

APWIN for System Two Cascade

APWIN



96k

Frequency
Response

Analog

Contents of this CDROM

This CDROM contains installation files for APWIN version 1.60, Adobe Acrobat PDF files for all manuals, Addendum information, and several audio tracks containing test signals. Here is the organization of the disc.

Folder	Contents
APWIN	Installation files for APWIN version 1.60. Run SETUP.EXE to install this software
Adobe	Installation files for the Adobe Acrobat Reader that is necessary to view or print any of the manuals included on this disc in Adobe Acrobat PDF format. If you do not already have the Adobe Acrobat Reader installed on your system, run SETUP.EXE in this directory to install version 3.01.
Documentation	Adobe Acrobat PDF files of all user manuals. Using the supplied Adobe Acrobat Reader, any of the manuals may be viewed and/or printed. Also included in this folder are PDF files of various other forms and tables. See the more detailed list below for a complete list of all included files.

List of included Adobe Acrobat PDF files (Manuals and documents)

Folder	Manual, form, or document
Accessories	
ApplicationNotes	Copies of all AppNotes, associated test and procedure files
APWBasic	APWIN BASIC User's Guide and Programming Reference (3 volumes)
ATS-1	
AUDIOTST	Copies of selected AUDIO.TST issues
Brochures	Brochures for cable kits, switchers, product specifications and an assortment of product brochures
InstallationandGettingStarted	Installation and Getting Started for System One and System Two
Miscellaneous	New features in APWIN, table listing the 72 audio test signals on this CD, Register form for your copy of APWIN, detailed specifications for System Two hardware and a bug report form to submit observed samples to Technical Support
PortableOne	Portable One Access and Portable One Dual Domain
TechnicalPapers	
TECHNOTES	Copies of all TechNotes, associated test and procedure files
Tutorials	APWIN Simplified Tutorial, Multitone, and Procedures for System One and System Two
UserManuals	APWIN User's Manual for System One and System Two

APWIN Version 1.60

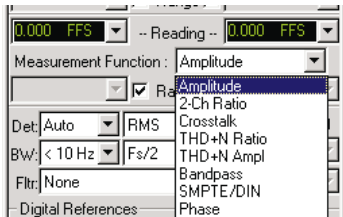
(Final Release March 1999)

New features since version 1.52a

APWIN version 1.60 has been created to support the new hardware features provided with System Two Cascade. Much of the capability included in APWIN 1.60 draws on the legacy of earlier versions of APWIN that operate with System Two but updated for the new Cascade platform. This document will describe these new features added to APWIN to support the new capabilities of System Two Cascade. It is written from the perspective of a user familiar with System Two and previous versions of APWIN.

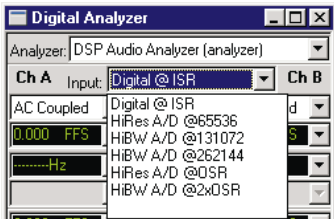
Dual Reading Meters on DSP Audio Analyzer.

DSP Audio Analyzer now has dual Reading Meters that allow two simultaneous readings with the resultant speed gain. Thus it is possible to make stereo distortion, crosstalk, bandpass, and phase readings. When added to the two level readings, four simultaneous measurements may be made.



Additional Inputs on DSP Audio Analyzer

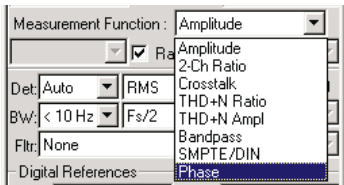
The INPUT selection list for the DSP Audio Analyzer has been increased to now include the High Bandwidth A to D converter.



Additional measurement functions added to DSP

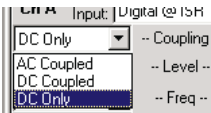
Audio Analyzer

Phase and SMPTE/DIN IM distortion have been added to the list of possible measurements for the digital audio analyzer.



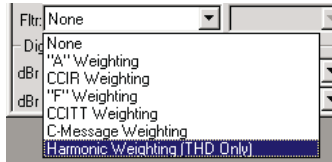
New DC-Only coupling for DSP Audio Analyzer

A DC Only selection on the input coupling choice allows true DC Voltage measurements.



Harmonic Weighting for DSP Audio Analyzer

A new selection in the Weighting Filter menu allows measurement of harmonics only in THD+N measurement function.



Longer record lengths for INTERVU

INTERVU now acquires 1.5M samples allowing over 19 ms of data to be acquired for subsequent analysis. (System Two can acquire 256k samples). The sample rate of the A to D converter has also increased from 67MHz to 80 MHz.

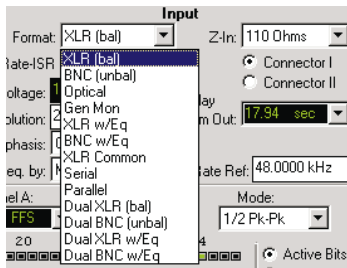
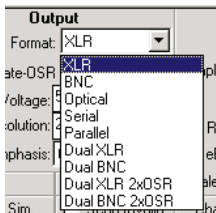
New Support for higher sample rates on System Two Cascade

System Two Cascade supports the new digital audio sample rates of 88.2kHz and 96kHz.

Support for System Two Cascade Dual Connector Digital Audio Interface

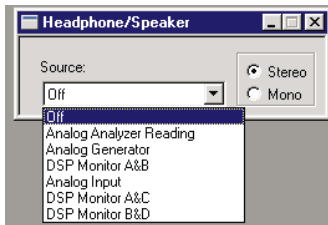
A new D/I/O panel now includes controls to select from among several digital audio formats. In addition to the classic single connector 44.1/48kHz AES/EBU format,

System Two Cascade hardware includes two balanced and two unbalanced connectors for AES/EBU/SPDIF input and output. In single connector modes, these two connectors interface to a 2 x 1 switch allowing programmable selection of one of two digital audio bit streams. In the interleaved dual connector digital audio format, each connector carries one channel of the two-channel signal.



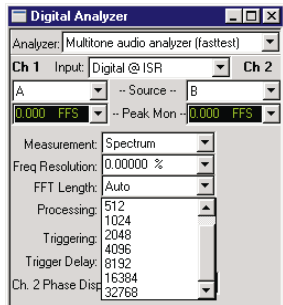
Now four channels of signal monitoring

There are now four monitor connectors on the front panel allowing simultaneous monitoring of four channels of data. Additional selections have been added to the Headphone/Speaker panel to accommodate these additional channels.



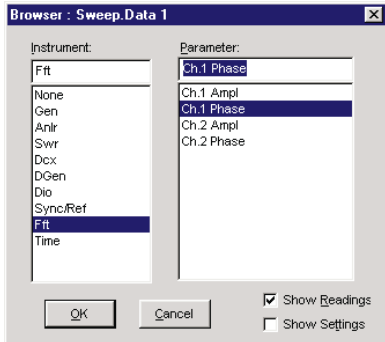
FASTTEST record length increased to 32k

The maximum record length in FASTTEST has been increased to 32k (from 16k). Also, the double-precision FFT gives improved noise floor.



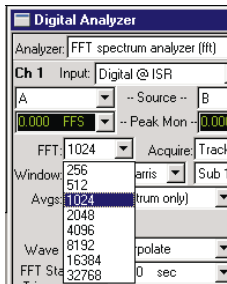
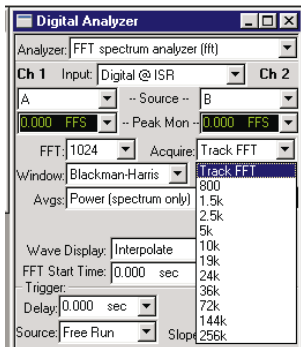
Phase readings now possible on FFTs

Phase readings have been added to the magnitude readings available from FFT transforms. The browser available from the Sweep panel includes Phase as well as Amplitude. Additionally, changes to the DSP code improve the “move-to-bin-center” and “realign” operation of sync averaging.



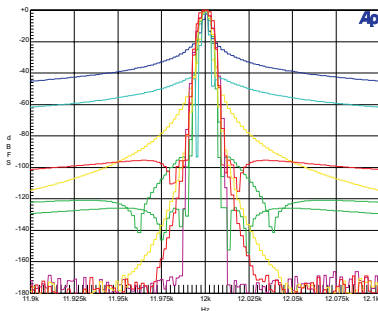
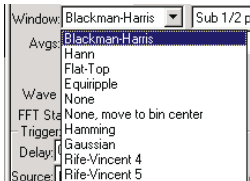
FFT acquisition and transform length increased

System Two Cascade FFT Acquisition buffer has been increased to 256k from the 24k size available on System Two. Additionally, the Transform buffer length adds 32k to the previous 16k maximum.



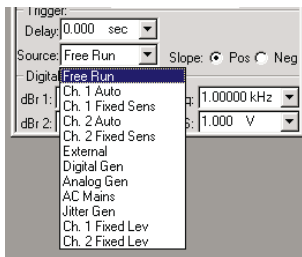
New Windows

Four new FFT window selections have been added: Hamming, Gaussian, Rife-Vincent 4 term, and Rife-Vincent 5 term. The Equiripple window has also been improved with lower sidelobes.



Enhanced FFT triggering

Additional choices have been added to the FFT hardware triggering menu to allow fixed level triggering (oscilloscope-style) in addition to the previous fixed sensitivity triggering.

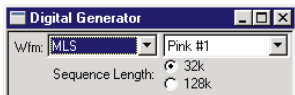


Even Integer FFT Bin Centers now possible

The 65,536, 131,072, and 262,144 Hz sample rates provide FFT bin centers that are even integer Hz values. For example, with 32k FFT Transform length and 65k A/D sample rate, the FFT bin centers are 2.0000 Hz, 4.0000 Hz, etc.

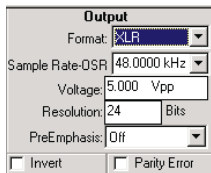
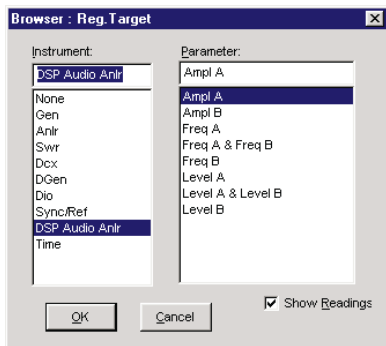
MLS sequence length increased

An extended sequence length of 128k has been added to the previous 32k size for the Maximum Length Sequence generation and measurement capability. This will allow an acquisition of 2.8 seconds (at 48kHz) thereby increasing the size of the acoustic environment that can be measured.



D I/O now has Invert and Parity Error selection

Selections are now added to invert the digital audio output signal and to add a parity error to the data stream.

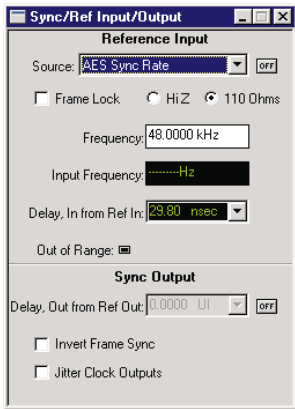


Additional choices added to DSP Audio Analyzer Regulation

New choices of Level A & Level B and Freq A & Freq B have been added to the Regulation panel for the Digital Analyzer to allow simultaneous control to two parameters during the regulation process.

New Sync Ref panel

An enhanced Sync Ref panel adds Frame Lock to AES/EBU Reference as a signal choice. Controls also allow the sync output to be inverted and allow jitter to be added to the Master Clock output.

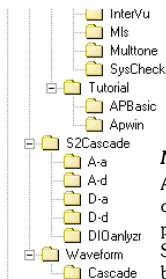
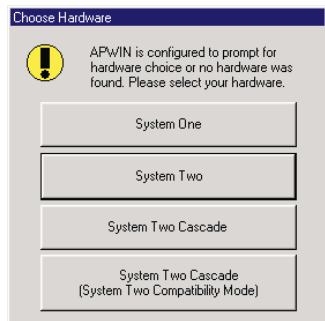


New test type added .AT2C extension

To simplify management of test files for the new System Two Cascade platform, a new test file type has been created with the extension .at2c. Additionally, APWIN 1.60 includes the ability to import System Two .at2 test files (which could then be saved as System Two Cascade .at2c test files).

Additional Instrument Selection at Startup

When APWIN 1.60 starts, the user can select from one of three platforms: System One, System Two, or System Two Cascade. Alternatively, if "Hardware Auto Detect" is selected, APWIN will make the platform selection automatically. In the "Prompt for Choice" mode, a System Two Compatibility mode is available if the hardware is System Two Cascade. This allows System Two (at2) test files to be loaded and run on System Two Cascade hardware.

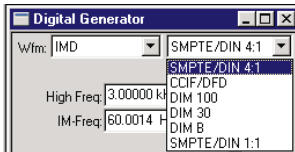
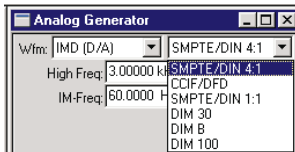


New Samples provided for System two Cascade

A new set of furnished samples have been generated to support the new capabilities of System Two Cascade and APWIN 1.60. The new folder branch adds to the previous S1 and S2 branches with their samples particular to System One and System Two. New samples provided for System two Cascade use long file names for better identification of their function.

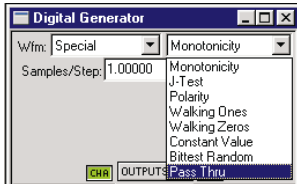
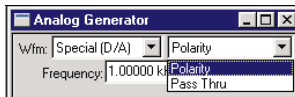
New IMD Waveforms available on D/A source signals

Intermodulation (dual tone) test signals have been added to the list of choices available on DSP generated waveforms, that is IMD selections on the digital generator and D/A selections on the analog generator. Additionally, SMPTE IMD amplitude ratios have been fixed at 1:1 and 4:1.



New Pass Through selection on Digital Generator and Analog D/A signals

A Pass Through selection is now available on the D/A waveform selection of the Analog Generator and the Special waveform selection of the Digital Generator that passes through the digital signal present at the rear panel Digital Reference input connector.



Improved Performance of digitally generated IMD signals

The IMD (D/A) waveform generation in System Two Cascade has better performance than System Two or System One since one D/A generates one component, at full scale, while the other D/A generates the other component, at full scale, and are then resistively summed at 1:1 or 4:1 ratio. The combination of the individual signal components each operating at full scale on their respective converter and the better performance converters yield significantly lower IMD test signal distortion.

Enhanced Converter Performance in System Two Cascade

Support has been added to APWIN for the improved converters present in System Two Cascade: the high-resolution A to D converters, useable with signals up to approximately 50kHz, have improved from 20 bit to 24 bit. The high bandwidth 16 bit A to D converters, previously able to handle signals up to approximately 80kHz, can now handle signals up to approximately 120kHz. The D to A converters have improved from 18 bit to 24 bit.

Greatly increased A/D and D/A converter bandwidth extend sophisticated DSP-based testing techniques to much higher frequencies

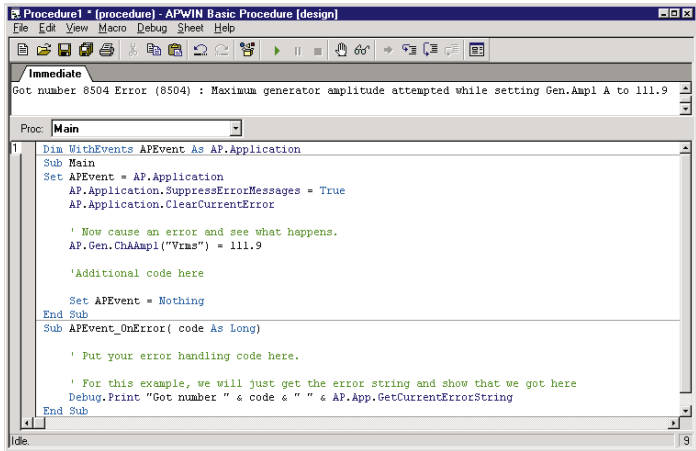
A/D converter sample rates of 65k, 131k, and 262k provide bandwidths of 30 kHz, 60 kHz, and 120 kHz to most DSP-based analyzer programs. This means that the Fast RMS feature and simultaneous 2-channel THD+N, SMPTE IMD, and Bandpass meters of DSP Audio Analyzer are now extended to as high as 120 kHz. Multitone testing techniques are now available to bandwidths of 60 kHz with FASTTEST. Quasi-anechoic testing with MLS can now be accommodated to 60 kHz bandwidth.

Extended upper frequency limits for D/A generated signals

D/A converter sample rates of 65k and 131k provide complex and sophisticated waveforms such as Stereo Sine, Variable Phase Sine, Shaped Burst, Dual Sine, MLS, and Arbitrary Waveforms to upper frequency limits of 30 kHz at best performance levels and 60 kHz at slightly reduced performance levels.

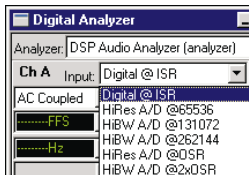
New error handling in OLE

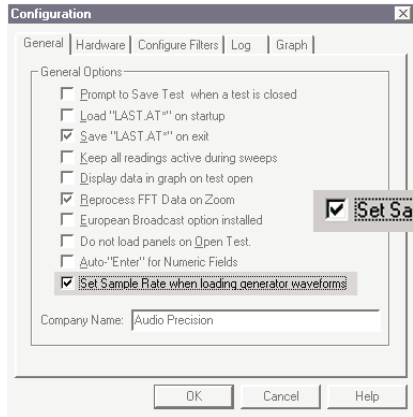
APWIN Basic now includes powerful error handling capability for measurement-related errors. Formerly available only on the language part of APWIN Basic, this new error handling for APWIN Basic Extensions will allow better processing of errors returned during hardware interaction.



Sample Rate abbreviations added: OSR and ISR

There are several different Sample Rates used throughout the system: sample rate of digital audio signals entering and leaving the system and the sample rates of the various converters used in the system. D/A converter sample rate, A/D Converter Sample Rate, Digital Output Sample Rate, and Digital Input Sample Rate are now independent and could be four separate values, or can be deliberately set to the same value when required. With limited space on many panels and drop down menus, the terms OSR for Output Sample Rate and ISR for Input Sample Rate have been developed.





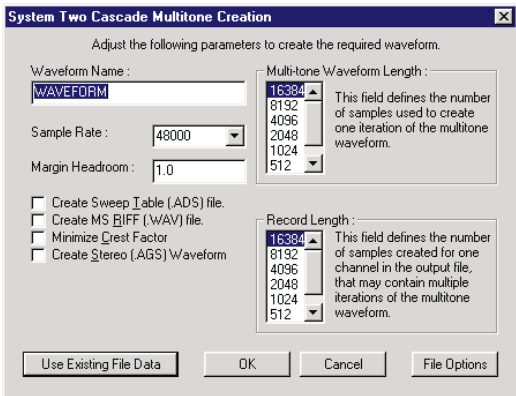
Waveform loading automatically sets Sample Rate

Sample rates are now automatically set when waveforms are loaded using information contained in the waveform file itself. The Configuration panel allows this feature to be enabled.

Set Sample Rate when loading generator waveforms

New MAKEWAVE utility

Several improvements have been added to the MAKEWAVE utility. Long file names are now supported. The upper frequency range has been slightly increased to .499 of sample rate, up from approximately .47. The low frequency range has been extended to include any values that particular sample rates and record lengths will support. 16k record length has been added. There is now more control of statistical data produced by the program.



Installing the software

The CDROM starts with an opening screen illustrated at the right. If your CDROM is set to AUTORUN, this screen will be automatically displayed within a minute or two after inserting the disc. If AUTORUN is not enabled, browse the CDROM and start the SETUP.EXE program located in the root folder.

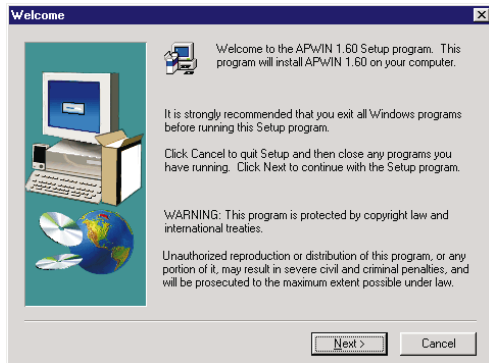
Not compatible with Windows 3.11

APWIN version 1.60 will operate on Windows 95, Windows 98, and Windows NT 4.0.

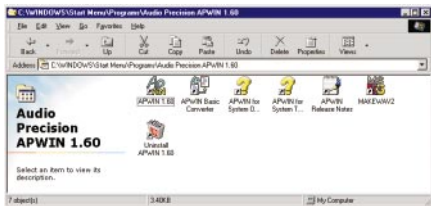
It will not run under Windows 3.1 or 3.11 as did version 1.50.

From this point, you can browse the CDROM, install APWIN, view or print any of the manuals, or view last minute information. The installation program for APWIN is self explanatory and will guide you through the installation process. The APWIN installation program will automatically detect what operating system you are using (Windows 95 or Windows NT) and install the appropriate driver. It will give you a choice of what files to install and where to install them.

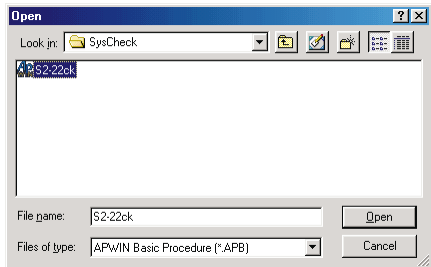
The default installation will install all files and take approximately 37 MB of hard disk space.



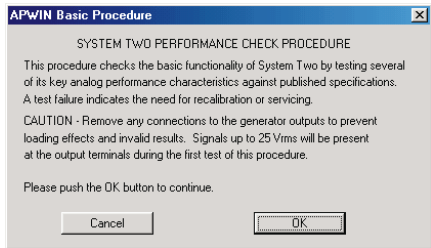
After a successful installation, you will find a new Start Menu Folder such as shown at the right. Select the APWIN icon to start APWIN.



For a quick tour of the software, open one of the sample tests or procedures supplied. Select File Open, Test or Procedure, and navigate to the S1 or S2 folder (for System One and System Two). There are several sample tests you can browse for an introduction to some of the capabilities of System One and SystemTwo inside APWIN.



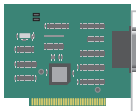
An interesting procedure to start with is the System Performance procedure S1-22CK.APB (or S2-22CK.APB) which runs a complete performance evaluation of the analog hardware of the System including comparison to specification limits and failure reporting. It will also illustrate automatic test loading and show several sweeps on graphs. To find this procedure, look in S1 (or S2) under the APWIN folder.



Then navigate to the PROCEDUR and then SYSCHECK folder and find a file called S1-22CK.APB (or S2-22CK.APB). Load this self check procedure and select RUN under the Procedure menu. This will test the hardware and illustrate an automatic sequence of tests, graphing, and comparison to limits.

Installing the hardware

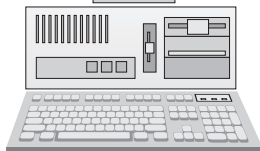
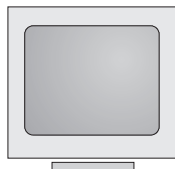
APWIN requires an interface card to communicate with System One or System Two. Every purchased copy of APWIN includes either an ISA-WIN interface card for desktop PC installation or a PCM-WIN PCMCIA interface card for notebook computers. (Note that APWIN will not run with earlier Audio Precision APIB interface cards such as PCI-1, PCI-2 or PCI-3.)



With the computer turned off, remove the cover and install the ISA-WIN interface card that came with this APWIN package.

Use caution handling the card to avoid static damage.

The factory default address jumper setting should work for most installations. If not, see the Installation and Getting Started manual for details on how to set



OR



If the computer to be used with APWIN is a notebook with a PCMCIA slot, use the PCM-WIN interface. Whether running Windows 95 or Windows NT, **install APWIN before plugging in the PCM-WIN interface card**. The APWIN installation process will install the correct driver for the PCM-WIN card. After completing the installation of APWIN, plug in the PCM-WIN card and Windows 95 should "find" the card and establish the correct link. (Windows NT requires a power cycle to "find" the card)

Not compatible with Windows 3.11

APWIN version 1.60 will operate on Windows 95, Windows 98, and Windows NT 4.0. It will not run under Windows 3.1 or 3.11 as did version 1.50.

Audio Precision APWIN CD-ROM Audio Test Signals

All waveforms are at the standard CD Audio 44.1 kHz sample rate.

Track	Description	Level	Duration	Dither	FILE NAME
1	Data track: APWIN software, Manuals in PDF format, Newsletters, and TECHNOTES. Readable on a computer CDROM drive only				
Reference					
2	997 Hz single tone level reference	0 dBFS	30 seconds	Triangular	
Noise					
3	Quiet Track, "Infinity zero"	Zero	30 seconds	None	
4	Quiet Track	Zero	30 seconds	Triangular	
5	Quiet Track	Zero	30 seconds	Shaped	
Frequency Sweep					
6	20 – 20 kHz High Resolution 120 frequencies	0 dBFS	1 sec each tone	Triangular	
7	20 – 20 kHz High Resolution 31 frequencies	0 dBFS	1 sec each tone	Triangular	
8	20 – 20 kHz High Resolution 120 frequencies optimized for Fast RMS	0 dBFS	.5 sec each tone	Triangular	
9	20 – 20 kHz High Resolution 31 frequencies optimized for Fast RMS	0 dBFS	.5 sec each tone	Triangular	
10	20 – 20 kHz High Resolution 120 frequencies	0 dBFS	120 seconds, 1 sec each tone	Shaped	
11	20 – 20 kHz High Resolution 31 frequencies	0 dBFS	31 seconds, 1 sec each tone	Shaped	
12	20 – 20 kHz High Resolution 120 frequencies optimized for Fast RMS	0 dBFS	.5 seconds	Shaped	
13	20 – 20 kHz High Resolution 31 frequencies optimized for Fast RMS	0 dBFS	.5 seconds	Shaped	
14	Stepped sweep with 11 frequencies at ISO octave spacing	0 dBFS	1 sec each tone	Triangular	
15	Stepped sweep with 21 frequencies at ISO half-octave spacing	0 dBFS	1 sec each tone	Triangular	
16	Stepped sweep with 31 frequencies at ISO third-octave spacing	0 dBFS	1 sec each tone	Triangular	
17	Stepped sweep with 11 frequencies at ISO octave spacing	0 dBFS	3 sec each tone	Triangular	
18	Stepped sweep with 21 frequencies at ISO half-octave spacing	0 dBFS	3 sec each tone	Triangular	
19	Stepped sweep with 31 frequencies at ISO third-octave spacing	0 dBFS	3 sec each tone	Triangular	
20	20 – 20 kHz High Resolution 120 frequencies	-20 dBFS	1 sec each tone	Triangular	
21	20 – 20 kHz High Resolution 31 frequencies	-20 dBFS	1 sec each tone	Triangular	
22	20 – 20 kHz High Resolution 120 frequencies optimized for Fast RMS	-20 dBFS	.5 sec each tone	Triangular	
23	20 – 20 kHz High Resolution 31 frequencies optimized for Fast RMS	-20 dBFS	.5 sec each tone	Triangular	
24	20 – 20 kHz High Resolution 120 frequencies	-20 dBFS	1 sec each tone	Shaped	
25	20 – 20 kHz High Resolution 31 frequencies	-20 dBFS	1 sec each tone	Shaped	
26	20 – 20 kHz High Resolution 120 frequencies optimized for Fast RMS	-20 dBFS	.5 sec each tone	Shaped	
27	20 – 20 kHz High Resolution 31 frequencies optimized for Fast RMS	-20 dBFS	.5 sec each tone	Shaped	
28	Stepped sweep with 11 frequencies at ISO octave spacing	-20 dBFS	1 sec each tone	Triangular	
29	Stepped sweep with 21 frequencies at ISO half-octave spacing	-20 dBFS	1 sec each tone	Triangular	
30	Stepped sweep with 31 frequencies at ISO third-octave spacing	-20 dBFS	1 sec each tone	Triangular	
31	Stepped sweep with 11 frequencies at ISO octave spacing	-20 dBFS	3 sec each tone	Triangular	
32	Stepped sweep with 21 frequencies at ISO half-octave spacing	-20 dBFS	3 sec each tone	Triangular	
33	Stepped sweep with 31 frequencies at ISO third-octave spacing	-20 dBFS	3 sec each tone	Triangular	

Track	Description	Level	Duration	Dither	FILE NAME
Amplitude Sweep					
34	400 Hz 0 dBFS to -110 dBFS	NA	5 sec each tone	Triangular	
35	Left: Amplitude Linearity 400 Hz 0 dBFS to -110 dBFS Right: Frequency sweep 1000 to 890, 10 Hz steps synced with amplitude changes	NA	5 sec each tone	Triangular	
36	Right: Amplitude Linearity 400 Hz 0 dBFS to -110 dBFS Left: Frequency sweep 1000 to 890, 10 Hz steps synced with amplitude changes.	NA	5 sec each tone	Triangular	
37	400 Hz single tone level reference	0 dBFS	30 seconds	Triangular	
38	400 Hz single tone level reference	-3 dBFS	30 seconds	Triangular	
39	400 Hz single tone level reference	-6 dBFS	30 seconds	Triangular	
40	400 Hz single tone level reference	-10 dBFS	30 seconds	Triangular	
41	400 Hz single tone level reference	-20 dBFS	30 seconds	Triangular	
42	400 Hz single tone level reference	-30 dBFS	30 seconds	Triangular	
43	400 Hz single tone level reference	-40 dBFS	30 seconds	Triangular	
44	400 Hz single tone level reference	-50 dBFS	30 seconds	Triangular	
45	400 Hz single tone level reference	-60 dBFS	30 seconds	Triangular	
46	400 Hz single tone level reference	-70 dBFS	30 seconds	Triangular	
47	400 Hz single tone level reference	-80 dBFS	30 seconds	Triangular	
48	400 Hz single tone level reference	-90 dBFS	30 seconds	Triangular	
49	400 Hz single tone level reference	-100 dBFS	30 seconds	Triangular	
50	400 Hz single tone level reference	-110 dBFS	30 seconds	Triangular	

Acoustic

51	MLS Sequence Pink #1	0 dBFS	15 seconds	None	
52	MLS Sequence Pink #2	0 dBFS	15 seconds	None	
53	MLS Sequence Pink #3	0 dBFS	15 seconds	None	
54	MLS Sequence Pink #4	0 dBFS	15 seconds	None	

Miscellaneous

55	1 kHz Squarewave	0 dBFS	15 seconds	None	
56	Polarity	0 dBFS	15 seconds	None	
57	J-Test	NA	15 seconds	None	
58	Walking Ones 10 Samples / Step	NA	15 seconds	None	
59	Walking Zeros 10 Samples / Step	NA	15 seconds	None	
60	Monotonicity 10 Samples / Step	NA	15 seconds	None	

Calibration

61	THD -40dB 1kHz and 2kHz at -40 dB	0 dBFS	15 seconds	None	
62	THD -60dB 1kHz and 2kHz at -60 dB	0 dBFS	15 seconds	None	
63	THD -80dB 1kHz and 2kHz at -80 dB	0 dBFS	15 seconds	None	

Track	Description	Level	Duration	Dither	FILE NAME
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Twin Tone (Intermodulation Distortion Test Signals)

64	63 Hz & 7 kHz 4:1 Amplitude Ratio (SMPTE IMD Test Signal)	-1 dBFS	30 seconds	Triangular	SMPTE-44.AGM
65	19 kHz & 20 kHz Twin Tone (CCIF IMD Test Signal)	-1 dBFS	30 seconds	Triangular	1920TT44.AGM
66	14 kHz & 15 kHz Twin Tone (CCIF IMD Test Signal)	-1 dBFS	30 seconds	Triangular	1415TT44.AGM

Multitone

67	Multitone with 31 frequencies at ISO 1/3 octave spacing + 20kHz	-1 dBFS	10 seconds	Triangular	ISO3144.AGM
68	Multitone with 11 frequencies at ISO 1 octave spacing + 20kHz	-1 dBFS	10 seconds	Triangular	ISO-1-44.AGM
69	Multitone with 21 frequencies at ISO half-octave spacing + 20kHz	-1 dBFS	10 seconds	Triangular	ISO-2-44.AGM
70	Multitone with 31 frequencies at ISO third-octave spacing + 20kHz	-1 dBFS	10 seconds	Triangular	ISO-3-44.AGM
71	Multitone with 31 frequencies at ISO 1/3 octave spacing, 3 frequencies near 200 Hz, 2 kHz, 20 kHz have been shifted up one bin to the next possible frequency in right channel for crosstalk measurements	-1 dBFS	10 seconds	Triangular	ISOXTALK.AGS

Codecs

72	Sinewaves in every other critical band from 40 Hz to 20 kHz excluding 1 kHz to 4 kHz	-1 dBFS	10 seconds	Triangular	ALTCRT44.AGM
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