

Axent Fitting Reference Guide

Axent Digital Signal Processor

1. Initial Fitting Procedures:

Enter patient information into the Standalone PFS (Standard ProHear) or NOAH database. Enter audiometric thresholds minimally at 500, 1000, 2000, and 4000 Hz.

2. Launch Hearing Aid Fitting Module & Read:

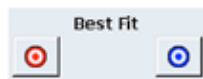
From the PFS Module Launchpad, click the Hearing Aid Fitting button to launch the Hearing Aid Fitting Module.



Select Binaural, Left Ear, or Right Ear. Click **Read** to establish communication with the hearing aid(s).



Click **Best Fit** to optimally adjust the programmable parameters to approximate the targets for the selected fitting formula. Best Fit buttons can be found in either the button panel in the center of the screen, or in the toolbar.



When communication is established, the Best Fit Optimization dialog box will appear. Select Adult or Child. If Adult is selected, choose the most appropriate Experience Level. The recommended Fitting Formula for each Experience Level will be selected. To continue with the current Fitting Formula, uncheck the change to recommended Fitting Formula checkbox.

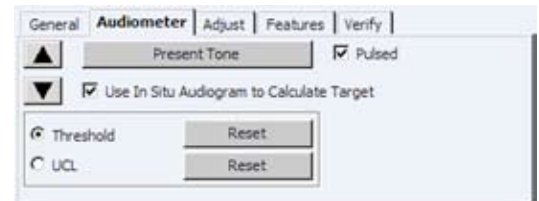


Note: Once the hearing aid is read, the volume control is disabled until the device is disconnected from the programming cable. Volume adjustments may be made within the software during programming.

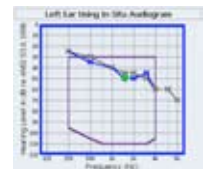
3. In Situ Audiometry:

The hearing aid microphone will be muted in order to perform In Situ Audiometry. Therefore, it is important to instruct the patient prior to entering audiometer mode. Ensure that the hearing aids are fully inserted in the ears. Click on the **Audiometer** tab of the control panel on the lower portion of the screen.

Pure tone thresholds and Uncomfortable Loudness Levels (UCL) may be acquired directly through the hearing aid. Select **Threshold** to establish threshold or select **UCL** to establish uncomfortable loudness levels.



Use the keyboard arrows to select the frequency and intensity or click on the desired frequency/intensity point on the graph. Press and hold the space bar or click **Present Tone** until the red or blue tone indicator appears around the audiogram graph.



The purple boundary on the audiogram represents the upper and lower limits at which tones may be presented. If audiometric thresholds are better than the upper limit of the purple boundary, it is not necessary to perform In Situ testing at those frequencies.

When audiometry is complete, ensure that **Use In Situ Audiogram to Calculate Target** is checked.

Use In Situ Audiogram to Calculate Target

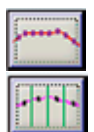
Click the **Adjust** tab. The new audiogram will automatically be used to establish a new fitting formula target and the devices will automatically be Best Fit to this target.

4. Fine Tuning:

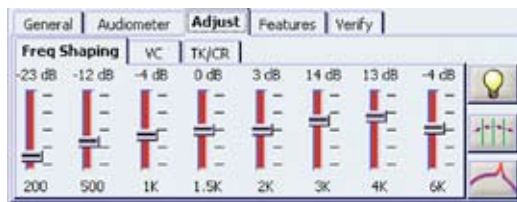
From the Adjust tab, access Frequency Shaping, Volume Control, and TK/CR by clicking the appropriate sub-tab. Within each of these adjustment modes there are three main ways to fine tune Axent:

- 1) Drag and drop the curves on the fitting graph
- 2) Adjust the slider controls on the control panel, or
- 3) Utilize the Expert Assistant fitting tool.

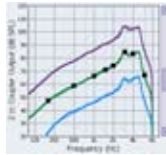
Axent **Frequency Shaping** adjustments are made by using Band or Channel adjustments. These two options are accessible via the band/channel toggle button, located on the Adjust tab of the control panel. Toggling between these two modes changes the graphical display as well as the slider control panels.



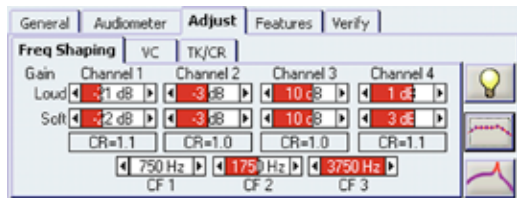
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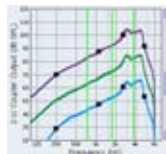
Band adjustment is the default adjustment mode. There are eight individual frequency points to adjust the frequency response shape. In this mode, the frequency points are on the mid-level curve (i.e. 70 dB) and the selected band for all three input levels (soft, moderate, and loud) moves simultaneously. An adjustment affects the gain equally for all inputs and has no effect on the kneepoint or compression ratio.



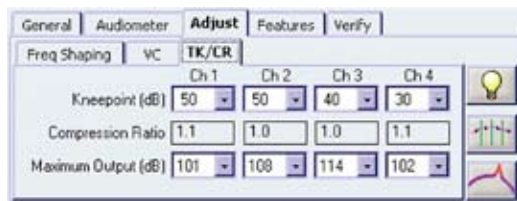
The Channel mode accesses the four compression channels and the three crossover frequencies.



Channel adjustments are made to the soft and/or loud curves (i.e. 50 and 90 dB) and move only the selected curve, thus, changing the compression ratio. As the soft and loud responses are brought closer together, the compression ratio increases up to 3.3:1; separating the soft and loud responses decreases the compression ratio to 1.0:1 or linear.



Select the TK/CR sub-tab for direct access to the Channel Kneepoints and Maximum Output controls. The Compression Ratio is also displayed on this panel.



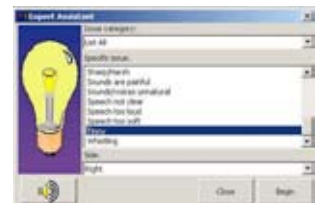
Click the VC sub-tab to make adjustments to the VC Position slider. Adjustments to the VC Position slider will be audible to the patient during programming. When the device is powered up again after programming, the Volume Control indicator tone is presented when the volume control position on the device matches the Volume Control Position indicated in the software. (See *Programmable Indicator Tones under Special Features section*)



To Optimize Target for Audibility, click the **Best Fit Optimization** icon. The Best Fit Optimization dialog box will appear. Select the Optimize Target for Audibility checkbox. Optimized targets will be indicated by diamonds.



Click the **Expert Assistant** button, available on the Adjust tab. From the Expert Assistant window, select the patient's complaint (e.g., Tinny), choose Right, Left, or Both Ears, and then click Begin. Follow the prompts within the window to complete the adjustment for the complaint.



Audio files are available within Expert Assistant to help determine the appropriate adjustments. Click the Audio File Player button on the Expert Assistant pop-up screen.

5. Aext Special Feature Adjustments:

From the Features tab, the following parameters are available: Expansion, Noise Management, Feedback Cancellation, Dynamic Directionality, and Direct Audio Input. In addition to these adjustments, Aext incorporates programmable Indicator Tones and Power-On Delay settings. Each parameter is described in the following sections:

Expansion: To adjust the amount of gain for very soft inputs (below the expansion/compression kneepoint), such as a refrigerator running or computer fan, Expansion may be set to Off, Low, or High. The default settings are Low when any threshold is better than 40 dB HL and Off when all thresholds are poorer than 40 dB HL. Choosing the Off setting will result in no reduction in gain below the expansion/compression kneepoint. The High Expansion setting will result in maximum reduction in gain below the expansion/compression kneepoint in each channel, with less gain reduction occurring with the Low setting. This feature is adjustable per memory. Audio files are available to help determine the appropriate Expansion setting. Click the Audio File Player button in the toolbar or select it from the Activity menu to use this fitting tool.

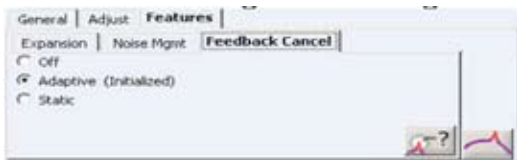


Noise Management: To improve listening comfort in noisy environments, Noise Management may be activated. When Noise Management is activated, gain in the channel is automatically reduced when the speech/noise ratio (SNR) within the channel is poor (noise dominates as input to the channel). The default Noise Management setting is Min. The Min setting provides up to a 10 dB reduction in channel gain. The Max setting provides up to a 20 dB reduction in channel gain. The amount of channel gain reduction occurring at a given time will vary depending upon the channel

SNR calculation. When the optional Noise Management feature is set to Off, no automatic gain reduction will occur in the presence of noise. This feature is adjustable per memory. Audio files are available to help determine the appropriate Noise Management setting. Click the Audio File Player button in the toolbar or select it from the Activity menu to use this fitting tool.



Feedback Cancellation: The Feedback Canceller is set to Adaptive by default. In the **Adaptive** mode, the feedback path is continuously monitored as the device is worn. Updates to the Feedback Cancellation filter are automatically made, as necessary, to provide the most effective feedback cancellation during use. In order to use the Static setting, the Feedback Canceller must be initialized while in the patient's ear. Prior to running the algorithm, ensure that the room is quiet and that the hearing aids are fully inserted in the ears. Instruct the patient to remain quiet and still for the entire sequence. A static noise for calibration will be presented through the hearing aid. Click the Feedback Cancellation button within the Adjust tab (or the Feedback Cancel subtab from Features) to start the algorithm. When the initialization is complete, Initialized will appear next to Adaptive.



The Feedback Canceller is adjustable per memory and can be turned Off for no active feedback cancellation or to Static. If the Static mode is selected, the feedback path measured at the time of the fitting is used to determine the filter settings and this filter is not updated during use. The Static mode is only recommended in cases where the patient complains of artifacts with tonal signals such as music.

An additional feature to assist in the manual reduction of feedback is the **Primary Feedback Frequency Detector**.



This tool may be used when a reduction to band gain is desirable to reduce feedback. The Primary Feedback Frequency Detector button is located on the Feedback Cancel sub-tab. Clicking the button will begin the test and the Primary Feedback Frequency Band will be reported. Gain can be reduced manually in the specified band in an effort to eliminate feedback with minimal effect to the channel gain.

Precision Directional Imaging (PDI): If fitting Axent PDI, the Directional subtab will be available. The Directional checkbox on the Directional subtab will set the device to Dynamic which will automatically change from the omnidirectional mode to the diffuse directional pattern for the active memory when appropriate. For single memory devices, the Dynamic feature will default On for Memory 1. For multimemory devices, the Dynamic feature will default On for Memory 1 and Off for Memory 2 and Memory 3. For MultiMemory devices with an Autocoil, the Dynamic feature will default On for Memory 1 and the Autocoil will be programmed in Memory 2. Memory 3 will be unavailable. The Dynamic feature may be turned On or Off in any memory. If the Dynamic checkbox is unchecked, the device will activate a directional response whenever a memory with directionality is selected. Additional frequency response adjustments are available with the Low Frequency Roll Off checkbox. For thresholds at 500 Hz better than 40 dB HL, the default setting is Full Low Frequency Roll Off. For thresholds at 500 Hz between 40 and 70 dB HL, the default setting is Partial Low Frequency Roll Off. For thresholds at 500 Hz poorer than 70 dB HL, the default setting is Off or unchecked. The Full Roll Off option provides maximum reduction of the low frequencies while the Partial Roll Off option offers increased gain to provide audibility for the low frequencies while in the directional mode. Unchecking the low frequency checkbox will match the gain and frequency response of the directional and omnidirectional modes.



Direct Audio Input (DAI): The DAI sub-tab of the Features tab is available for Axent BTEs and allows the gain differential between the environmental microphone input and DAI signals to be adjusted. The environmental microphone input can be turned on or off by checking or unchecking the Environmental Mic Active with DAI checkbox. When the environmental microphone is turned on, it can be set to 0, -6, or -10 dB below the level of the DAI signal.



Automatic Telephone Response (ATR): If fitting Axent CIC, Secret Ear or Canal with the ATR option, the device uses the magnetic leakage from the telephone to automatically switch from the normal memory to the telephone acoustic environment. The telephone environment provides increased low- to mid-frequency emphasis while reducing the high frequencies.

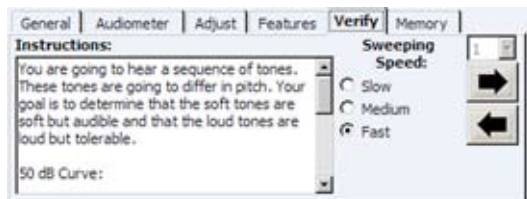
Performance is optimized on the telephone to improve sound quality and reduce feedback. When the telephone is placed in close proximity to the hearing aid, the ATR environment will be activated. The ATR parameters are accessed within Memory 2 via PFS software.

Programmable Indicator Tones and Power-On Delay: The Low Battery, Volume Control, and MultiMemory Indicator Tones are adjustable by selecting **Indicator Tones** from the Activity menu. Different frequencies and intensities are selectable for each tone. A tone can be disabled or a test tone can be presented through the hearing aid to verify audibility.

Select **Power-On Delay** from the Activity menu to choose the length of time it takes for the hearing instrument to power up once it is turned on. Power-On delay may be helpful in eliminating feedback while the patient inserts the hearing instruments. The options include Short (2 seconds), Medium (6 seconds), or Long (14 seconds).

6. Verify Loudness:

Instruct the patient prior to entering Verify Loudness mode. The hearing aid microphone will be muted within this mode. Ensure that the hearing aids are fully inserted in the ears. Click the **Verify** tab of the control panel.

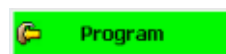


Select the desired speed for the tone sweep: Slow, Medium or Fast. Initiate a sweep at any of the six frequency points by selecting a point and then selecting either the **Sweep Up** or **Sweep Down** arrow buttons. Alternatively, present a single frequency tone by double-clicking on the point. A yellow light will appear at the current test frequency, and the frequency and level being presented will appear in red text within the control panel.

Adjustments may be made by clicking on the Adjust tab and using the Frequency Shaping, Volume Control and TK/CR control panels. After any modifications, verify the tone or tones again.

7. Program:

Click **Program**, either from the button panel in the center of the screen



Volume Control Position: 2/3

or from the toolbar, to store programming information into the hearing instrument. After programming the device, set the user volume control to the position indicated on the VC sub-tab of the adjust tab in order for programmed gain to be achieved.

