

6500 Quick Reference Cards

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FONIX 6500-CX TARGET 2CC SSPL 90

NOTE: Use the remote module for this procedure.

1. In the probe menu highlight CREATE TARGET and select 2cc SSPL90. Press [START/STOP]
2. Use [^ v, < >] buttons to enter comfort/discomfort levels in dB HL.
3. (Optional) Press [MENU] to change the settings.
4. Press [PRINT] to print.
5. Press [START/STOP] to exit.

Result is stored in REF 7 of Multi-Curve.

FONIX® 6500 TARGET 2CC F.O.G.

NOTE: Use the remote module for these procedures.

GENERAL PROCEDURE — using all AVERAGE EAR data:

- a. In probe menu, highlight CREATE TARGET and select 2CC FOG.
- b. Press [START], then enter audiogram.
- c. Press [SWEEP/START] to select an insertion-gain formula.
- d. Press [START/STOP] to continue
- e. Set menu, if necessary (AVERAGE UNAIDED and AIDED).
- f. Modify target curve, if desired.
- g. Print; exit. (Result gets stored in REF 8).

CUSTOMizing for the UNAIDED EAR resonance:

- a. Measure real-ear unaided response (REUR).
- b. Do general procedure, but set UNAIDED EAR to CUSTOM in menu.

CUSTOMizing for the AIDED EAR (RECD) impedance:

- a. Measure 2cc-coupler response of insert earphone or BTE aid.
- b. Copy 2cc-coupler response to REF 6.
- c. Measure aided response (REAR) of same earphone or aid.
- d. Do general procedure, but set AIDED EAR-2cc to CUSTOM in menu.

CUSTOMizing for both UNAIDED EAR and AIDED EAR (RECD) values:

- a. Measure 2cc-coupler response of insert earphone or BTE aid.
- b. Copy 2cc-coupler response to REF 6.
- c. Measure unaided response (REUR).
- d. Measure aided response (REAR) of earphone or aid.
- e. Do general procedure, but set both UNAIDED and AIDED EAR-2cc to CUSTOM in menu.

FONIX 6500-CX QUIK-PROBE (Automatic) INSERTION GAIN (IG) TEST

1. Enter probe menu by pressing [PROBE] (or [START/STOP] on remote) and then pressing [MENU].
NOTE: From here on use only the remote module to enter and test.
2. Use [\wedge \vee] buttons to highlight MODE. Select COMP/AUTO
3. Use [\wedge \vee , $<$ $>$] buttons to highlight CREATE TARGET and select INS. GAIN. Then press [START/STOP].
4. Use [\wedge \vee , $<$ $>$] buttons to enter HTL audiogram info.
5. If desired, press [MENU] to change settings.
6. Press [START/STOP] to continue.
7. Mark probe tube (5mm / 1/4")
8. Place wedge ear hook on subject.
9. Place Ref. Mic on Velcro platform above ear, and probe tube in ear.
10. Position subject 12" from speaker at 45 degree angle.
11. Press [LEVEL].
12. Press [START/STOP] to run Unaided (REUR).
13. Hold probe tube in place, put hearing aid in ear, set to user gain level.
14. Press [START/STOP] to run Aided (REAR).
15. Insertion Gain (REIR) & Target appear on upper graph.
16. Press [PRINT] to print.

TEST COMPLETE

FONIX 6500-CX QUIK-PROBE (Automatic) SPL TARGET TEST

1. Enter probe menu by pressing [PROBE] or [START/STOP] on remote) and then pressing [MENU].
NOTE: From here on use only the remote module to enter and test.
2. Use [\wedge \vee , $<$ $>$] buttons to highlight CREATE TARGET and select SPL TARGET. Then press [START/STOP].
3. Press [MENU] to select and change settings.
4. Use [\wedge \vee , $<$ $>$] buttons to enter HTL audiogram info.
5. If desired, press [SWEEP START] to enter UCL levels.
6. Press [START/STOP] to continue.
7. Mark probe tube (5mm / 1/4")
8. Place wedge ear hook on subject.
9. Place Ref. Mic on Velcro platform above ear, and probe tube in ear.
10. Position subject 12" from speaker at 45 degree angle.
11. Press [LEVEL].
12. Hold probe tube in place, put hearing aid in ear, set to user gain + output levels.
13. Press [UNAIDED] until AUTO appears at the bottom of the screen.
14. Press [START/STOP] to run CRV 1 (50 dB COMP), then CRV 2 (65 dB COMP) and finally CRV 3 (90 dB BURST)
15. The graph will display T (threshold), U (UCL), MCL Target (thick line **————**), and CRV 1, 2, and 3.
16. Press [PRINT] to print.

TEST COMPLETE

6500-CX AGC/ADAPTIVE AGC ANSI S3.22-1987 TEST

1. LEVEL (only if UNLEVELED).
2. Attach hearing aid & coupler to microphone, set full on gain, place in test box.
3. Press [MENU], then [ANSI]. Select ANSI S3.22-1987
4. Press [MENU]. Use [^ v, < >] buttons to select:
AID TYPE: AGC with EIN
AGC without EIN
ADAPTIVE AGC with EIN
ADAPTIVE AGC without EIN
FULL ON GAIN: 50 dB will be selected automatically
TELECOIL: DISABLED or ENABLED
AVERAGE FREQUENCIES: HFA 1000, 1600, 2500 or
SPA (specified by manufacturer).
SWEEP DELAY: 50 mS (default)
5. Press [START] to run test.
6. Press [CRT] to print.

TEST COMPLETE

Press [START] to run another test

FONIX 6500-CX LINEAR ANSI S3.22-1987 TEST

1. LEVEL (only if UNLEVELED)
2. Attach hearing aid & coupler to microphone, set full on gain, place in test box.
3. Press [MENU], then [ANSI]. Select ANSI S3.22-1987
4. Press [MENU]. Use [^ v, < >] buttons to select:
AID TYPE: LINEAR
FULL ON GAIN: 60 dB (or 50 dB for high gain aids).
TELECOIL: DISABLED or ENABLED
AVERAGE FREQUENCIES: HFA 1000, 1600, 2500 or
SPA (specified by manufacturer).
SWEEP DELAY: 50 mS (default)
5. Press [START] to run test.
6. The test may stop to turn down VC for Reference Test Gain. Follow instructions on screen.
7. Press [CRT] to print.
8. Press [CONTINUE] to return to ANSI Test Menu choice and [CONTINUE] again to exit.

TEST COMPLETE

Press [START] to run another test

FONIX 6500-CX

Multi-Curve—Pure Tone

(Software Version 2.50 and up)

Procedure: Using Multi-Curve to test four different hearing aids. All these test examples can be run as either SPL or Gain.

1. Press [SINE/COMPOSITE] to enter SINE/Pure Tone mode.
2. Select SPL or Gain, then select source input level.
3. Test hearing aid "A" in the test box.
4. Test hearing aid "B" in the test box.
5. Test hearing aid "C" in the test box.
6. Test hearing aid "D" in the test box.
7. Press [MULTI] button to enter the option.
8. Use arrow buttons [^ v] to select (highlight) "Multiple Curves."
9. Press the [START] button to display CURVES 1, 2, 3 and 4.

IMPORTANT: Because the curves are STACKED one on top of another in Multi-Curve, they are now in reverse order of how you tested them.

Example:

	STACK		
4th TEST	Hearing Aid "D"	=	CURVE 1
3rd TEST	Hearing Aid "C"	=	CURVE 2
2nd TEST	Hearing Aid "B"	=	CURVE 3
1st TEST	Hearing Aid "A"	=	CURVE 4

CLEARING OLD TEST CURVES: Re-test directly over old curves, or enter Multi-Curve Menu and select "Clear Curve" menu choice, or use [FREEZE] to "Deselect" a curve.

VARIATIONS:

1. Use one hearing aid at four (4) different volume control settings, i.e. 1/3, 1/2, 2/3, etc.
2. Use one hearing aid at four (4) different signal amplitudes, i.e. 50dB, 60dB, 70dB and 80dB.

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FONIX 6500-CX

Multi-Curve—Composite

(Software Version 2.50 and up)

Procedure: Using Multi-Curve to test four different hearing aids.

The key to understanding COMPOSITE MULTI-CURVE is that the first test stored always goes into CURVE 2, and CURVE 1 is always in Real-Time.

1. Place hearing aid "A" in the test box at full-on gain, set 6500 Amplitude [^ v] at 60 dB RMS, when the real time curve is stable, press [FREEZE] and then the [START] button to store this test into the Multi-Curve Stack.
2. To test hearing aids "B" and "C", repeat Step 1.
3. To test hearing aid "D", DO NOT PRESS [FREEZE] and [START] buttons; just place the coupled aid in the test box.
4. Press [MULTI] button.
5. Use arrow buttons [^ v] to select (highlight) "Multiple Curves."
6. Press [START] to display Curves 1, 2, 3, and 4.

Note: Curve 1 will be in Real-Time on the display — this is the test currently being run in the test box. When you press [CRT] to print it will freeze and print out.

IMPORTANT: Because curves are STACKED one on top of the other in Multi-Curve, they are now in reverse order of how you tested them. Example:

	STACK		
4th TEST	Hearing Aid "D"	=	CURVE 1
3rd TEST	Hearing Aid "C"	=	CURVE 2
2nd TEST	Hearing Aid "B"	=	CURVE 3
1st TEST	Hearing Aid "A"	=	CURVE 4

CLEARING OLD CURVES: 1) Re-test over the old curves; 2) Enter Multi-Curve Menu and select "Clear Curves"; 3) Use [FREEZE] to "Deselect a curve."

VARIATIONS:

1. Use one hearing aid and test at four (4) different volume control settings.
2. Use one hearing aid and test at four (4) different amplitude levels, i.e. 50dB, 60dB, 70dB and 80dB.

6500-4

FONIX 6500-CX IEC TEST

1. LEVEL (only if UNLEVELED)
2. Attach the hearing aid and appropriate coupler to microphone.
3. Linear aids—set to full-on gain
Compression aids—set to maximum output (usually minimum compression).
4. Place in test box.
5. Press [MENU], then [IEC].
Use the [$<$ $>$, \wedge \vee] buttons to select parameters:

AID TYPE: LINEAR, AGC, or ADAPTIVE AGC

FULL ON GAIN: 50 dB or 60 dB

REFERENCE TEST FREQUENCY: 2500 Hz or 1600 Hz

HARMONIC DISTORTION FREQUENCY: 400 Hz–
1600 Hz (200-Hz increments)

SWEEP DELAY: .02–1.0 seconds

6. Press [START] to run the test.
7. When the test stops, turn down aid to match Reference Test Gain. Follow instructions on screen.
8. Press [CRT] to print.
9. Press [START] run another test, or press [CONTINUE] or [IEC] to exit.

TEST COMPLETE

FONIX 6500-CX LINEAR ANSI S3.22-1996 TEST

1. LEVEL (only if UNLEVELED).
2. Attach hearing aid and coupler to microphone, set full on gain, place in sound chamber.
3. Press [MENU] then [ANSI]. Select ANSI 3.22-1996.
4. Press [MENU]. Select:
 - AID TYPE: LINEAR
 - TELECOIL: ON or OFF
 - AVG FREQUENCIES: 1000, 1600, 2500, or SPA closest to manufacturer's specifications.
 - HDIST 12DB: ON or OFF
 - EAR: RIGHT, LEFT, or NONE to be designated on SPLITS curve.
The next three selections are sub-menus. Press [START] to enter submenu and [CONTINUE] to exit sub-menu.
 - FOG MENU: 60db (50dB for high gain aids; print CURRENT screen, or ALL the screens.
 - AGC MENU: Not applicable for linear aid test.
 - DELAY MENU: default settings will work for most aids. See manual for details.
5. Press [START] to run test.
6. The test may stop for you to turn down volume on aid to match reference test gain. Press [CONTINUE] when completed.
7. After the test is completed, press \wedge and \vee to view different screens for test. [CRT] prints screen.
8. Press [CONTINUE] to return to ANSI test menu choice and [CONTINUE] again to exit.

TEST COMPLETE

FONIX 6500-CX AGC/ADAPTIVE AGC ANSI S3.22-1996 TEST

1. LEVEL (only if UNLEVELED)
2. Attach hearing aid and coupler to microphone, set full on gain, place in sound chamber.
3. Press [MENU] then [ANSI]. Select ANSI 3.22-1996.
4. Press [MENU]. Select:
 - AID TYPE: AGC WITH EIN or ADAPTIVE AGC
 - TELECOIL: ON or OFF
 - AVG FREQUENCIES: 1000, 1600, 2500, or SPA closest to manufacturer's specifications.
 - HDIST 12DB: ON or OFF
 - EAR: RIGHT, LEFT, or NONE to be designated on SPLITS curve.
The next three selections are sub-menus. Press [START] to enter submenu and [CONTINUE] to exit sub-menu.
 - FOG MENU: 50 dB only option for AGC aids; print CURRENT screen, or ALL the screens.
 - AGC MENU: Attack and release times will be measured for frequencies turned on. Choose appropriate ATTACK WINDOW and RELEASE WINDOW.
 - DELAY MENU: default settings will work for most aids. See manual for details.
5. Press [START] to run test.
6. The test may stop for you to turn down volume on aid to match reference test gain. Press [CONTINUE] when completed.
7. After the test is completed, press \wedge and \vee to view different screens for test. [CRT] prints screen.
8. Press [CONTINUE] to return to ANSI test menu choice and [CONTINUE] again to exit.

TEST COMPLETE

FONIX 6500-CX Telewand—ANSI '96 Telecoil

Important Note: Please read the instructions on the back of this card before proceeding.

If you have selected “TELECOIL: ON,” do the following when the ANSI '96 sequence stops for the telecoil measurement.



1. Open the lid of the sound chamber.
2. Switch the aid to telecoil mode. Do not alter the gain control.
3. Position the aid where there is the least magnetic noise*. To guide you, a continuous reading of the output is on the screen.
4. Once you have determined the best position, plug the telewand into the side of the sound chamber, just below where the sound chamber connects to the Frye box.
5. Now relative to the aid, bring the telewand into position as if it were the earpiece on a phone. Keeping the telewand as parallel as possible to the faceplate of an ITE aid or as flat as possible against the body of a BTE aid, move it around until you find the position that returns the most gain. Again, use the continuous reading on the screen to guide you.
6. If it is necessary, turn the monitor off to reduce the magnetic noise.
7. Press [CONTINUE] to measure the SPLITS curve and STS. Turn the monitor back on when the signal stops.
8. Return the aid to the normal mode, and press [CONTINUE].

*See other side of this card

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Determining a proper position, one with little magnetic noise, is vital to effective telecoil testing.

Test the area where the telecoil measurement is to be made for magnetic fields before beginning the ANSI '96 test sequence.

- a. Connect the hearing aid to a 2 cc coupler and set the aid for “T” with the gain full on. Do not place the measurement microphone into the coupler. Rather, use the coupler as a megaphone so that you can hear its output.
- b. Place the aid in the physical location where the test is to occur.
- c. Listen to the output from the aid. Do you hear a buzz, indicating that the area has magnetic noise? Does the analyzer's CRT monitor cause the noise? This can be determined by shutting the monitor off for a brief period of time.
- d. When the area has been tested and found to be free of undesirable levels of unwanted magnetic fields, then the aid can be tested for magnetic pickup sensitivity using the ANSI '96 sequence. If monitor noise is found to be unacceptable, then it may be necessary switch off the monitor during the telephone coil test.

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ANSI S3.22-1996 Specifications and Tolerances

- OSPL90 Curve:** Max SPL shall not exceed the mfgr. spec. by +3 dB
- HFA-OSPL90 or SPA-OSPL90:** Shall be within ± 4 dB of mfgr. spec.
- Full-on Gain (FOG):** 50 or 60 dB inputs
- HFA-FOG or SPA-FOG:** within ± 5 dB of mfgr. spec.
- Reference Test Gain:** information only
- Freq. Response Curve:** 50 dB input AGC, 60 dB input all others
- Freq. Range:** low band ± 4 dB, high band ± 6 dB
- Harmonic Distortion:** Shall not exceed mfgr. specified percentage by +3%
- Equivalent Input Noise:** Shall not exceed mfgr. spec. by + 3 dB.
- Battery Current:** Shall not exceed mfgr. spec + 20%
- HFA-SPLITS:** within ± 6 dB of mfgr. spec.
- AGC Aids:** I/O—within ± 5 dB; Attack and Release—within ± 5 ms or ± 50 % whichever is larger

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ANSI S3.22-1987

Recommended Measurements, Specifications and Tolerances

SSPL90 CURVE: Max. shall not exceed that spec. mfg + 3dB

HFA-SSPL90 or SPA-SSPL90: Shall be within ± 4 dB of mfg. spec.

FULL-ON GAIN: 50 or 60 dB inputs

HFA/FOG or SPA/FOG: Within ± 5 dB of mfg. spec.

REFERENCE TEST GAIN: Shall be stated for info only

FREQUENCY RESPONSE CURVE: 60 db input

FREQUENCY RANGE: (f1 - f2): f1 ± 4 dB, f2 ± 6 dB

HARMONIC DISTORTION: (Total Harmonic Distortion), gain in ref. test position, 70 dB at 500, 800, and 65dB at 1600 Hz or frequencies corresponding to 1/2 the freq. of each SPA frequency. Shall not exceed specs plus 3%.

Note: If a rise of 12 dB or more occurs between the test freq. and its second harmonic, the test at that freq. may be omitted.

EQUIVALENT INPUT NOISE LEVEL: 1000, 1600, and 2500 Hz or the 3 SPA freq., shall not exceed spec plus 3%

BATTERY CURRENT: 1000 Hz, 65 dB, Ref Test Pos., shall not exceed spec plus 20%

(To calculate estimated battery life: $\frac{\text{Capacity Rating (MAH)}}{\text{Current drain (MA)}} = \text{Hours}$)

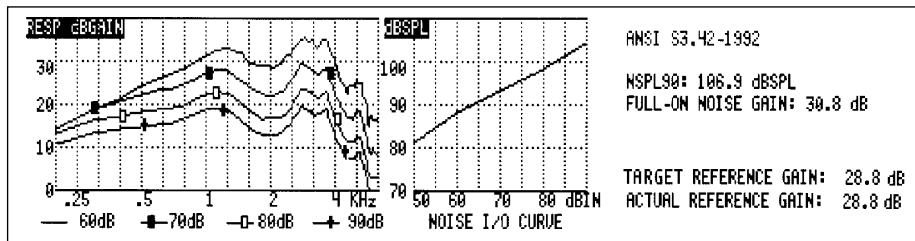
INDUCTION COIL (Telecoil): 10mA/m at 1000 Hz, full-on, within ± 6 dB of spec

AGC HEARING AIDS: Input-Output Characteristics, not more than ± 5 dB

Attack & Release Times, shall be within ± 5 ms or 50%, whichever is larger

ANSI S3.42-1992

Testing Hearing Aids with a Broad-Band Noise Signal



Definitions (Tolerances are unavailable)

NSPL90: Maximum RMS output sound pressure level (SPL) produced with a 90dB RMS speech-weighted noise input SPL signal.

Full-On Noise Gain: Maximum gain with a 60dB SPL noise input signal. (Note: This test may not elicit a true reading of maximum gain for hearing aids with an onset of non-linear operation below 60dB.)

Actual Reference Gain: The measured amount of gain when the hearing aid is set to full on or the gain after the volume control has been adjusted to ± 1 dB of the Target Reference Gain.

Target Reference Gain: This information is only displayed when the measured gain is greater than the calculated Actual Reference Gain. This target is used to adjust the hearing aid's actual gain to a level of ± 1 dB of the target. The figure is calculated by adding the 60dB SPL input + 17dB and subtracting it from the NSPL90 RMS output. (NSPL90 – 77 = Target Reference Gain)

Family of Frequency Response Curves: These curves are developed by adjusting the noise input level in 10-dB steps over a selected range. The preferred levels are 50, 60, 70, 80, and 90dB SPL. Frye has added 40dB SPL to the preferred levels.

Noise I/O Curve: This demonstrates the compression or limiting of the non-linear circuit.

Test Specifications: Stated for information purposes only. Please refer to the operator's manual for a complete description of each test specification.

6500-CX Digital Speech in Noise— Sound Chamber

1. Level (only if unlevelled)
2. Set up the hearing aid and coupler with the microphone. Place in the sound chamber.
3. Press [MENU] and then [*].
4. Select DIGITAL SPEECH IN NOISE. Press [START].
5. Press [MENU] to change the signal type (choices: ICRA or ANSI) and to activate the bias tone.
6. Use the [< >] buttons to adjust the bias tone frequency.
7. Press [START] to switch control of the [^v] buttons from the source amplitude to the bias tone amplitude.
8. Use the [^v] buttons to set the amplitude.

6500-CX Digital Speech in Noise— Probe

1. Follow the instructions to do SPL testing.
2. Once in the main SPL testing screen press menu
3. Select DIGSP ICRA or ANSI as the test signal for AIDED CURVES 1 and 2. Leave AIDED CURVE 3 as PT BURST
4. Select DIG SP MENU. Press [START/STOP].
5. Activate the bias tone and set its frequency and amplitude. It will be presented whenever a digital signal is used. You must turn the bias signal off in this menu.
6. Press [MENU] twice to return to the main test screen.
7. Continue to follow the SPL testing instructions.