



Bluetooth Duo

What's New: APx500 version 4.5 September 2017

This document looks at the new and improved features in the latest release of the APx500 software for all models of APx Series audio analyzers.

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INTRODUCING APx500 VERSION 4.5

APx500 4.5 is a major release that brings software support for the Bluetooth Duo option, along with other changes and improvements. See licensing acknowledgements at the end of this document.

Windows 64-bit Required

APx500 version 4.5 requires a 64-bit Windows operating system: Windows 7 Professional (64-bit), Windows 7 Ultimate (64-bit), Windows 8 Professional (64-bit), or Windows 10 Professional (64-bit). APx500 version 4.5 **cannot be installed** on a 32-bit operating system.

BLUETOOTH DUO

The Bluetooth Duo option is an entirely new *Bluetooth*® hardware module for APx modular analyzer systems, providing improved performance, additional audio codecs and incorporating recent upgrades to supported Bluetooth profiles. APx500 version 4.5 is the first version to support the Bluetooth Duo hardware; legacy Bluetooth modules are supported as well.

Features include

- Streamlined settings and step dialogs
- Faster device connection
- Filtered device scanning
- Bluetooth profile version updates: Core 4.2, A2DP 1.3, AVRCP 1.4, HFP Hands Free 1.7, HFP Audio Gateway 1.7, HSP 1.2
- AVRCP features include A/V Sync Delay, playback status, absolute volume, APx generator control
- New audio codecs: AAC, Qualcomm aptX, aptX HD, aptX Low Latency
- Adjustable transmit power
- Bluetooth firmware updates in the field
- No interchannel phase error (an issue with the legacy Bluetooth module)

DUT DELAY

APx500 has long had a DUT Delay field in Signal Path Setup, where you could manually enter a value that represented the delay through the device or system under test, so that APx could compensate for the delay when making measurements. New features have been added to extend the usefulness of the APx DUT Delay.

DUT Delay Measurement

A Sequence Mode measurement has been added to precisely measure the delay through a device or system by cross-correlating the generator output (a noise-like binary sequence stimulus) with the received signal having passed through the DUT.

Measure and Set DUT Delay step

See a description under Sequencer, below.

AVRCP A/V Sync Delay

For Bluetooth devices that support it, APx with Bluetooth Duo can read the AVRCP A/V Sync Delay from the connected sink device, and enter that value into the DUT Delay field.

ASIO IMPROVEMENTS

APx's ASIO interface can now automatically map up to 16 input and 16 output channels to an ASIO device.

SEQUENCER

Connect Bluetooth Device Settings dialog

The Signal Path Setup Measurement Sequence Settings > Connect Device From Settings > Connect Bluetooth Device Settings dialog has been reorganized, and allows Bluetooth Duo to use filters when scanning for devices.

Connect Bluetooth Device Step

The Connect Bluetooth Device step inherits the same reorganization and scan filtering features found in the new Connect Bluetooth Device Settings dialog.

Set Bluetooth Absolute Volume step

A sequence step has been added to support the Bluetooth Duo Absolute Volume feature.

Set Bluetooth Transmit Power step

A sequence step has been added to support the Bluetooth Duo Set Transmit Power feature.

Measure and Set DUT Delay Step

Using the same cross-correlation method as the DUT Delay measurement, a sequence step can be added to a signal path to measure the delay through a device, and enter the value into the DUT Delay field.

Program Step

The Program step has been improved.

- You can now specify that the program result be entered into a user variable.
- You can enter a timeout value to establish a maximum time to wait for the program to complete.

OTHER NEW FEATURES

Power Average Derived Result

A derived result providing power averaging has been added. Power averaging has applications in acoustic test, including

- Averaging acoustic response curves over an area to produce a “listening window” averaged response curve. This is also known as a spatial average.
- In tuning automotive sound systems, a few microphones are positioned at distributed locations near each seat location and the responses of sets pertaining to each seat are averaged to find the response representative of each seat.
- Averaging the frequency response curves of multiple microphones in an array.
- Averaging the response of multiple headphone measurements after refitting, to account for variations in fit. (IEC 60268-7)

Audible Monitor Switch on Progress Dialogs

Ever wish you could turn the Audible Monitor on or off, even when APx is busy with a long sweep or is in the middle of a sequence? There is now an Audible Monitor switch on progress dialogs.

Maximum Generator Frequency in Digital Serial

When configured with a Digital Serial output, in previous versions the generator frequency had been limited to 107.784 kHz. That restriction has been removed. With appropriate Digital Serial interface settings, generator frequencies up to 215.568 kHz are allowed.

Curve Fit Range controls in the Impedance Thiele-Small and Loudspeaker Production Test measurements

For calculating Thiele-Small parameters, it is best to constrain the high-frequency extent of the range across which the data is fitted to the model curve, to approximately $20 \times F_s$ (where F_s is the resonant frequency of the driver). A control has been added to these measurements to optionally restrict the frequency range of the data fitted to the model curve.

ACKNOWLEDGEMENTS

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