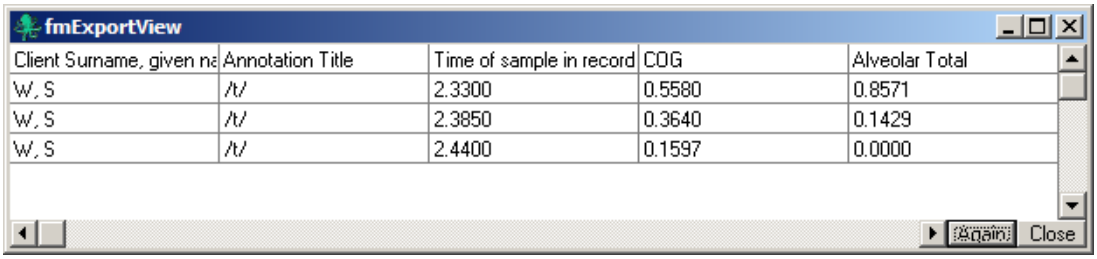
Audio data

- **Channels**
- **Bytes per sample**
- **Sample Rate**

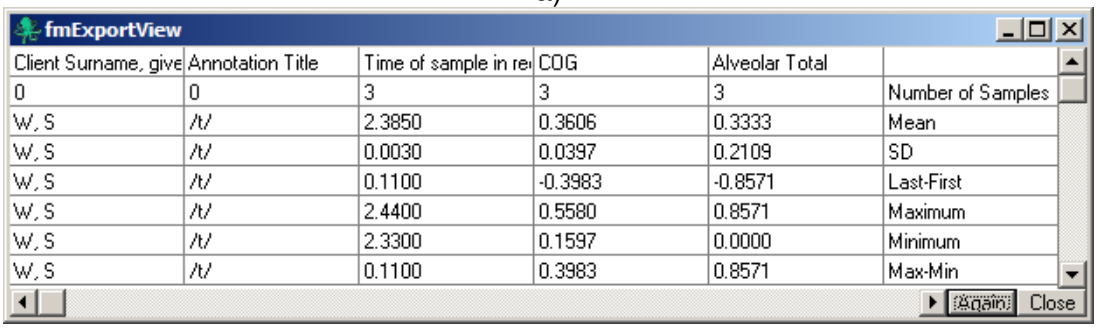
Saving and Retrieving Your Export Configuration Setup

Configuration of the export file can be quite elaborate but once it has been determined the configuration can be saved in an *.xsu file using the 'Export Setup' within the 'Export Dialogue Box' 

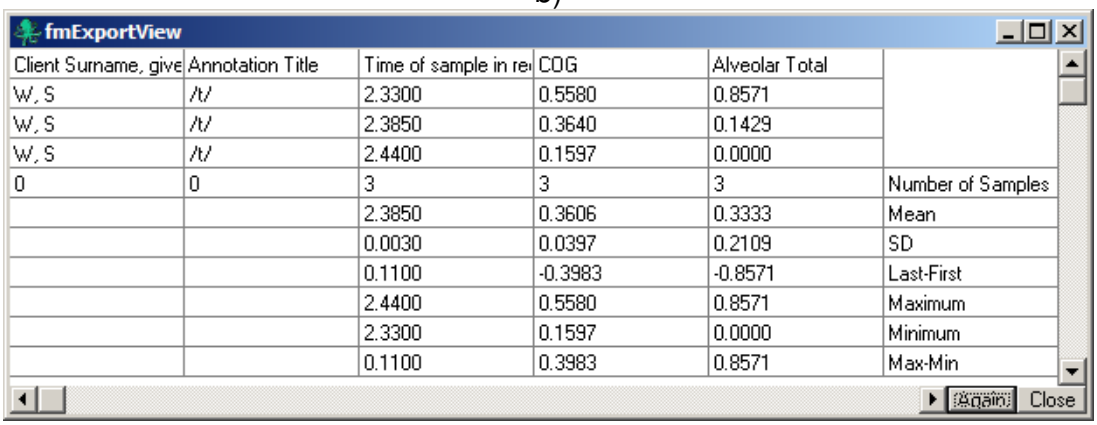
. 'Save As' button will bring up a dialogue which allows the name of the configuration setup file to be selected. Prior to version 216 this file could be saved anywhere but from 216 onwards it must be in the current project folder. Any changes to the dialogue will automatically overwrite the currently open export specification. The 'Open' button allows previously saved configurations to be loaded. Use the 'Save As' button to create a new export setting file which can be modified while leaving the original file unchanged and available to be reloaded if needed in the future. The *.xsu file can be copied from one project folder to another if it is required to be used for another project or the 'Import' button can be used to do this within AAA.



a)



b)

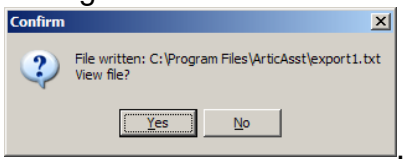


c)

Figure 56 Export view dialogue a) data only b) summary only c) data plus summary for the same single annotation.

Viewing Exported Data

On Clicking the 

button there is an option to view the exported data 

. The Export view window (Figure 56) shows the exported data values in a grid. Moving the mouse over a cell in the grid shows the entire contents of the cell.

The Export EPGs window will pop up if the '**Export to mean**' checkbox is checked in the 'file' page of the export dialogue. shows a variability display generated from palates in all of the exported rows.

The EPG variability graphic can be copied to the clipboard and pasted into a document. The variability and relative variability can be copied as text to the

clipboard for easy pasting into another application. The variability scores are defined in the “Record Task Window” section earlier in this manual.

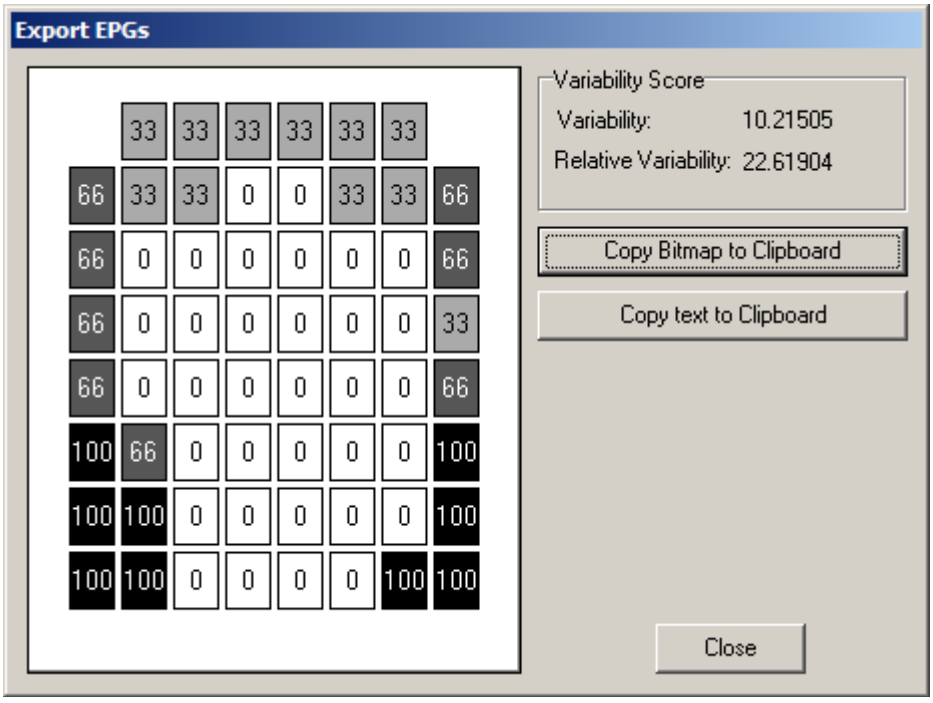


Figure 57 Export data - EPG mean view

Exporting Files

It is possible to export the data contained within any given project in a variety of familiar file formats. The ‘**Export Files Dialogue Box’** (Figure 58) can be invoked using the ‘**File|Export > Files…**’ menu option.
Specific recordings can be selected for export and specific data channels from each recording can be specified. It is envisaged that this function will be expanded in the future in accordance with user requirements.

By clicking on the 

button a file selection dialogue allows recordings to be selected for export. See similar function in the “Create/copy project…” dialogue earlier in this manual.

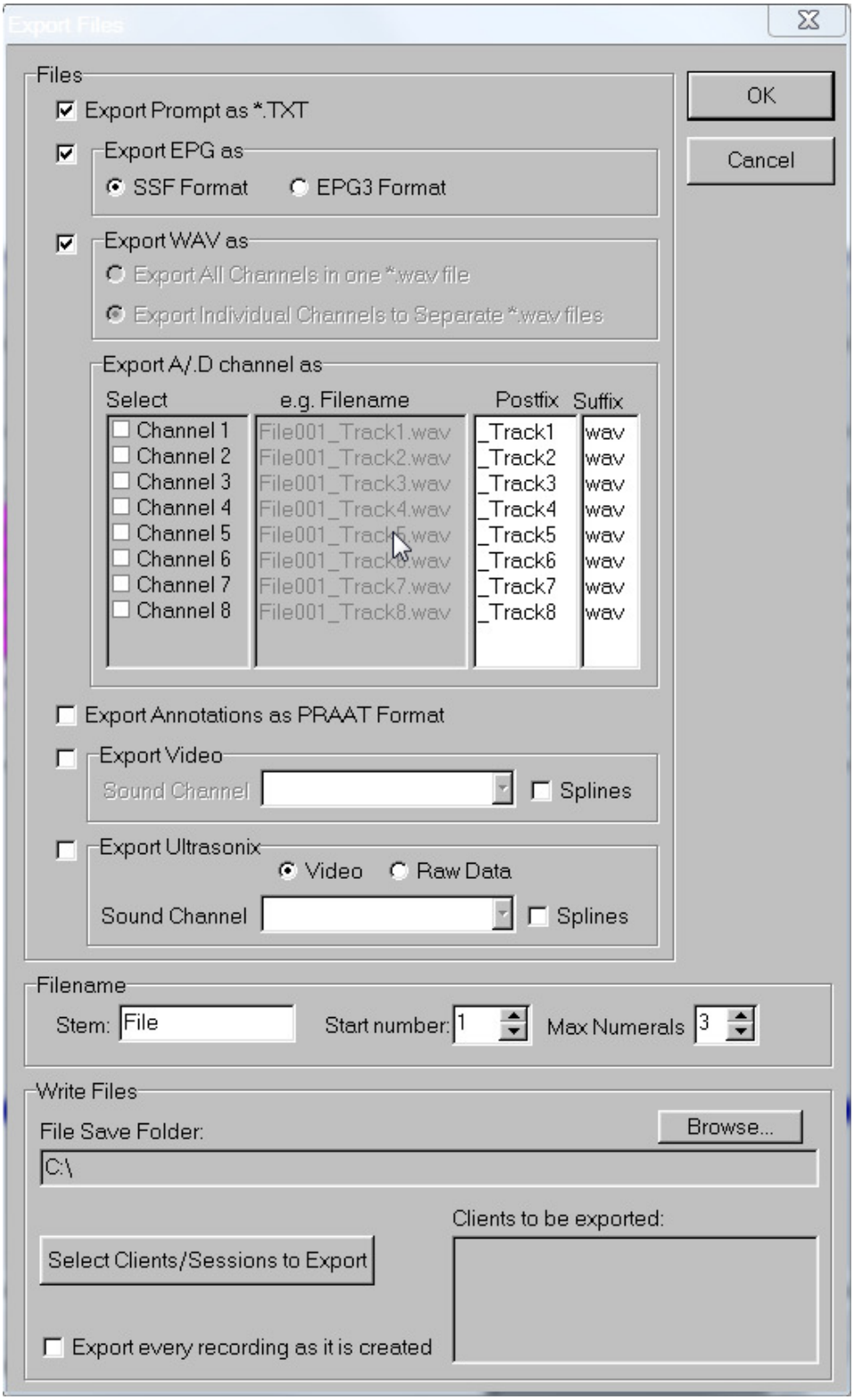


Figure 58 Export Files Dialogue

The EPG data can be exported in raw binary (EPG3 format) with no header or in Kiel University SSF format which comprises of binary data preceeded by an ascii header that defines the frame rate and the number of bytes per frame as follows:

```
SSFF -- (c) SHLRC
```

```
Machine IBM-PC

START_TIME 0.0000
Record_Freq 100.0000
Column epg BYTE 8
```

Figure 59 SSF File header format

Multichannel A/D or stereo audio can be exported in Microsoft PCM format wav files. This data can either be exported as a single multichannel file or as any number of mono wav files.

Annotations can be exported in PRAAT Textgrid format. The export function will separate overlapping annotations into separate interval tiers automatically.

Video can be exported in avi format. The audio channel can be selected from the dropdown box. Note that the number of channels available depends on the currently loaded client. It is recommended (but not necessary) to load the client to be exported so that the audio channel can be confirmed. There is also an option to superimpose any associated splines on the video. A dialogue box will appear to allow the video codec to be selected. “Cinepak” is recommended if the avi is going to be played on another computer as it is available on all Windows PCs. Do not use the default “uncompressed” format as it will take up more space and will not play properly.

Ultrasonix data can be exported in raw echo-return format i.e. each frame is a matrix of radial scanlines with approx 5 8 bit values per mm along each scanline. The exact number of scanlines and bytes per scanline is dictated by the ultrasonix setup at the time of recording.

All files have a fixed filename prefix which can be defined. Files are exported in the order in which they were recorded.

Exporting Annotations

It is useful to be able to export and re-import annotations. For example to share the task of labelling a project, one labeller can work on one client and transfer the completed annotations to another researcher working on a copy of the same project.
Annotations can be exported for the purpose of being reimported into a duplicate project using the ‘**File|Export > Annotations…**’ menu option.

Exactly which annotations are exported is controlled by the current Annotation filter. So the filter setting can be set to export all the annotations for one client or indeed one session. Note that when annotations are imported back into the same project they will overwrite any annotations contained in the project on a recording by recording basis. So if two people work on annotating the same recording these cannot be merged, one persons work will be overwritten by the others during the annotation import process.

Each annotation is stored in the following format:
ClientName:W, S
Prompt:Encyclopedias seldom present anecdotal evidence
DateTime:24/03/2000 18:36:46
Start:233000
Finish:244000
AnnotTitle:/t/
Annotation:{\rtf1\ansi\ansicpg1252\deff0{\fonttbl{\f0\fnil MS Sans ….
AnnotFontName:MS Sans Serif
AnnotFontColor:-2147483640
AnnotFontStyle:
AnnotKeywords:/t/ stop segment word final

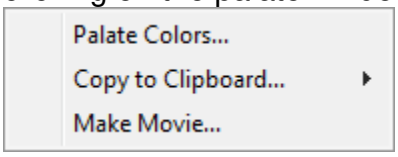
Importing Annotations

Annotations created in a duplicate project can be imported using the '**File|Export > Annotations…**' menu option. This process matches up the annotations according to the client name and the exact date and time of recording. For this reason avoid creating two clients in the same project with the same name.

Once a recording that matches the client and the date and time is found, all annotations for that recording are deleted and then the imported annotations replace them.

Exporting Movies

It is possible to export avi movies of regions of EPG/audio data by right-clicking on the palate window and selecting "Make Movie.. "



menu option. This is useful for including in presentations.

The movie can be exported at 3 speeds.
Real time
X2 half speed
X4 quarter speed to see the pattern changing slowly

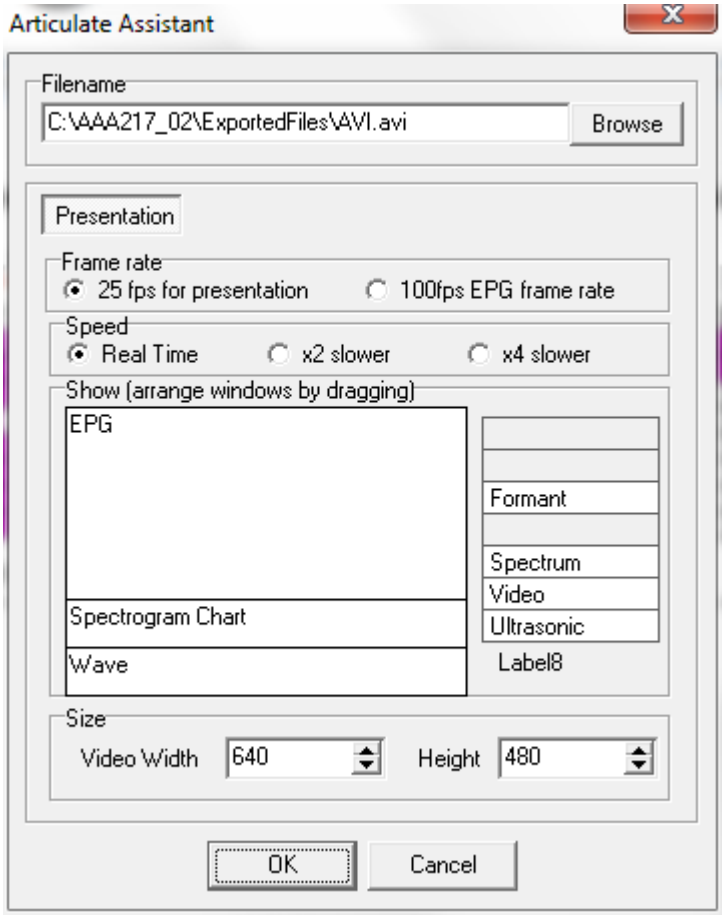


Figure 60 Make Movie Dialogue

The audio is processed so that the pitch is retained when played back at lower speeds. This preserves the intelligibility of the speech but does introduce “burbling” noise.
If the “Show Waveform” checkbox is ticked then a waveform is included in the movie with a moving cursor that indicates the position in the waveform.
A spectrogram will be displayed ONLY IF A SPECTROGRAM IS VISIBLE IN THE TASK WINDOW. I.e. If “Make Movie” is called when the Record Task Window is visible then no spectrogram will be displayed in the movie. If it is called when the Analyse Task Window is visible then a Spectrogram will be displayed in the movie.

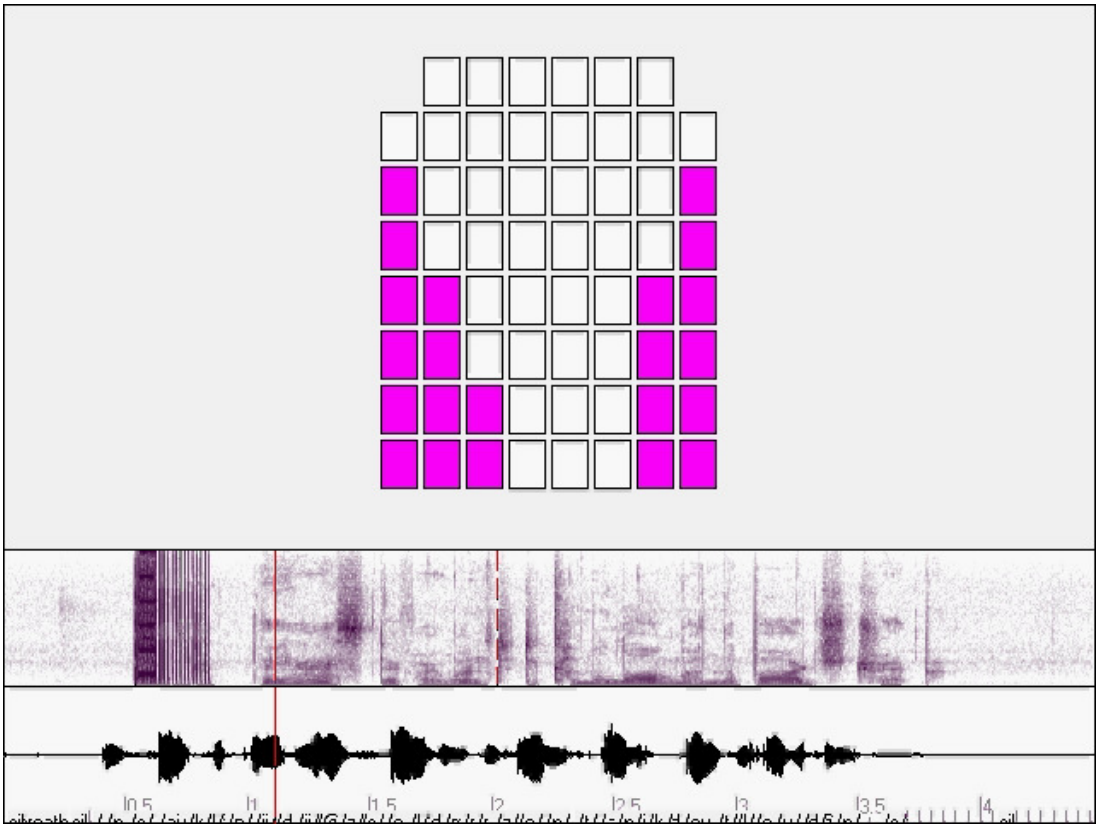
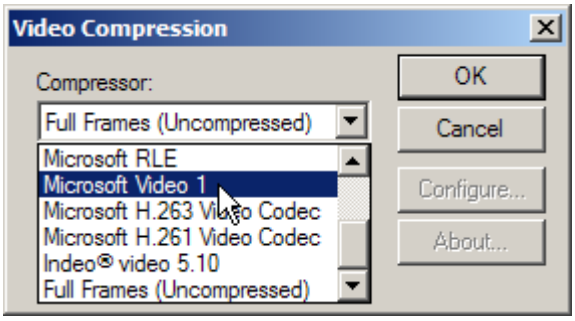


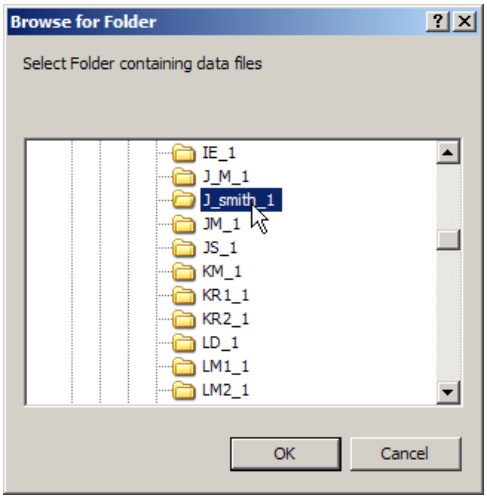
Figure 61 Example Exported Movie "Encyclopedias"

After selecting the destination folder there is an option to choose the video compression codec. Uncompressed avi files will stutter when played so it is best to choose a compression codec. "**Microsoft Video 1**" and "**Cinepak**" are default codecs that come with Windows so are the safest ones to use in order to allow the file to play on any Windows PC.



Importing files

Files recorded using the standard version of Articulate Assistant can be loded into the current project using the '**File|import files…**' option. Simply select the client folder containing the data to be imported.

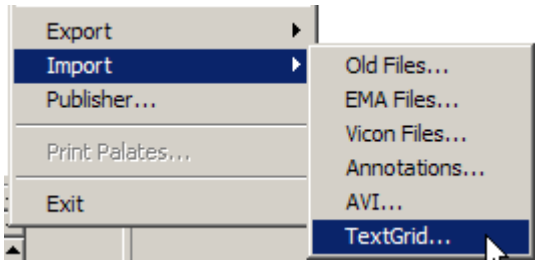


The import process then reads the Client.cln file in that folder to determine the client name and details, creates the client as defined in this file in the current project and imports all the *.wav *.epg and *.ann files. The filename prefix must end in an underscore followed by a number. E.g. My file name_1.wav, My file name_1.epg My file name_1.ann, where the number indicates the repetition index when more than one recording has been made of the same utterance. This function will also read in ***.textgrid PRAAT** format annotation files if any have been created.

Importing PRAAT textgrids

It is sometimes desirable to export wav files from AAA, label them in PRAAT and then import the resulting textgrid files back into AAA and associate them with the original recordings. In order to do this the prompt text file must be exported with the wav files as it contains information detailing where in the database the wav file has come from. The procedure is therefore:

1. Export prompt text and wav files
2. Label wav files in PRAAT
3. Use the Import Textgrid… menu option by specifying the folder containing the Prompt text files and PRAAT textgrid files with matching filename stems.



Backup

It is always advisable to make a backup of valuable data. It is easy to backup data to a networked computer or rewritable media such as an external USB hard drive. Either use the “File|Create/Amend” dialogue to create a new project with a copy of the required clients or recordings from the currently

loaded project OR use Windows explorer to copy the entire project folder to your backup location.

Printing Palates

It is easy to print a sequence of numbered palates (left to right on the page) along with details about the palate sequence. This may typically be used in the clinic to keep a paper record of patient progress.
To print palates, select the '**File:Print Palates…**' menu option and the dialogue box shown in Figure 62. Note that this menu option is disabled until a specific file has been selected. The dialogue allows the user to adjust how many palates can be fitted onto a page by varying the number of 'Palates across page'. The user can choose to add information to the top of the printed page. Checkboxes are provided to select information already held in the computer. Additional free text can be added. For example, the specific segment, word or phrase being spoken can be noted along with comment on the particular feature of interest. See Figure 62 for an example.
A print preview screen (Figure 62**A**) shows an outline of the 1st page layout before it is printed. The dialogue also states approximately the number of pages required for the printout.
The 'Print Palates…' option should work with the default printer installed on the users PC.

> **Note**: Some HP laser printers with limited memory can be very slow (20 mins) at spooling and printing a page of palates. Inkjet printers are much faster (about 30secs per page).

The dialogue allows the palate numbers and/or currently selected annotations to be printed above each row of palates. Checkboxes can be clicked to select and deselect these options.
It is also possible to show extra palates before and after the selected region. This is useful, for example, if an annotated speech segment is to be printed but some surrounding context is desired on the printout. Note, if the whole utterance is selected the before and after options are disabled.

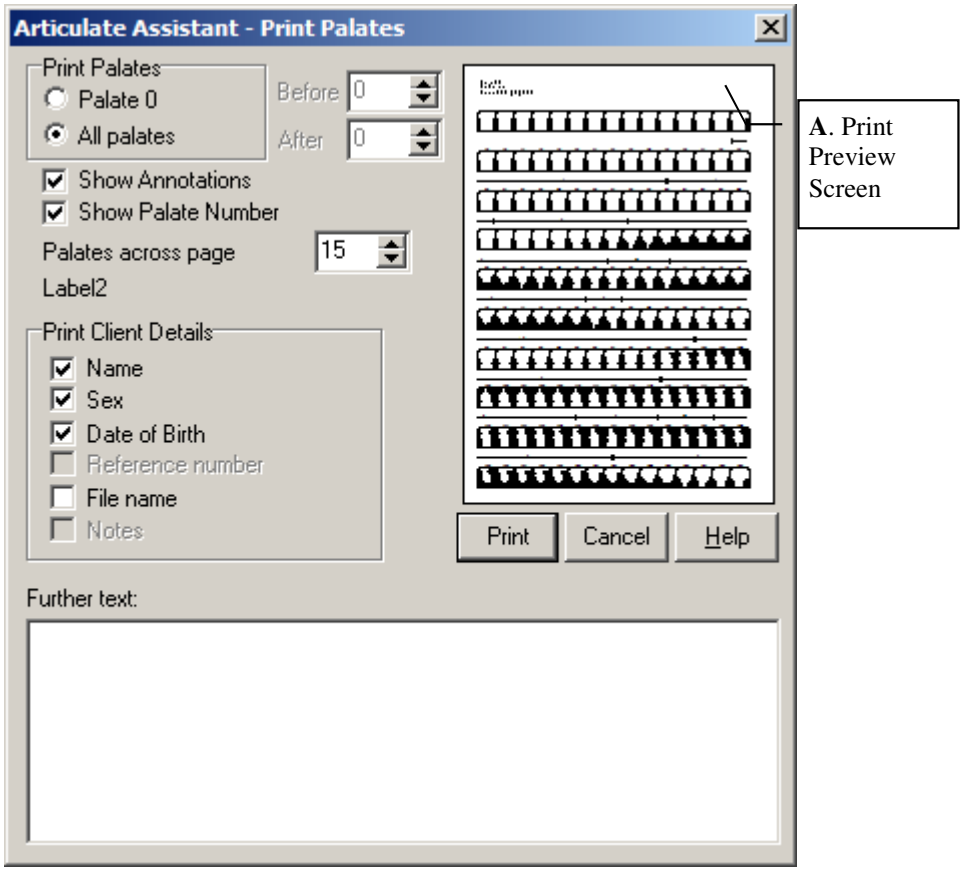


Figure 62 Print Palates Dialogue

Copying Palates

It is easy to copy a sequence of numbered palates (left to right on the page).This may typically be used to produce clinical reports or research papers.

To copy palates, select the '**Edit:Copy Palates…**' menu option and the dialogue box shown in Figure 63. Note that this menu option is disabled until a specific file has been selected. The dialogue allows the user to adjust how many palates can be fitted onto a page by varying the number of 'Palates across page'.

A copy preview screen (Figure 63**A**) shows an outline of the 1st page layout before it is copied. Only the palates fitting on this page will be copied.

The 'Copy Palates…' option should work with any Windows application that can paste a bitmap from the clipboard such as Word.

The resolution of the bitmap can be set to low medium or high or specified using custom and setting the 'width' edit boxes. The 'height' edit box value will be automatically set to the optimum size to fit the palates displayed in the preview box but this can be overridden. The greater the size in pixels, the better the resolution but the more memory the bitmap will need. Note that if the size is set too low to be able to represent the number of palates on the page then 'copy palates' may not provide a sensible picture.

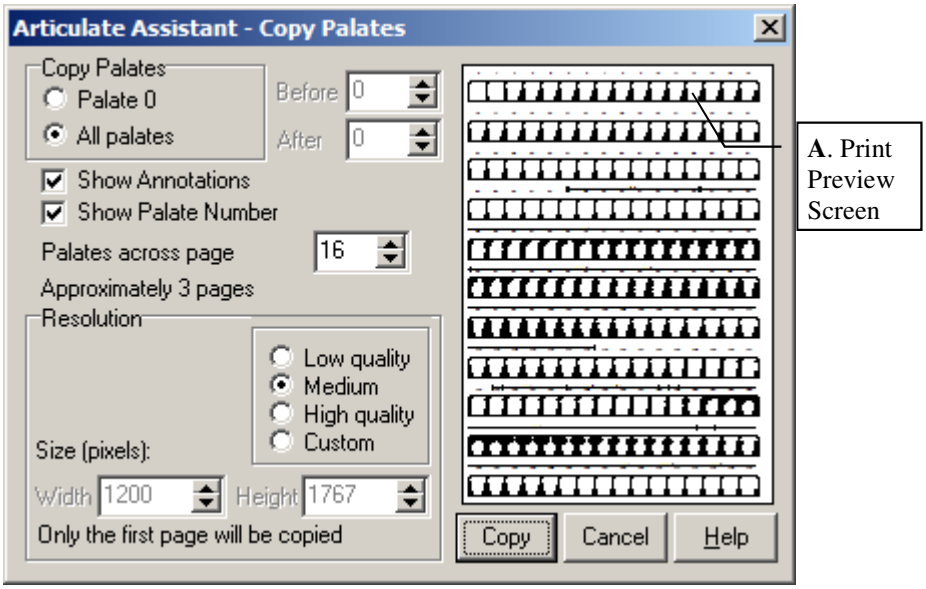


Figure 63 Copy Palates Dialogue

As with the Print palates display, it is possible to include palate number or annotations above the palate sequence. The annotations are selected using the 'filter' option in the annotation window.

Publishing Figures and diagrams

AAA provides a versatile function in order to create combinations of charts and plots suitable for publication.

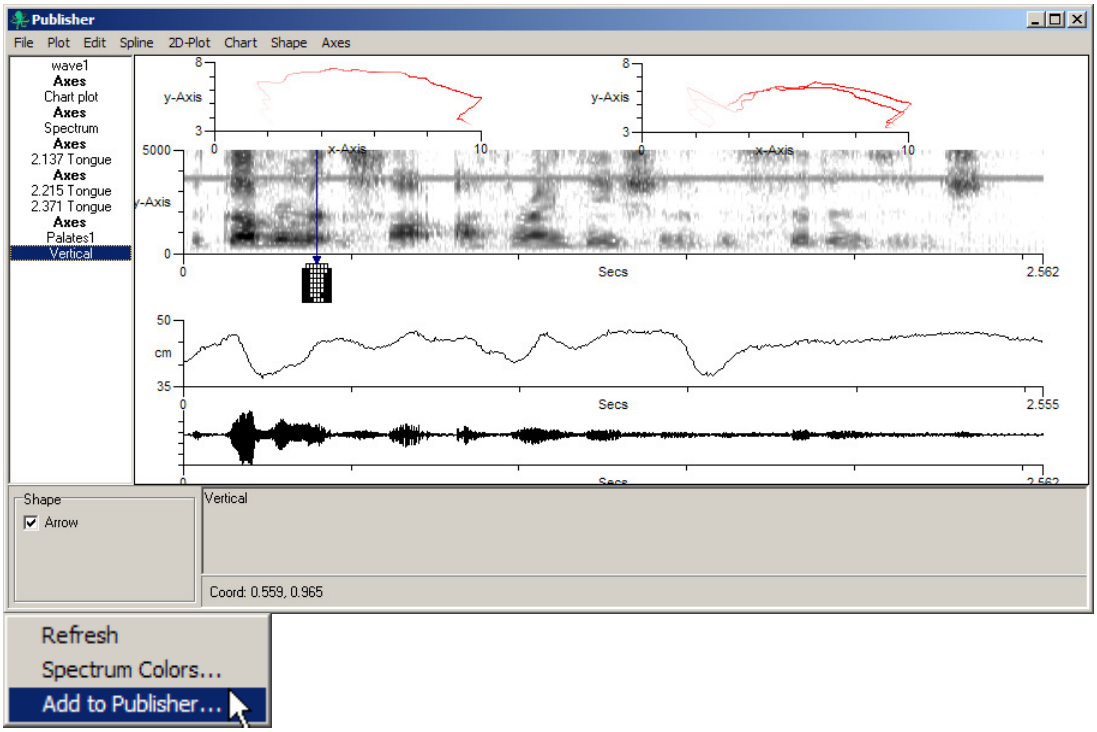
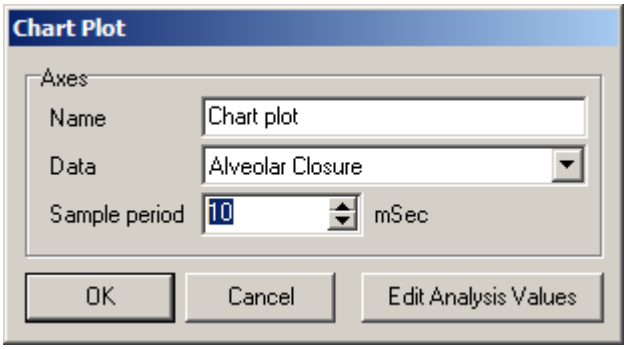


Figure 64 Publisher Dialogue

To publish a time-based chart such as a waveform, a spectrogram, EPG sequence or an analysis value, right click in the appropriate window and select "**Add to Publisher…**".

Waveforms and Analysis values



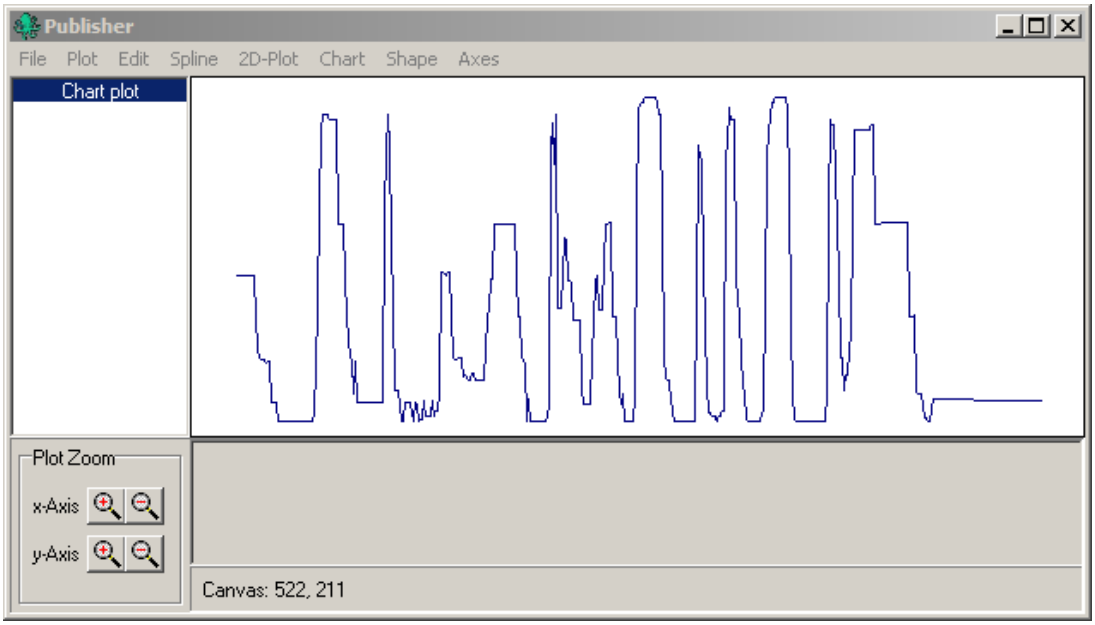
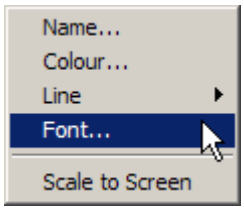


Figure 65 Adding a Chart to Publisher

Then, select the **Axes** menu option and **Create Axis**. Then hold down the ctrl key and click on the axis and the chart in the lefthand plot list so that they are both highlighted, select the **Axes** menu again and this time select "**Tie Plots to Axes**". The choices are tie to one of the axes or both. The process of tying links the scale on a given axis to the data so when you change the range on the axis the plot will expand or contract to correspond with the chosen scale. If the axes are not tied then values can be changed independently of the axis. For example, it may not be desireable to have the waveform y-axis tied as it will range from +32768 to –32768.

Axes may be named and max and min values changed. The size and type of font used for the axes can be changed by selecting" **Font…"** from the "**Plot"** menu.



To move the plot around the screen use the shift key in conjunction with the mouse. The cursor will change to a  symbol

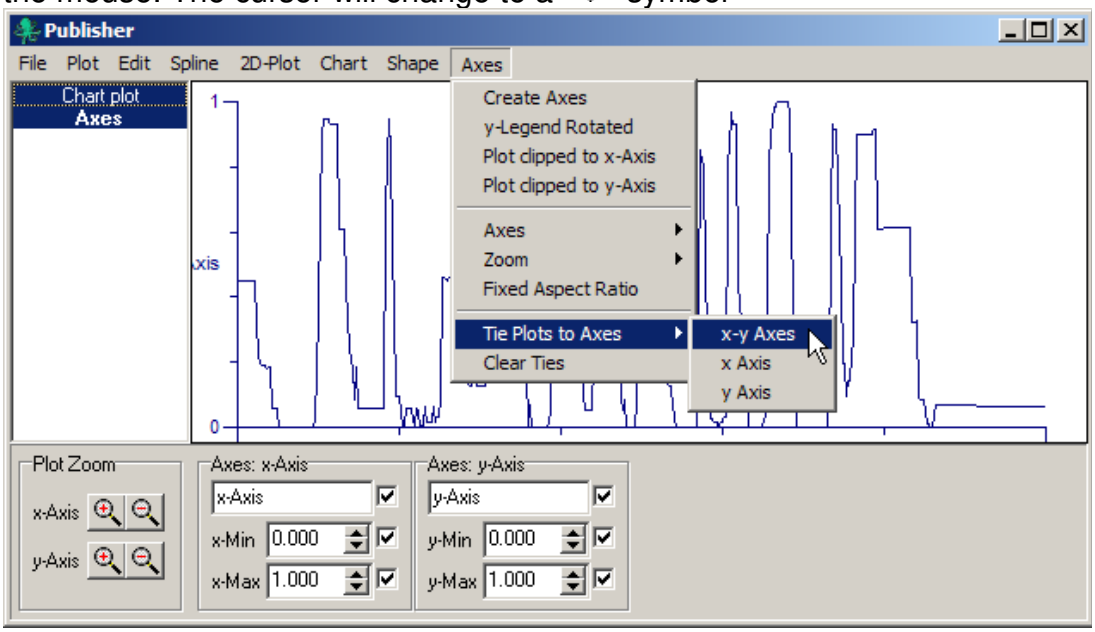


Figure 66 Tying the Axes

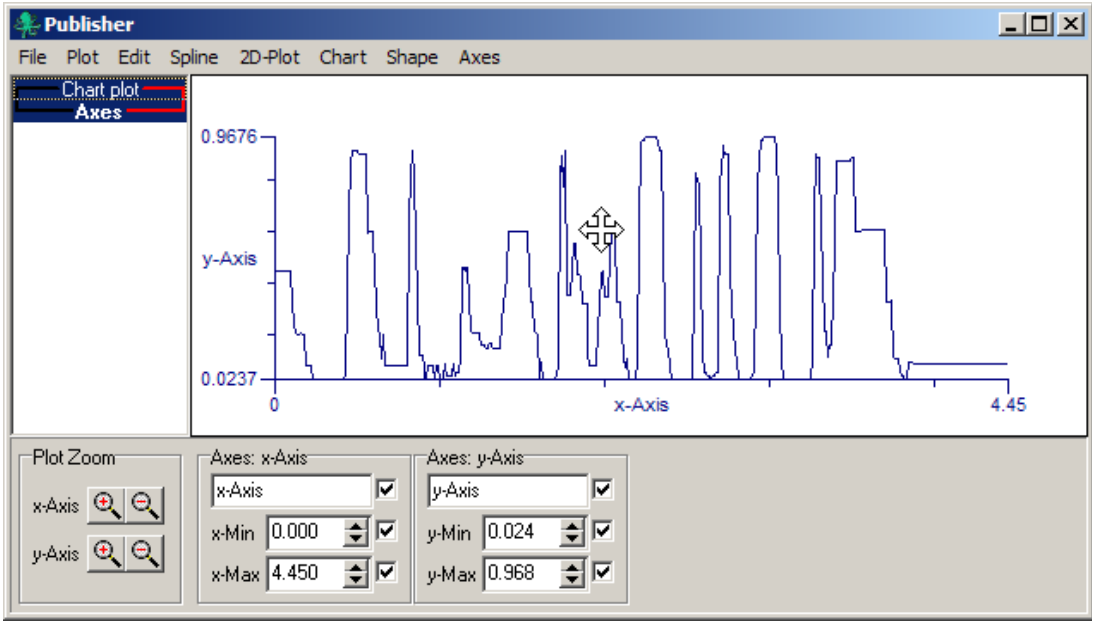


Figure 67 Chart with Tied Axes

It is possible to clip the data so that it does not extend beyond the axes. This is useful if you wish to show only part of the range of a spectrogram or a shorter period of time.

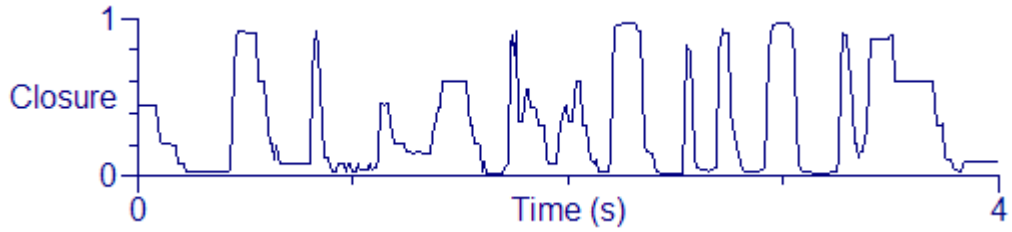


Figure 68 Plot with larger font, clipped to 4 seconds

Waveform

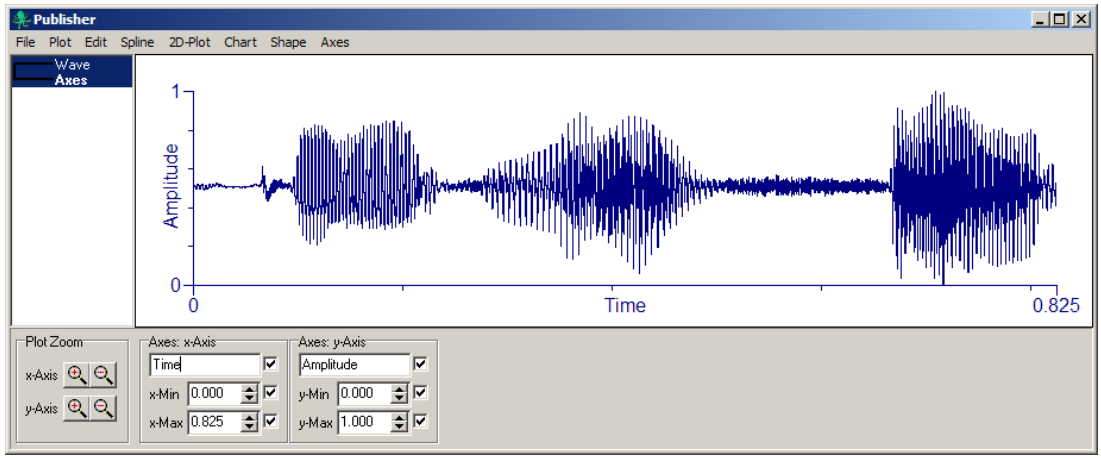


Figure 69 Waveform plot

Spectrogram

A spectrogram can be created in the same way. Note that there is also an option to change the greyscale levels.

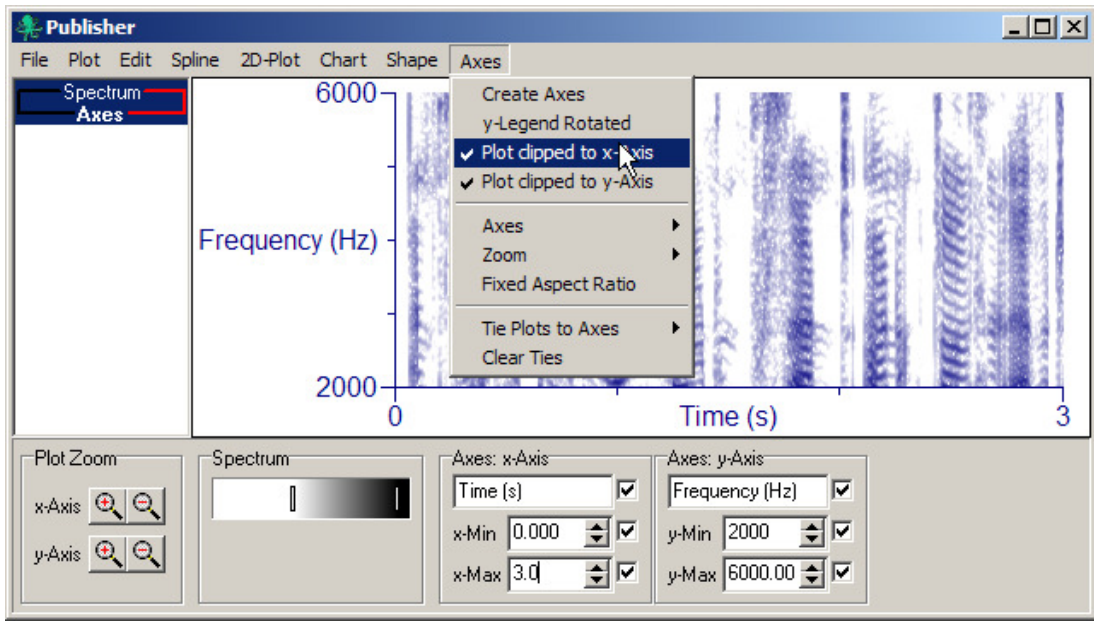


Figure 70 Spectrogram with frequency clipped between 2kHz and 6kHz

EPG sequences

As well as the Copy Palates function, it is possible to publish EPG sequences in the publisher.

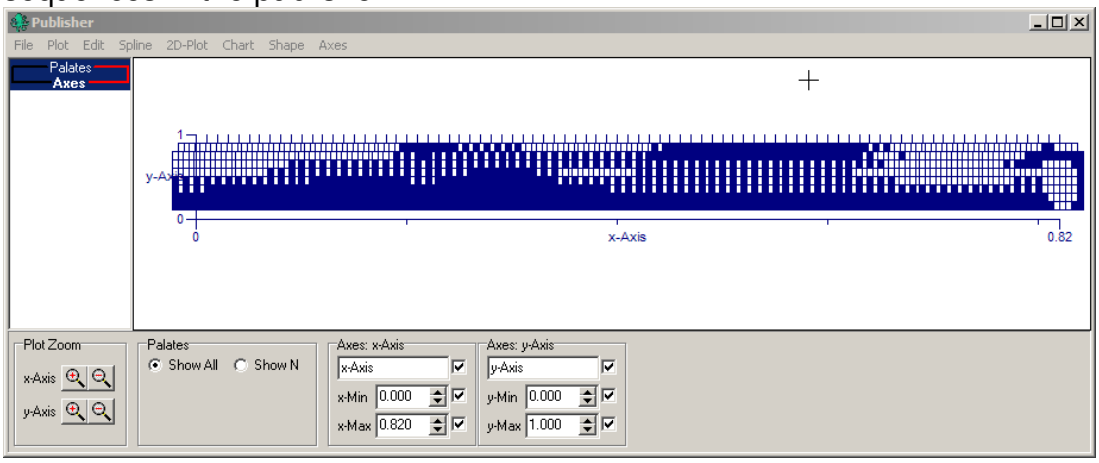


Figure 71 EPG sequence with tied axis (too many to view)

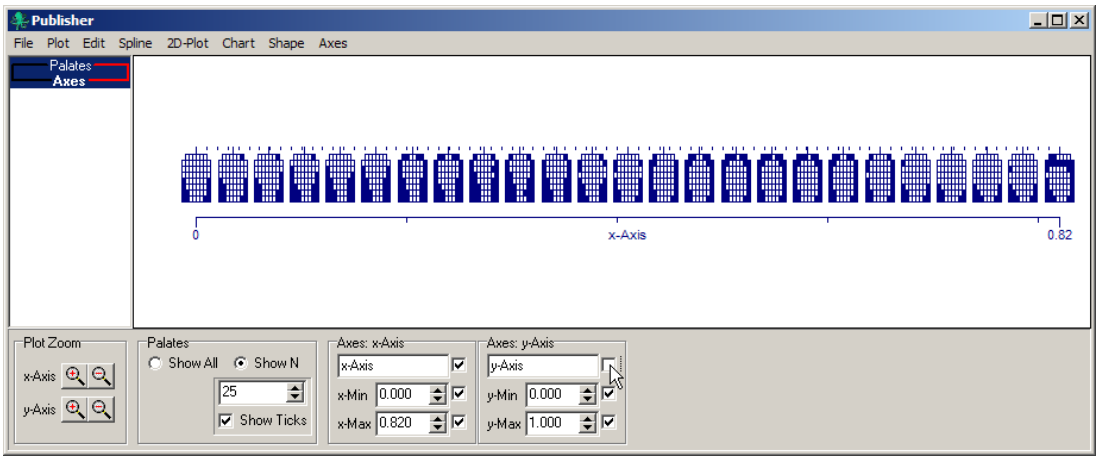


Figure 72 EPG sequence showing 25 out of 80 palates (tick marks above show timings of all 80 palates)

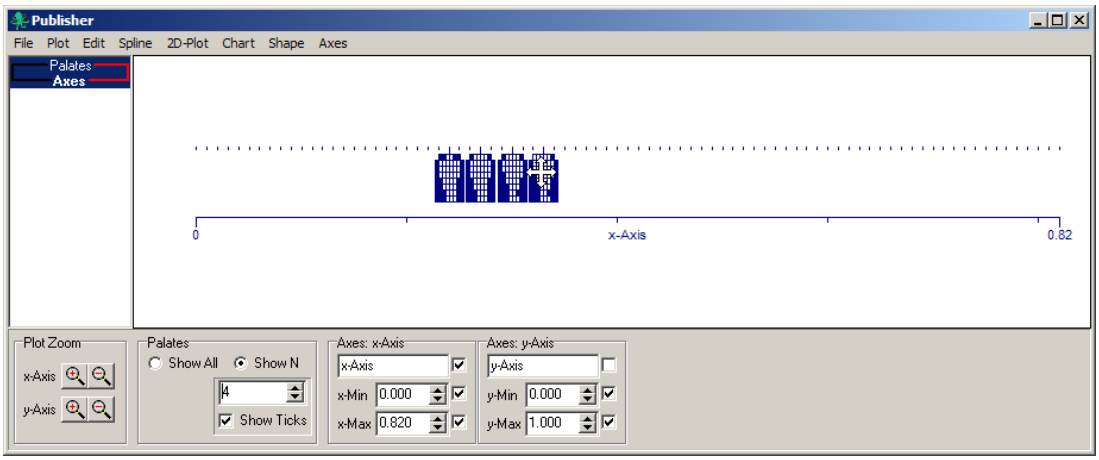


Figure 73 Click and drag a palate and the pattern changes to match the data at any time point

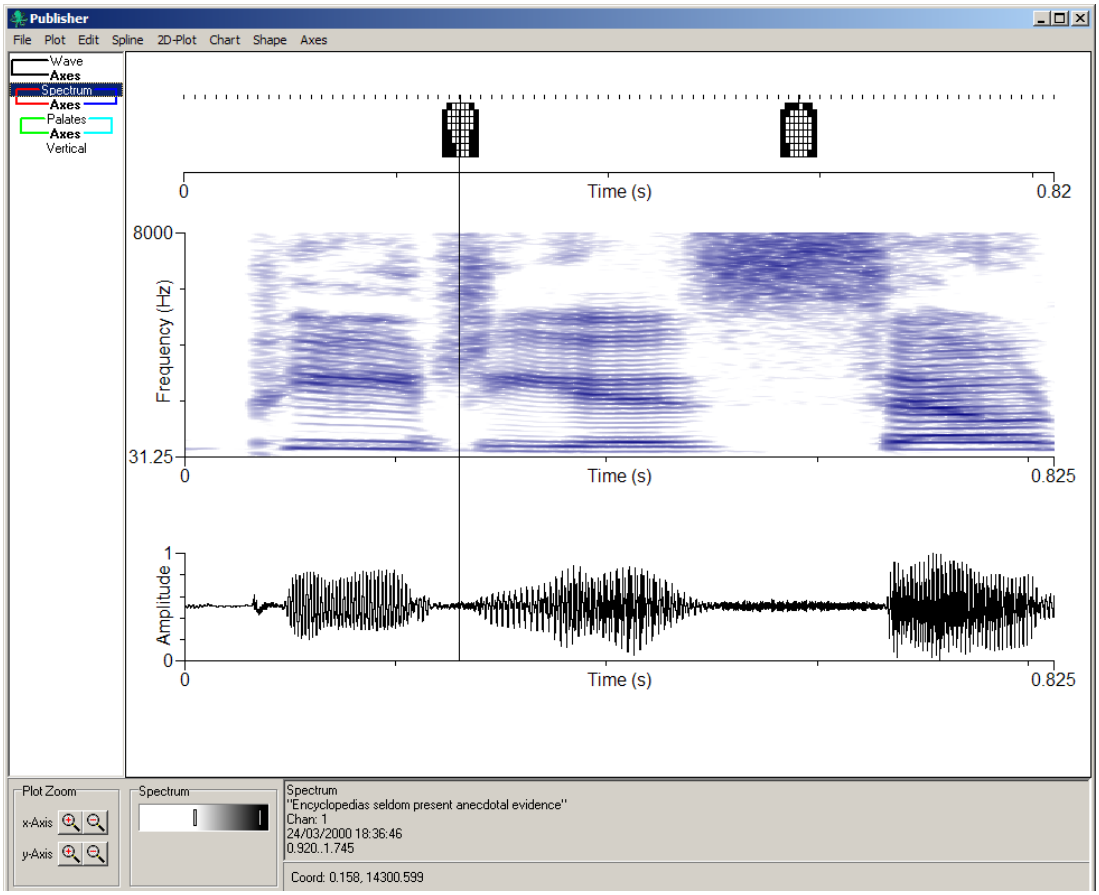
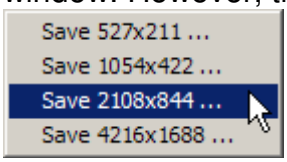


Figure 74 Combined plots including extra graphics such as text, lines, arrows, boxes, etc.

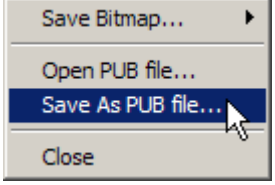
To publish the plot it is possible to copy to the clipboard (**Edit** | **Copy** menu) or to save as a bitmap file (**File** | **Save Bitmap…** Menu). Note that the clipboard may have a size limit that prevents the higher resolution images from being stored. If this is the case then use the Save Bitmap option. The size and shape of the plot depends on the size and shape of the publisher window. However, the resolution can be improved by up to a factor of 8.



Publisher stores and manipulates copies of the data, not just the images

so when higher resolutions are selected the whole plot is redrawn to that resolution before being output.

The contents of publisher are retained while AAA is running but are lost when the application is closed. In order to save a plot that may have taken some time to create, it is possible to save the plot in a *.pub file using the "**File** | **Save As PUB File…**" menu.



The Plot Window (Bar charts, 2D and 3D plots)

AAA provides a window for observing relationships between analysis values. This is principally intended for viewing 2D or 3D data such as EMA sensor positions. However, it may also be used for any analysis values. There is more detail in the EMA module manual about setting the plot for that type of data. The plot window may be partitioned two or more plots if desired.

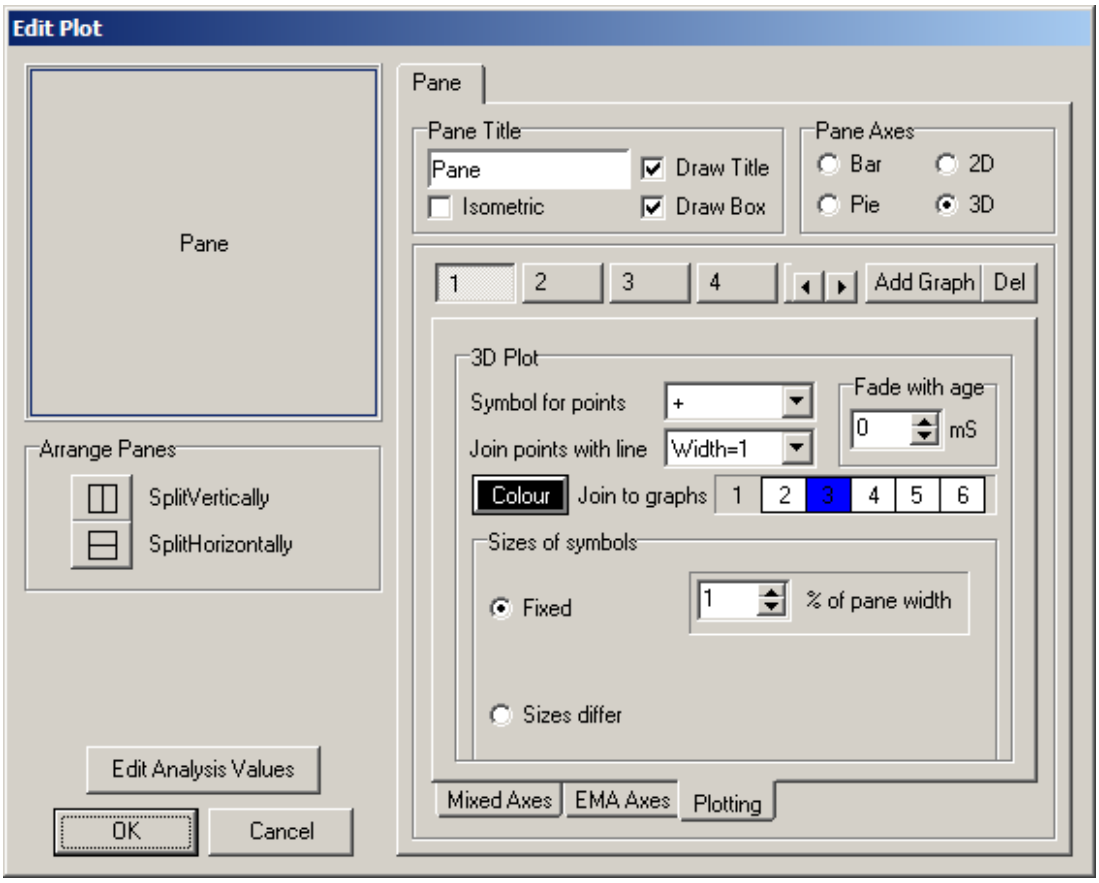
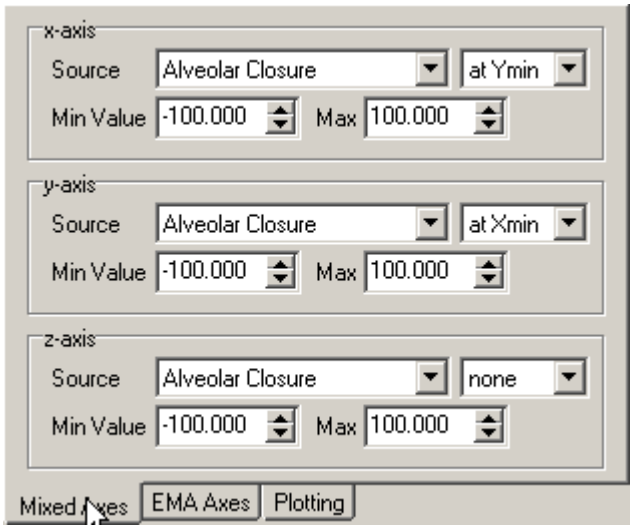


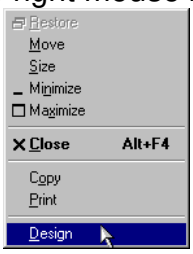
Figure 75 Plot dialogue



It is not clear that the Bar, Pie Charts or 2D plots are of any practical use but comments from users are welcome and this facility will be reviewed as the software is revised.

Designing Task Windows

Entering and Exiting Design Mode

In order to enter design mode the user must click on the caption bar (Figure 1**A**) of Articulate Assistant Advanced™ with the right mouse button. Then select the 'Design…' option in the popup menu 

.

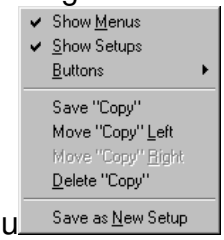
> **Note**: If there is more than one window with a caption bar (e.g. The Copy Task Window) then only the Caption bar with Articulate Assistant Advanced™ written in it has the 'Design' option

The 'Design Dialogue' list will then appear (Figure 76).

Figure 76 Design Dialogue

To exit design mode without saving any changes simply close the 'Design Dialogue by clicking on the ✕.

Saving Design Changes

Saving changes must be done before exiting design mode. To save changes made in design mode, click the right mouse button in the Task Bar (Figure 1**B**) to reveal the popup menu 

and click on '**Save "<Task name>"**' ('Save "Copy" ' in this example).

Charts, Panels, Bars and Displays

Task windows are made up of modules that dock together and can be resized and positioned to create an ensemble suited to a particular task. Modules fall into 4 categories as follows:

Charts. Any module which has a display with a time axis .
Panels. Modules that do not fall into the other 3 categories
Bars. Modules that cannot be resized in normal operation
Displays Any module with a graphical display, which doesn't have a time axis

Articulate Assistant Advanced™ supports the following modules:
Charts

- **Analysis Values**. EPG analysis values
- **Palates**. *
- **Wave**. *
- **Spectrogram ***

Panels

- **Prompts. *** Prompt list box
- **Annotations. *** Annotation Editor
- **Prompt. ***

Bars

- **Status**.
- **Menu**. Menu, Task Bar and buttons

Displays

- **Palate** Reference and live palate display
- **Analysis Values** Key to Analysis Values Chart and numerical readout

Modules marked with a '*' are limited to one instance per Task Window.

To create a new module, simply select it from the menu in the 'Design Dialogue'.

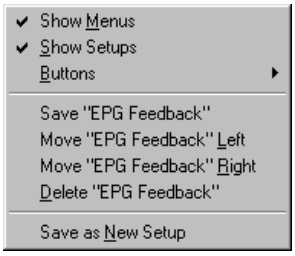
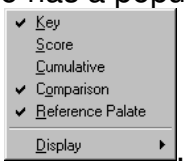


Figure 77 Menu/Task/Button Bar popup menu

The 'Menu Bar' can be configured further by right clicking in it to bring up the popup dialogue (Figure 77). The top three options in this popup menu control the visibility of 'Menu', Task 'Setup Buttons' and 'Buttons'. There is a submenu 

allowing each of the buttons to be enabled or disabled.

The ‘Palate Display’ also has a popup dialogue to control the visibility of elements of the display 

. The elements consist of:

- **Key**. Colour scale
- **Score**. Variability Index
- **Cumulative**. Cumulative contact check box
- **Comparison**. Palate comparison gauge

It is also possible to specify whether the ‘Palate Display’ is a ‘**Reference Palate Display**’. Note: Only one ‘Reference Palate Display’ permitted per ‘Task Window’.

Repositioning a module in a Task Window

To rearrange the modules in a Task Window, click and drag the  in the top left corner of the window (or the  at the left edge in the case of ‘Bar’ type modules).

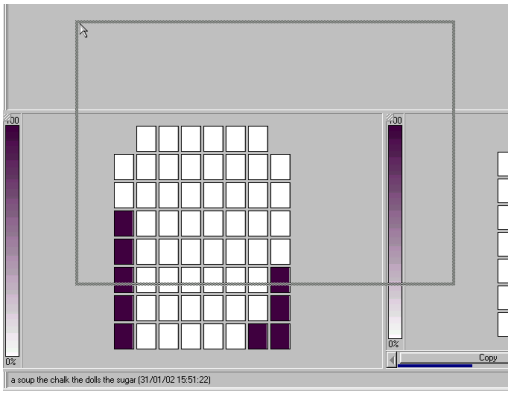


Figure 78 Rearranging Modules in Design Mode

Figure 78 shows the grey outline that will move about the screen and ‘dock’ in positions relative to other modules. When you are happy with the position release the mouse button. The relative size of the module can be adjusted as described on page 51 of this manual.

It is also possible to move a module so that it exists in a separate window on its own. In fact this is the state of a new module created by selecting a menu option from the ‘Design Dialogue’. To get a module to be separate from the main window , click and drag until the grey outline is not aligned with the other modules (as shown in Figure 78) then release the mouse button.

Repositioning modules is an art that improves with practice.

Deleting a Module from a Task Window

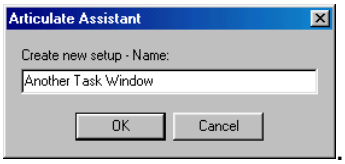
To delete a module from a Task Window move the module so that it exists in a separate window on its own (as described in the previous section) then close that window by clicking on the  .

Reordering the Task Bar Buttons

It may be desirable to change the order in which the Task Bar buttons appear. To change the order click the right mouse button in the 'Menu/Task Bar' to bring up the popup menu (Figure 77). The Task Bar button corresponding to the current can be moved left or right one place by selecting the appropriate popup menu option. Repeat this to move the button one space each time.

> **TIP**: Articulate Assistant Advanced™ always starts in the first Task Window as defined by the order of the Task Bar buttons. To get Articulate Assistant Advanced™ to open in the Analysis Task simply move the Analysis Task button left so that it is first in the row.

Creating a New Task Window

To create a new Task Window click on 'Save As New Setup'. Fill in the name of the new Task Window 

. A duplicate of the current window will be created. Then rearrange this new Task Window to suit.

Deleting a Task Window

To delete a Task Window, first select the Task Window to be deleted. Then use the menu/task/button popup menu and click on the 'Delete "<task window>" ' option (e.g. 'Delete EPG "Feedback" ' in Figure 77).

Shortcut Keys

Help	F1
Playback	F2
Record	F3
Select visible region of waveform	Ctrl+A
Adjust selected region/ selected annotation	Ctrl + drag mouse
Select region in Palates or Analysis values windows	Shift + drag mouse

Revision	Date	Notes
2.12	04/11/10	Added keyboard shortcuts for zooming and stepping through data
2.13		
2.14		
2.15	31/01/14	Updated for AAA version 2.15 Prompting options added.
2.16	10/10/14	Analysis values now stored for each project, data export specification is stored for each project. Recalculation of analysis values carried out methodically and option to calculate every time a recording is viewed removed.
2.16.15	20/05/16	Added regular expressions and indicated default annotation is taken from 1st line of hotlist.

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