APD Test Software

Auditory Processing Disorders Test Data Records and Report Generation Software



User Manual and Installation Guide

Version 1.2 October 2020

© AudiPro Audiology Clinic Inc. Developed by Ayyala Studio

Contents

System Requirements
APD Test Software Installation Process
Installation of MiKTeX Distribution for PDF Report Generation
Installation of Required MiKTeX Packages7
APD Test Software – Starting the Program
APD Test Software Main Screen
Creating a new file
Patient Data Filename and Data Format12
Loading an existing file
Set Data Folder for Patient Data Files
MyAPD – Program and Document Settings for PDF Report Printing 12
APD Test Battery Data and Questionnaires
Opening an APD Test Data or Questionnaire Form
Save and Menu Buttons
Questionnaires & Forms
Speech in Quiet & Noise Test
Staggered Spondaic Words (SSW) Test
Word Correctness and Delays
Reversal and Word Order
Cardinal Responses and Re-Instruction
Phonemic Synthesis Test
Phonemic Error Analysis
Phonemic Error Types and Description
Phonemic Error Counts and Summarization
PDF Report Generation

APD Test Software Program Version 1.2 (Trial)

User Manual and Software Installation Guide

Thank you for choosing to install APD Test Software Version 1.2 (trial). This user manual and software installation guide is designed to help with installing and running APD Test Software. Users can install the software from the Windows installer (APDTestSoftwareInstaller.msi) package. The software is available for download from AudiPro Audiology's website at https://audiproaudiology.ca/apdtestsoftware.html.

System Requirements

Minimum system requirements for running APD test software program are as follows:

- Windows 10 (preferred) or Windows 7 (minimum)
- 4GB RAM

The software has not been tested on systems running Windows 7 or Mac OS. The procedure for setting up a LaTeX distribution is also different for Unix-based OS such as Mac or Linux.

APD Test Software Installation Process

Please run the APDTestSoftwareInstaller.msi package to begin installation. Click on *Next* to proceed to the next step. Continue to click *Next* whenever the option is provided during the process unless there are any additional instructions.

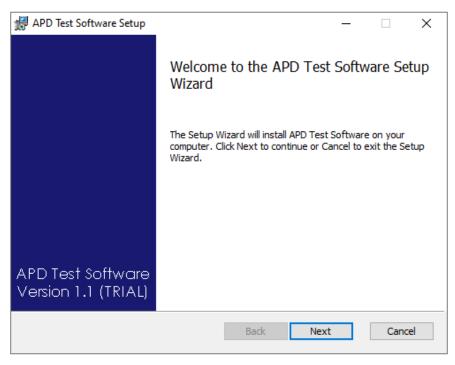


Figure 1 Software Installation Step 1 – Running the Installer

Select the option that says "I accept the terms in the License Agreement" in the End-User License Agreement. The agreement strictly governs only the trial version of the software.

🕼 APD Test Software Setup	– 🗆 X	
End-User License Agreement Please read the following license agreement carefully	APD	
END USER LICENSE AGREEMENT	^	
Last Updated: August 1, 2020		
Please read this End-User License Agreement ("Agreem before clicking the "I Agree" button, downloading or using Software ("Application").		
By clicking the "I Agree" button, downloading or using the the end-user ("You") are agreeing to be bound by the term conditions of this agreement.		
☑ I accept the terms in the License Agreement		
Print Back Next	Cancel	

Figure 2 Software Installation Step 2 – License Agreement

🛃 APD Test Software Setup	_		×
Destination Folder Click Next to install to the default folder or click Change to choose anot	ner.	API	\mathbf{D}
Install APD Test Software to:			
C:\Program Files (x86)\APD Test Software\			
Change			
Back Next		Cance	9

Figure 3 Software Installation Step 3 – Installation Folder

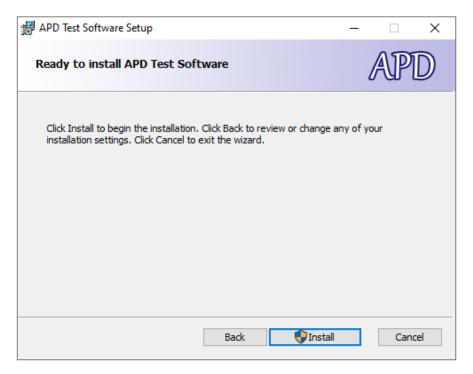


Figure 4 Software Installation Step 4 – Installing the Program

Click on the *Install* button to begin installing the program. Click on *Allow* if your computer prompts you for permission to install the software. Once the software has been installed, click on the *Finish* button to complete the installation.

After the program has been installed, you will find a Start Menu entry as well as a desktop icon. You are now ready to start using APD Test Software program.

HINT $\bigcup_{i=1}^{n}$ Words that are formatted like *THIS* in the user manual indicate a button that a user can click or press to execute an action.

Installation of MiKTeX Distribution for PDF Report Generation

APD Test Software uses the MiKTeX distribution, which is a free-to-use LaTeX distribution to generate PDF reports from patient test data files. The installer for MiKTeX can be found at the MiKTeX website: <u>https://miktex.org/download</u>. Download and install the basic-miktex program from the website. The procedure to install MiKTeX, along with supporting screenshots are shown below.

nditions.	
liKTeX	
libre, that is, r Software Four ware Guidelin he FSF. If you	not ndation's es. Where u find any non-
	of the article given at the e fikTeX ftware in the M libre, that is, r Software Four ware Guidelin the FSF. If you s (reference g

Figure 5 MiKTeX Installation – Running the Basic MiKTeX Installer

Select the option to install MiKTeX for all users, as this will allow any user who uses the computer to print reports from patient data files.

MiKTeX installation allows users to change the installation path (installation folder location as well as the installation name). It is recommended that you *do not* change the default installation path. If you do wish to change the install folder name, e.g. C:\Program Files\Miktex, it must be ensured that the folder path name contains the word "Miktex" (case insensitive), as APD Test Software must verify that MiKTeX is installed and accessible prior to printing PDF reports.

Basic MiKTeX Installer (20.6.29, 7487, 64-bit)	×
Installation Scope If you are administrator, you have the option to set up MiKTeX for all users.	
◯ Install MiKTeX only for me (
Install MiKTeX for anyone who uses this computer (all users)	
< Back Next >	Cancel

Figure 6 MiKTeX Installation – Installing for All Users

Basic MiKTeX Installer (20.6.29, 7487, 64-bit)	×
Installation Directory Choose a location for the installation directory.	
Install MiKTeX to:	
C:\Program Files\MiKTeX 2.9	Browse
< Back Next >	Cancel

Figure 7 MiKTeX Installation – Selecting Installation Folder

APD Test Software generates PDF reports on letter paper, so set the preferred paper size to Letter. The option to install missing packages on-the-fly can be left unchanged as "Ask me first".

Basic MiKTeX Installer (20.6.29, 7487, 64-bit)	×
Settings Set your preferences.	
Preferred paper: A4 ~ A4	
Install missing packages on the fly: Ask me first V	
< Back Next >	Cancel

Figure 8 MiKTeX Installation – Paper Size and Package Installation Settings

Click on *Next* to proceed to the next steps and complete installation of MiKTeX.

Basic MiKTeX Installer (20.6.29, 7487, 64-bit)	×
Update Check Check for updates now.	
MiKTeX has been successfullly installed.	
In order to obtain an up-to-date installation, it is recommend that you allow MiKTeX to check for updates now. This will happen in the background. You will be notified, if updates are available.	0
Check for updates now	
< Back Next >	Cancel

Figure 9 MiKTeX Installation – Completing MiKTeX Installation

Installation of Required MiKTeX Packages

In addition to installing MiKTeX, additional packages must be installed to allow APD Test Software to generate PDF reports. A total of six additional packages are required:

- geometry
- setspace
- multirow
- fancyhdr
- ulem
- tipa

These packages can be installed through the MiKTeX console, which is available in the list of Windows programs after MiKTeX has been installed. The main screen of MiKTeX user console is shown in the picture below. Packages can be installed either in administrator mode (recommended) or user mode (if administrator privileges to the computer are not available). Packages installed in user mode will only be available to that user and other users will not be able to access the report printing features of APD Test Software. This guide shows the installation process in administrator mode. The package installation process is identical for user mode but with a different installation folder (User's local data folder) instead of the MiKTeX folder in Program Files (MiKTeX installation folder).

	MiKTeX (-	×
File	Tasks		Welcome!		
	Overvie Setting Update	gs es	This is the MiKTeX Console. It will assist you in managing your MiKTeX configuration. If you want, you can start with an online tutorial: <u>HOWTO: manage MiKTeX with the MiKTeX Console</u>		
	Packag Diagno		Operation mode		
	Cleanu Cleanu	р /	 Please decide how you wish to continue: → Switch to MiKTeX administrator mode Restart MiKTeX Console with elevated privileges and switch to MiKTeX administrator mode. Use this option, if you want to operate on the shared (system-wide) MiKTeX configuration. → Stay in MiKTeX user mode Continue to work with MiKTeX Console in MiKTeX user mode. Use this option, if you want to operate on your private MiKTeX configuration. 		
			Updates You can now check for package updates. Check for updates		

Figure 10 MiKTeX Console Main Screen

Tasks H	lelp											
<u> </u>	Packag	es										
Overview	Install from:	a rando	om package repositor	rv on the Internet	t					~	Chan	nae
Settings			ram Files MiKTeX 2.9		-							-
Updates (0				,								
Packages	÷ - (0	geometry		8	7						
Diagnose	Name		Category	Size	Packaged on		Installed on	Installed by	Title	Files		
-	euclideang geometry		\Formats\LaTeX \Formats\LaTeX		5/6/2020 1/3/2020	÷	Install package		Draw geometric Flexible and co			
Cleanup	pst-eucl		\Applications\G	2.15 MiB	6/22/2020		Uninstall package		Euclidian geom	pst-eu	icl.pro +	+4
	tkz-euclide	2	\Formats\LaTeX	1.64 MiB	4/7/2020	W	Update package	database	Tools for drawin	tkz-eu	iclide.st	y
Y						0	Package informa	tion				
~						_						
>_												

Click on the *Packages* tab on the left-hand side panel on the console screen.

Figure 11 MiKTeX Console – Packages Tab and Installing Packages

This guide demonstrates the process for installing the package "geometry". Repeat the process for other package names that have been mentioned earlier in the guide.

- Click in the search field and type the word "geometry".
- The search yields a total of four packages, one of them having the exact name as the search word.
- Right-click on the "geometry" package and click on *Install package*.
- Wait till the console finishes installing the package and click *Close*.

Overview	Packages							
Settings	Install from: a rand	dom package reposito	ry on the Intern	et				 Change.
Updates (0)	Install to: C:\Pro	ogram Files∖MiKTeX 2.9	9					
Packages	- + - 🖸 🖣	geometry		8	7			
-	Name	Category	Size	Packaged on	Installed on	Installed by	Title	Files
Diagnose	euclideangeom	\Formats\LaTeX	1.04 MiB	5/6/2020			Draw geometric	euclideangeome
Cleanup	geometry	\Formats\LaTeX		1/3/2020			Flexible and co	
	pst-eucl tkz-euclide	\Applications\G \Formats\LaTeX		6/22/2020 4/7/2020			Euclidian geom Tools for drawin	
I								
۶.			🛞 Mik	TeX Console		×		
				Your MiKTeX installa	tion will now be u	pdated:		
					installed			
				1 package(s) will be				
				1 package(s) will be 0 package(s) will be				
					removed	ncel		
					removed	ncel		
					removed	ncel		
					removed	ncel		
					removed	ncel		

Figure 12 MiKTeX Console – Package Installation Process

Overview	Packages			
Settings	Install from: a rand	om package repository on the Internet		✓ Change
Updates (0)		aram Eiles\MiKTeX 2.9 MiKTeX Console ?	×	1
Packages	ך וי − ו		^	
Diagnose	Name	Downloading:	0%	Title Files
	euclideangeom geometry	Total	0 /8	Draw geometric euclideangeom Flexible and co geometry.cfg +
Cleanup	pst-eucl		0%	Euclidian geom pst-eucl.pro +4
	tkz-euclide	starting package maintenance	_	Tools for drawin tkz-euclide.sty
		Instaliation directory: "C:IProgram FilesVMIKTeX 2.9" package repository: http://mug.ca/mirory(tanl/systems/win32/miktex/tm/packages/ package repository: http://mug.ca/mirory(tanl/systems/win32/miktex/tm/packages/ going to download 921500 bytes going to install 8 file(g) (1 package(g)) downloading http://mug.ca/miror/ctan/systems/win32/miktex/tm/packages/ geometry:ta.tama 0.921MB, 22.01 Mbit/s extracting files from geometry.tar.lzma		
		Padkages Files MB Mbit/s	llose	
			.:	

Figure 13 MiKTeX Console – Package Installation Success

APD Test Software – Starting the Program

APD Test Software requires the user to be connected to the internet for validating the trial program license. The trial version is free to use till Dec 31, 2020. The program validates the trial license over the internet when started or displays an invalidation message and shuts down as shown below. Click *OK* to proceed to use the software or click *Close* to close the program. The internet activation is intended for use only with the trial version. The full version of the software will include a license key model to validate the application's license status and can be used offline as well.

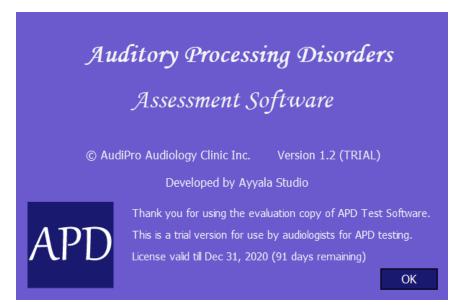


Figure 14 APD Test Software License Validation - Success

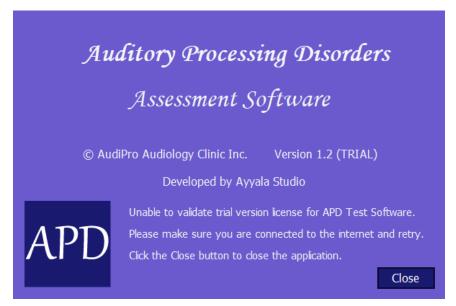


Figure 15 APD Test Software License Validation Failed (No Internet Connection)

APD Test Software Main Screen

After the trial version license is activated over the internet, the program loads the main screen. The main screen stays active throughout the use of the program and closing the main screen will shut down the program. The program allows users to either create a new patient data file for a new test or open an existing file to view or modify the contents. The various features on the main screen are explained below.

Manual Auditory Processing	g Disorder Test Software - Patient Information			– 🗆 X
Patient Info	ormation		Save MyA	Print Exit
First Name	User		Select Test	
Middle Name			Questionnaires and Forms Speech in Quiet/Noise (W-22) Test Staggered Spondaic Words (SSW) Test	
Last Name	Manual		Phonemic Synthesis Test Phonemic Synthesis Picture Test Phonemic Error Analysis (PEA)	
Name Suffix	~			
Test Date	7/31/2020			
Date of Birth	12/25/2011	₽▼ Age <mark>8y7m6d</mark>]	
		LOAD EXISTING RECORD	→ START TEST	1
Data Folder	D:\Test Folder\		Browse Folder	User_x_Manual_20200731_2037

Figure 16 APD Test Software Main Screen

Creating a new file

Enter the patient information in the respective fields. Patient's first name and last name are required as a minimum to create a new patient data file. Click on the *Create New Record* button to initiate a new data file. The button only *initiates* a data file with the name displayed to the user. The file must still be saved by clicking on the *Save* button at the top of the screen.

To create a new file, the following information needs to be entered by the user.

- Salutation Mr. / Mrs. / Ms. / Dr.
- First name (required)
- Middle name (optional)
- Last name (required)
- Name suffix (optional)
- Test date (usually the date on which file is created, can be changed by user)
- Date of birth (recommended)
- Patient age The software automatically calculates the patient's age in years, months, and days as the difference between the test date and the patient's date of birth.

Patient Data Filename and Data Format

Users are not allowed to select filenames for their data files – the software will automatically assign filenames using various parameters. The standard filename format used by APD Test Software is $F_M_L_D_T$, which translates to (F) First name, (M) Middle name, (L) Last name, (D) Test date and (T) Time at which the record is created. If a middle name is provided for a patient, it is replaced by an 'x' in the filename. Data files are saved in Java Script Object Notation (JSON) format. Filenames are designed to not contain any blank spaces, so all spaces entered by the user in a patient's name will be removed while generating a filename. The patient's name, however, will remain unchanged in the data file as well as the report.

Example 1: The data file for a patient Dr. Alice Brittany Chase whose record is created on March 18, 2020 at 4:25 p.m. will be saved with filename Alice_Brittany_Chase_20200318_1625.json.

Example 2: The data file for a patient Mr. Michael Lee whose record is created on August 3, 2022 at 8:15 a.m. will be saved with filename Michael_x_Lee_20220803_0815.json.

Loading an existing file

The software also allows users to load existing patient data files using the *Load Existing Record* button. Users can select JSON files previously created by APD Test Software or generated in the exact format as required by the software.

Set Data Folder for Patient Data Files

The **Data Folder** is the working directory or folder where APD Test Software saves the patient data records and uses as the starting folder to search for existing data files. The data folder only needs to be changed when switching folders and need not be updated when the software starts. It is important to set this folder right after installation so that user knows where the data files are being saved. Data folder can be changed by clicking on the *Browse Folder* button.



MyAPD – Program and Document Settings for PDF Report Printing

The MyAPD button allows users to define settings for each clinic separately, allowing for personalization of the PDF reports. Users can enter up to four lines of specific information.

- Line 1 Clinic name
- Line 2 Clinic address
- Line 3 Contact information
- Line 4 Additional contact information

Clinic name must be entered by the user and will be printed as the first line on the PDF report. Lines 2 through 4 are optional and can be left blank in any order. Users can also select a JPG image having same dimensions (square) for use as clinic logo. The minimum permissible image size is 128×128 pixels, while the largest permissible image dimensions are 2160×2160 pixels. The default setting uses a control square image that indicates to the user to upload a custom logo. It is recommended that the user sets clinic-specific information when using the software for the first time. If no logo should be used, the user can upload a blank (white) image of any size, preferably 128×128 pixels to keep the PDF report file size smaller.

TIP Use clinic logo with an image size 256×256 pixels or 512×512 pixels to reduce the file size of the PDF output report.

💀 PDF Report Printing - Test Selection				×						
PDF Report Printing Format										
Enter your organization details for use on the APD test report (PDF document)										
Line 1: Clinic Name Clinic name										
Line 2: Clinic Address	Clinic address									
Line 3: Contact Details 1			5) 542							
	Phone: +0 (123) 456 7890 Fa	`	5) 543							
Line 4: Contact Details 2	Email: audiologist@clinic.com	1								
Select an image for use as orga	anization logo (Optional)									
Select a JPEG image with squa	re dimensions									
Browse Images										
Bronbe Intigeo										
Select test results to include in	PDF Report (Current documer	it only)								
Patient information (Include	ed)									
Questionnaires and Forms										
Speech in Quiet/Noise (W-2										
Staggered Spondaic Words										
☑ Phonemic Synthesis 35 Test										
Phonemic Synthesis Picture			\bigcirc							
☑ Phonemic Error Analysis (PEA)										
			LXIL							

Figure 17 Clinic Information and PDF Report Settings

Users can also select which test results to be included in the PDF report. These selections are specific to the current patient file and are reset to include all tests when user creates a new file or loads an existing file. The patient information page (first page with clinic information as entered on the main screen), along with the test results summary is included by default in the PDF report and cannot be excluded by the user. After making the desired changes to the PDF report details, click *OK* to accept and save the changes or *Exit* to discard the changes and close the form to return to the main screen.

APD Test Battery Data and Questionnaires

The APD test software program allows users to record patient data for the Buffalo Model APD central battery tests. The software also includes screening questionnaires and a detailed analysis of phonemic errors on all three Buffalo model tests. The software facilitates recording information for the following tests and questionnaires:

- Questionnaires & Forms Buffalo model screening questionnaire for children and adults
- Questionnaires & Forms Hearing inventory screening (HHIA) questionnaires for children and adults
- Speech in Quiet/Noise test
- Staggered Spondaic Words (SSW) test
- Phonemic Synthesis (PS) test
- Phonemic Synthesis Picture (PS Picture) test
- Phonemic Error Analysis (PEA)

Opening an APD Test Data or Questionnaire Form

Test or questionnaire forms can be opened after either creating a new file (click on *Create File* button) or loading an existing file. To open a test form, click on any test in the **Select Test** list and click on the *Start Test* button. If there is no file open in the software, the software will not open the requested form and will display the message – "There is no file currently open. Please create a new file or load an existing file".

Save and Menu Buttons

All test forms and questionnaires have two buttons in common – the *Save* button and the *Menu* button. The *Save* button writes all information that is entered during a session to the JSON data file. It is important to save data intermittently during a test session to avoid loss of data due to unexpected reasons. The *Menu* button closes the current test form and displays the main screen. It is recommended that users use the *Menu* button to return to the main screen instead of simply closing the form they are working on, as the *Menu* button also saves data to the JSON file before it closes the form.

Questionnaires & Forms

The Questionnaires & Forms screen allows users to enter patient responses to the Buffalo model screening questionnaire and HHIA screening questionnaire.

The default response to all questions is *No* and the default questions category is set to *Child* when a new patient data file is created. Users can switch between child and adult questions using the buttons at the top of the questionnaire table.



Switching between Child and Adult questions does not reset the responses. It only changes the way questions are framed for the selected category.

Questionnaires and Forms for APD Testing			Save Menu
Buffalo Model Questionnaire HHIA Questionnaire Statement	Yes	No	Additional Information
Please indicate if your child is currently receiving or has received any of the following services			
Auditory training			
Speech therapy			
Phonological awareness training			
Special phonics training			
Special help with reading			
Sensory-integration training			
DECODING (Please mark YES if the statement applies to you or NO if not a problem)			
My child has a problem saying speech sounds			
My child has a problem understanding language			
My child has a problem understanding spoken instructions			
My child has a problem reading aloud			
My child has a problem with phonics			
My child has a problem with spelling			
My child responds slowly/delayed to spoken language			
My child has a problem learning a foreign language			
My child speaks slowly			· · · · · · · · · · · · · · · · · · ·

Figure 18 Questionnaires and Forms Screen

Speech in Quiet & Noise Test

Speech-in-Quiet/Noise test is part of the Buffalo Model central test battery for evaluation of auditory processing disorders. It consists of two distinct sets of words that the patient hears in different ears, one set with a quiet background and the other with a noisy background. The results for words in quiet and noise are scored separately at the end of the test as a percentage of correct responses for each set of words.

The Speech-in-Quiet/Noise test screen displays the following information:

- Buttons for selecting word sets for quiet or noise
- Table showing a list of 25 words for the word set. There are four lists of words that are displayed in the table (a) Speech-in-quiet, words in right ear (first 25 words), (b) Speech-in-quiet, words in left ear (last 25 words), (c) Speech-in-noise, words in right ear (first 25 words), (d) Speech-in-noise, words in left ear (last 25 words).
- Speech level (dB) for each of the four sets as described above. The speech level can only be entered when the first word is selected for the list, i.e. word no. 1 or word no. 26 only.
- Word number and word display
- Buttons to navigate to *Previous* and *Next* words
- Buttons to mark the word as *Correct* or *Wrong*. Each word is marked as *Correct* by default.
- Delay markers The panel consists of four buttons corresponding to four different delay levels. The buttons correspond to ~ (no delay) which is the default selection, *X* indicating a short delay, *XX* indicating a long delay and *I-X* indicating an integration delay. Each button is highlighted using a different color to help with quick identification.

- Drop-down menu to navigate to any word within the Quiet or Noise word lists.
- Buttons to switch between Right and Left ear word lists
- Statistics showing the number of incorrect (wrong) responses and the score as percentage of correct responses for each of the four sets.

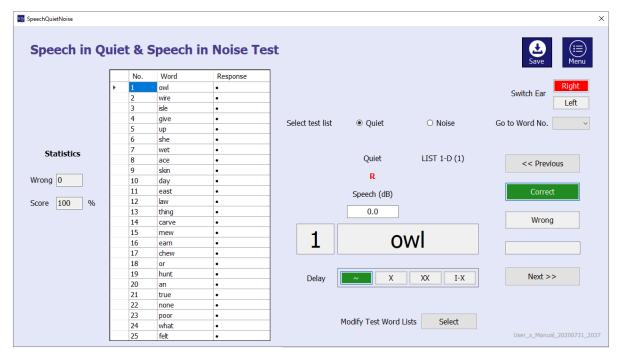


Figure 19 Speech-in-Quiet Test Screen

SpeechQuietNoise						
Speech in Qu	ie	t & S	Speech i	in Noise To	st	Save Menu
		No.	Word	Response		
	•	1	owl	•		Right
		2	wire	•		Switch Ear
		3	isle	•		Left
		4	give	•	Select test list	Go to Word No. 22 V
		5	up	•	Select test list I Quiet O NOIS	
		6	she	•		
Statistics		7	wet	wait		
Statistics		8	ace	•	Quiet LIST 1-D	(1) << Previous
		9	skin	scan	R	
Wrong 4		10	day	•	R	
		11	east	•	Speech (dB)	Correct
Score 84 %		12	law	•		
		13	thing	•	0.0	
		14	carve	car		Wrong
		15	mew	new	22 none	
		16	earn	•	22 none	
		17	chew	•		
		18	or	•		
		19	hunt	•	Delay ~ X XX	I-X Next >>
		20	an	•		
		21	true	•		
		22	none	•		
		23	poor	•	Modify Test Word Lists	oct
		24	what	•	Pioury rest word LISts Ser	
		25	felt	•		User_x_Manual_20200731_20

Figure 20 Speech-in-Quiet Test Score and Delay Marking

Scoring the speech-in-quiet/noise test is done by clicking on the *Correct* or *Wrong* buttons for each word. When a patient responds to the test word incorrectly, the user can click the *Wrong* button and directly start typing in the patient's response. This will automatically focus the cursor on the textbox for entering the recorded word (box below the wrong button). After entering the recorded word and marking the appropriate delay marker (if applicable), click on the Next button to go to the next word in the list. The statistics are updated when navigating to a different word or when the *Save* button is clicked.

TIP You can also use the arrow keys (\leftarrow and \rightarrow) to navigate to the previous and next words instead of clicking on the *Previous* and *Next* buttons. This method applies to any test form that has the two navigation buttons.

Click on the *Menu* button after completing in the Words in Speech/Noise test to close the form and return to the main screen.

OKAY! It is okay to navigate to the next word without saving after each word. The software saves all user activity to memory and the data file should be saved intermittently so that data is written to the JSON file (permanent save).

Users can now select one of two word sets for the W-22 speech in quiet/noise test. The default word lists are 1-D and 3-D for quiet and noise tests. Use the Select button next to Modify Test Word Lists to select 2-D and 4-D lists. It is recommended to select the word lists before beginning the test, as changing the word list will clear and reset all responses, including recorded words and delay markers.

SpeechQuietNoise					×
Speech in Qu	uiet & Spe	W-22 Speech in Quiet/Noise Word	List Selection	- 0 X	Save Menu
	No. W ▶ 1 ow 2 wir	Select word lists to use for	r W-22 test Speech-in-Quiet/Noise		Switch Ear
	3 isle 4 giv 5 up		before proceeding		Go to Word No. 22 V
Statistics	6 she 7 we 8 act 9 ski	3. Word list selection is lo	change word lists before starting the scal to the current patient data file, always have the default word lists so		<< Previous
Wrong <mark>4</mark> Score <mark>84</mark> %	10 da 11 ea 12 law 13 thir	1-D (Quiet) and 3-D (Noi 2-D (Quiet) and 4-D (Noi	se) : Default se)		Correct
	14 car 15 me 16 ear 17 che				Wrong
	17 Cha 18 or 19 hu 20 an	nt •	t Cancel	XX I-X	Next >>
	21 tru 22 noi 23 por 24 wh	• or •	Modify Test Wo	ord Lists Select	
	24 Wit 25 felt				User_x_Manual_20200731_2037

Figure 21 Speech-in-Quiet Test Word List Selection

Staggered Spondaic Words (SSW) Test

The SSW test is part of the Buffalo Model central test battery for evaluation of auditory processing disorders. The test consists of four practice sets of words followed by 40 sets of four words each. The controls on the SSW test form are similar to the Speech in Quiet/Noise test, with additional controls to enter information for skipped words, word order (reversals), cardinal responses and re-instruction messages.

Word Correctness and Delays

The test screen displays all four words for a set along with the set number. All words are marked *Correct* by default and user can mark them as either *Skip* or *Wrong*. Delays are similar to speech in quiet/noise test. For a given word set, correctness and delays should be marked for all four words.

Reversal and Word Order

The Reversal checkbox should be ticked if words are spoken by the patient in the wrong order. Ticking the Reversal checkbox will enable the user to enter the word order in the textbox right below the checkbox. Word order is entered as numbers corresponding to the order in which the patient responds to the word set. The software will automatically calculate the numbers and print them in the correct order on the SSW form portion of PDF report.

TIP SSW test can be extremely demanding in terms of data entry when the test is in progress. It is easier to enter as much data as possible during the test, save the data file and revisit it from the *Load File* option to complete data entry.

APD Test Software - SS	W Test Program				×
Staggere	ed Spondaic Word	s Test		s	ave Menu
Practice 1	air	plane	wet	paint	Reversal
		pane			412
	OK Wrong Skip	OK Wrong Skip	OK Wrong Skip	OK Wrong Skip]
DELAY	~ X XX I-X	~ X XX I-X	~ X X I-X	~ X XX I-X	
	□ SM : Sm	veration k iet Rehearsal	Re-instruction AYR : Are You Ready Y: Yes SR : Staccato Response		
	<< Previous Set	Load Set No.	~	Next Set >>	

Figure 22 SSW Test Screen

Example: If the word set consists of the four words (1) air (2) plane (3) wet (4) paint, and the patient response is wet-paint-air-plane, the user should enter **3412** into the box. When the test is in progress, entering the word order in this manner is quicker than arranging the words in order as required by the SSW test report form. Interestingly, for this example, the user entry for word order and the order printed on the report are identical, i.e. **3412**.

Example: If the patient response is paint-air-plane, the user should mark the word "wet" as Skip, check the Reversal checkbox and enter **412** as the word order. The software will calculate the print order as **2 3 - 1**.

Users should be careful to match the skipped words with the word order entered into the textbox. The software will not allow users to enter a word order if it includes the word number corresponding to a skipped word.

Cardinal Responses and Re-Instruction

Cardinal responses and reinstruction options should be checked for each word set. It is possible to select more than one option from each list. All responses will be marked on the PDF report. Perseveration is automatically marked by the software for incorrect responses.

RULEUsers should not mark Perseveration responses, as they are marked automatically by
the software. This applies to the SSW test and Phonemic Synthesis test, where
perseveration errors occur.

Phonemic Synthesis Test

Phonemic Synthesis test is the third test of the Buffalo Model central test battery for evaluation of auditory processing disorders. It consists of a set of 25 words, preceded by one set of two training words and another set of two practice words. The test screen for phonemic synthesis is similar to speech in quiet/noise. The table displays the test word and patient's response, along with user markings for different qualifiers in real-time, i.e. qualifier cells are highlighted as soon as the user checks a qualifier. Perseveration errors are automatically marked by the software for phonemic synthesis test.

Ρ	honei	mic Sy	ntł	ıes	is '	Tes	st										Save Menu
#	Word	Response	X	XX	Т	D	D	0	D	D	T	D ^					
1	she	•	х	хх	Q	QR	NF	Rv		Р	1st						
2	nose	•	х	xx	Q	QR	NF	Rv		Р	1st						
1	me	•	х	xx	Q	QR	NF	Rv		Р	1st				Descentation	Laural.	
2	up	•	х	xx	Q	QR	NF	Rv		Р	1st				Presentation	Level	Go to Word No. 8 🗸
	each	•	х	xx	Q	QR	NF	Rv		Р	1st			Rick	nt dB HL	Left dB HL	
!	shoe	•	х	xx	Q	QR	NF	Rv		Ρ	1st			Rigi	IC OD TIE	Leit dD HL	
	boat	goat	х	xx	Q	QR	NF	Rv		Р	1st						
	bake	•	х	xx	Q	QR	NF	Rv		Р	1st						<< Previous
	dog	•	х	xx	Q	QR	NF	Rv		Р	1st						
	buy	•	x	xx	Q	QR	NF	Rv		Р	1st		8		mak	\sim	Correct
·	coat	goat	х	xx	Q	QR	NF	Rv		Р	1st		0		IIIdr		Confect
	make	•	х	xx	Q	QR	NF	Rv		Р	1st						
	COW	•	х	xx	Q	QR	NF	Rv		Р	1st			C	Dualifiers and AP	D Categories	Wrong
)	dish	•	х	xx	Q	QR	NF	Rv		Р	1st				Delay		
L	say	•	х	xx	Q	QR	NF	Rv		Р	1st				Extreme dela	۹V	
2	see	•	х	xx	Q	QR	NF	Rv		Р	1st				Quick Respo	·	
3	pie	•	х	ХХ	Q	QR	NF	Rv		Р	1st				Quiet rehear		
ł	gift	•	х	xx	Q	QR	NF	Rv		Р	1st	_			Nonfused		Next >>
5	dress	•	х	xx	Q	QR	NF	Rv		Р	1st				Reversal		Next >>
5	sky	•	х	XX	Q	QR	NF	Rv		Р	1st				O/L Decodin	a	
7	child	•	х	xx	Q	QR	NF	Rv	OL	Р	1st				Perseveration		
3	cold	•	x	хх	Q	QR	NF	Rv	OL	Р	1st				Omit 1st Sou	und	
)	ghost	•	x	хх	Q	QR	NF	Rv		Р	1st						
D 1	spoon	•	х	XX	Q	QR	NF	Rv		Р	1st						

Figure 23 Phonemic Synthesis Test Screen

Phonemic Error Analysis

Phonemic errors in patient responses to the central battery test words, i.e. speech in quiet/noise test, SSW test and phonemic synthesis tests can be analyzed using the phonemic error analysis (PEA) module. The PEA module generates an aggregate list of words that have been marked *Wrong* on the three tests (skipped words on the SSW test are not included). The PEA screen shows the following information:

- Total number of error words: Count of number of words that are marked as Wrong by the user on the three tests
- Test name and test word/set number of the wrong word
- The recorded (wrong) word and test (correct) word
- Error type and two phonemes X and Y

Phonemic Error Types and Description

There are four types of errors that can be marked for a wrong word. No error (default option) means that there are no phonemic errors to be marked in the recorded word. The second option is a substitution error, where the patient substituted phoneme Y in the test word with phoneme X, i.e. an X for Y substitution. The third option is an addition error, where the patient added phoneme X to the recorded word which does not exist in the test word. Finally, the fourth option is an omission error, where the patient omitted a phoneme Y that is part of the test word.

rek					×
Phonemic Error Ana	alysis				Save Menu
Test: Speech-in-Quiet	Test Set/Word Number: 7	Go to Word No.	× 1	Error Phoneme ^ (^)	Number of Times ^
Error No.	Recorded Word	Test Word	2 3 4 5	a:(a:) æ (@) ə () e (e)	0 0 0 1
Error Type	Phoneme X	Phoneme Y	6 7 8 9	3:r I (i) i:(i:) D (0)	0 0 0
Error 1 Substitute X for Y ~ Error 2 No error ~	er (ei) Eg: say, eight ~	e (e) Eg: met, bed -	 9 10 11 12 	ت (0) 2:(0:) ت (u) u:(u:)	
Error 3 No error ~		-	× 13 × 14 15	aɪ (ai) aʊ (au) oʊ /	0 0 0
Error 4 No error ~	- · ·	-	 ✓ 16 17 18 ✓ 19 	eər (er) eɪ (ei) ɪə ^r (i(r)) oɪ (oi)	0 1 0 0
		xt >>	20 21 22	σι (d) σε' (u(r)) b (b) d (d)	
			23	f (f)	0 ~

Figure 24 Phonemic Synthesis Test Screen

To mark a phonemic error, users select the phoneme from one or both drop-down lists depending on the error type. For substitution error, one phoneme should be selected from both drop-down lists. For addition or omission errors, one phoneme should be selected from the appropriate list. The software ignores any selections made to the wrong list, or if no selection is made from the appropriate list after marking an error type. They may appear in the overall list of user markings but will not be counted as phonemic errors in the final summary.



The table on the right-hand side shows the number of times each phoneme has been used to mark a phonemic error.

Phonemic Error Counts and Summarization

The software analyzes the phonemic errors entered by the user for all wrong words in the Buffalo model central battery tests and generates three tables in the PDF report.

- Table 1: User entries for each wrong word on the tests (software input data)
- Table 2: Tally of substation, addition, and omission errors
- Table 3: Total count of errors for each phoneme

PDF Report Generation

A detailed PDF report is generated by APD Test Software program by clicking on the *Print* button on the main screen. The reports will be saved to the same folder with the same filename as the APD test data file. When running the software for the first time, MiKTeX may ask for permission to install additional packages for compiling the PDF report. A permission request will be presented to the user through a dialog window as shown below.

Auditory Processing	g Disorder Test Software - Patient Information					-		×
Patient Info	ormation				Save MyAPD	Print	Exit	
First Name	User		Select Tes Questionna	- ires and Forn	ns			
Middle Name			Speech in C	<mark>)uiet/Noise (\</mark> ? ×	V-22) Test Is (SSW) Test			
Last Name	Manual		The required file tex/latex/ucs/utf8x.def		re Test (PEA)			
Name Suffix	~		is missing. It is a part of the following package: ucs					
Test Date	7/31/2020		The package will be installed from: <random package="" repository=""></random>	Change				
Date of Birth	12/25/2011	•	The package will be installed for: Anyone who uses this computer (all users)	~				
		P			→ START TEST			
			Always show this dialog before installing packages	Cancel				
Data Folder	D:\Test Folder\		Browse Folder			User_x_Manual_	20200731_2	2037

Figure 25 PDF Report Generation – First Time Setup and Permissions

Since MiKTeX might need to install multiple packages during the initial use of APD Test Software, it is recommended that the user uncheck the box for **Always show this dialog before installing packages** so that MiKTeX does not show a dialog for every package. Uncheck the box and click *Install* to continue installing the required packages.

TIP The package setup takes place when printing a PDF report only for the first time using APD Test Software and may take several minutes to generate the PDF file.

The package installation process will take a long time to complete. Please be patient and do not close the program or turn off your computer to skip the process. Subsequent print activity for all other files will be completed in just a few seconds.

Package Installation	?	×
The required file		
tex/latex/ucs\utf8x.def		
is missing. It is a part of the following package:		
ucs		
The package will be installed from:		
<random package="" repository=""></random>	Change	e
The package will be installed for:		
Anyone who uses this computer (all users)		\sim
Always show this dialog before installing packages	Cance	el

Figure 26 PDF Report Generation – Package Installation Permission Request

The PDF report will be available in the data folder after all packages have been downloaded and MiKTeX generates the PDF document. A success message will be shown the user when the PDF file is generated, along with the full path (folder and file location) of the generated PDF file.

Auditory Processing Disorder Test Software - Patient Information		– 🗆 ×
Patient Information Salutation	Save MyAPD	Print Exit
First Name User	Select Test	
Middle Name	Questionnaires and Forms Speech in Quiet/Noise (W-22) Test Staggered Spondaic Words (SSW) Test Phonemic Synthesis Test	
Last Name Manual	Phonemic Synthesis Picture Test Phonemic Error Analysis (PEA)	
Name Suffix	×	
Test Date 7/31/2020	PDF Output report successfully generated D\Test FolderUser x, Manual 20200731, 2037,pdf	
Date of Birth 12/25/2011		
	LOAD EXISTING RECORD	
Data Folder D:\Test Folder\	Browse Folder	Jser_x_Manual_20200731_2037

Figure 27 PDF Report Generation – Success Message