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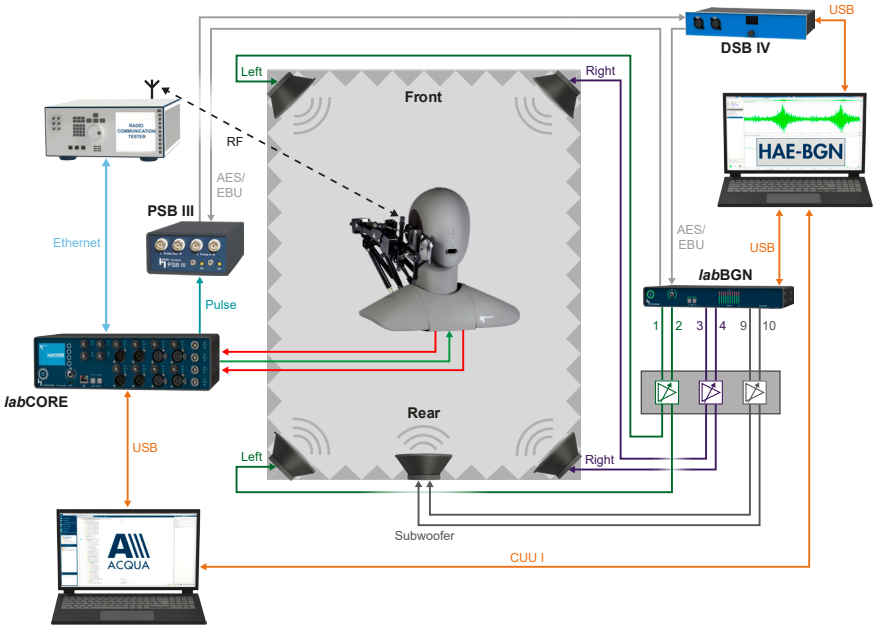
Data Sheet

HAE-BGN (Code 6971)

Semi-automated Equalization for Background Noise Simulation in Labs



Overview

HAE-BGN is a background noise simulation system for laboratories and test rooms. The goal is to test telecommunication equipment in the presence of background noise under lab type conditions and with full repeatability. With four loudspeakers and subwoofer HSW II.1, HAE-BGN reproduces prerecorded binaural signals with high accuracy. It features semi-automated equalization and is delivered with a background noise database as laid out in ETSI Standard ES 202 396-1 as well as binaural versions of the recordings described in TS 103 224. Both are adapted for use with the analysis system ACQUA and require no additional calibration.

HAE-BGN works interactively with the hardware platforms labBGN and labCORE as well as the HEAD Measurement Systems HMS II.3 and II.4 as a binaural, ID-equalized recording and playback system.

Key Features

- Background noise simulation for laboratories and test rooms as specified in ETSI ES 202 396-1
- Including recordings ready for use with ACQUA:
  - background noise database as specified in ES 202 396-1
  - binaural recordings according to TS 103 224
- Supports creating background noise environments as laid out in ITU-T G.160
- Semi-automated digital equalization with measurement microphone or binaural HEAD Measurement Systems HMS II.3/4/6
- Minimal inherent noise and high dynamic range
- Synchronization of playback with ACQUA measurements to ensure full repeatability

Applications

- Background noise simulation for laboratories and test rooms with semi-automated equalization, e.g. for speech quality evaluation of mobile devices

Description

With an arrangement of four loudspeakers as well as a binaural HEAD measurement system like HMS II.3, HAE-BGN is able to reproduce previously recorded background noises in suitable test rooms with high accuracy. The subwoofer HSW II.1 supports the loudspeakers at low frequencies, ensuring realistic playback and high dynamic range. At the same time, it leaves room for scaling of loudspeaker size and allows quick setup of HAE-BGN.

Semi-automated equalization allows fast and convenient calibration of the system, compensating the individual acoustic traits of loudspeakers and room. The equalization procedure works on several levels, correcting frequency response, level and delay of the playback system. This results in high playback accuracy at the chosen reference position.

HAE-BGN is optimized for playback of binaural (two-channel) signals. For testing telecommunication devices in the presence of background noise as described in ETSI ES 202 396-1, HAE-BGN includes a background noise database with binaural and stereophonic recordings as well as binaural versions of the recordings as described in ETSI TS 103 224. To ensure full repeatability of each test, HAE-BGN can be configured for triggered playback.

General Requirements

Software

- Microsoft Windows 8/8.1 Pro or Windows 10 Pro (English or German version, including all current service packs).

Hardware

- **PC** with multi-core processor, 1.6 GHz or faster, 4 GB RAM, 40 GB free disk space, 4 USB Ports
- ***lab*BGN (Code 6486)**, ACQUA*lab* (8+2)-Channel Background Noise Hardware Platform
- **Power amplifier(s)**, 4 channels
- 4 x **Loudspeakers**
- **CSO I.0 (Code 9822)**, Loudspeaker cable set for HAE-car/HAE-BGN/3PASS (4 speaker connections)
- **HSW II.1 (Code 2952)**, subwoofer with amplifier
- One of the following **HEAD measurement systems**
  - **HMS II.3-33 (Code 1230.1)** or **HMS II.4-33 (Code 1240.1)**, HEAD measurement system with ear simulator, pinna type 3.3, both with
  - **HIS L (Code 1231)**, HEAD impedance simulator, left ear

  or
  - **HMS II.3-LN (Code 1230.3)**, HEAD Measurement System, Low-Noise Version with 3.3 Pinna, Right Ear Simulator & Artificial Mouth with

  - **HIS L-LN (Code 1231.3)**, HEAD impedance simulator, left ear, low-noise version

  or

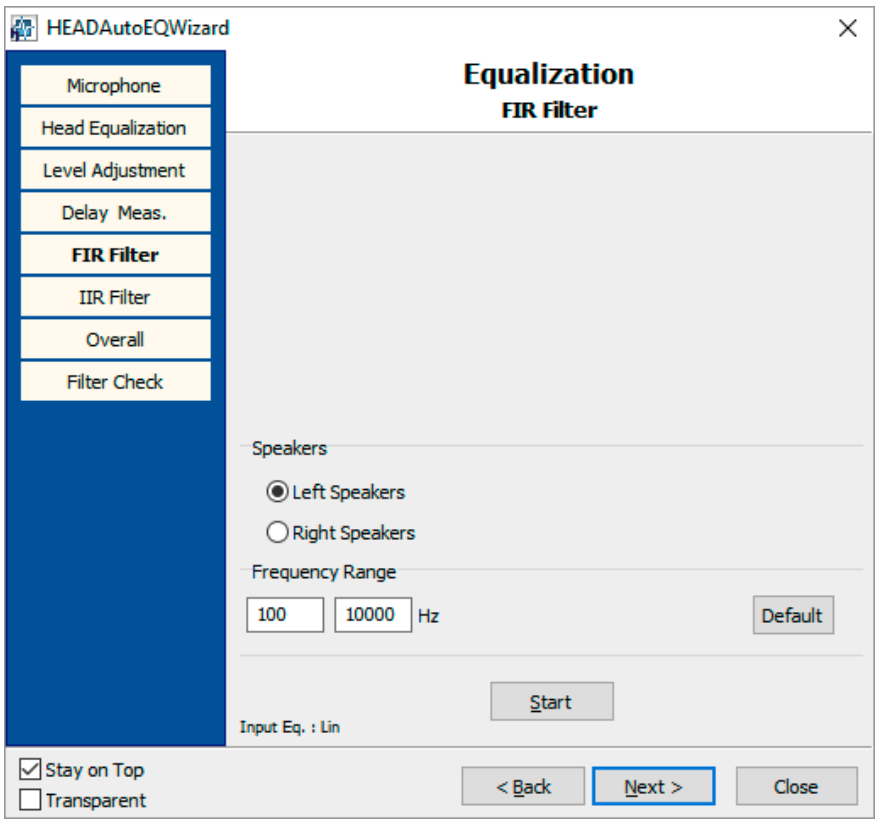
  - **HMS II.6 (Code 1389)**, HEAD Measurement System, with artificial mouth and free-field microphones (left & right)
- ***lab*CORE (Code 7700)**, Modular multi-channel hardware platform with
  - ***core*BUS (Code 7710)**, *lab*CORE I/O bus mainboard
  - ***core*IN-Mic4 (Code 7730)**, Microphone input board
  - ***core*BEQ (Code 7740)**, *lab*CORE binaural equalization software extension
- One of the following **soundboards**:
  - **DSB II (Code 2406)**, (internal, PCI) or
  - **DSB III (Code 2407)**, (internal, PCIe) or
  - **DSB IV (Code 2408)**, (external, USB)
- A **Measurement microphone** incl. cable and acoustic calibrator (only required for equalization type "Noise Generator")

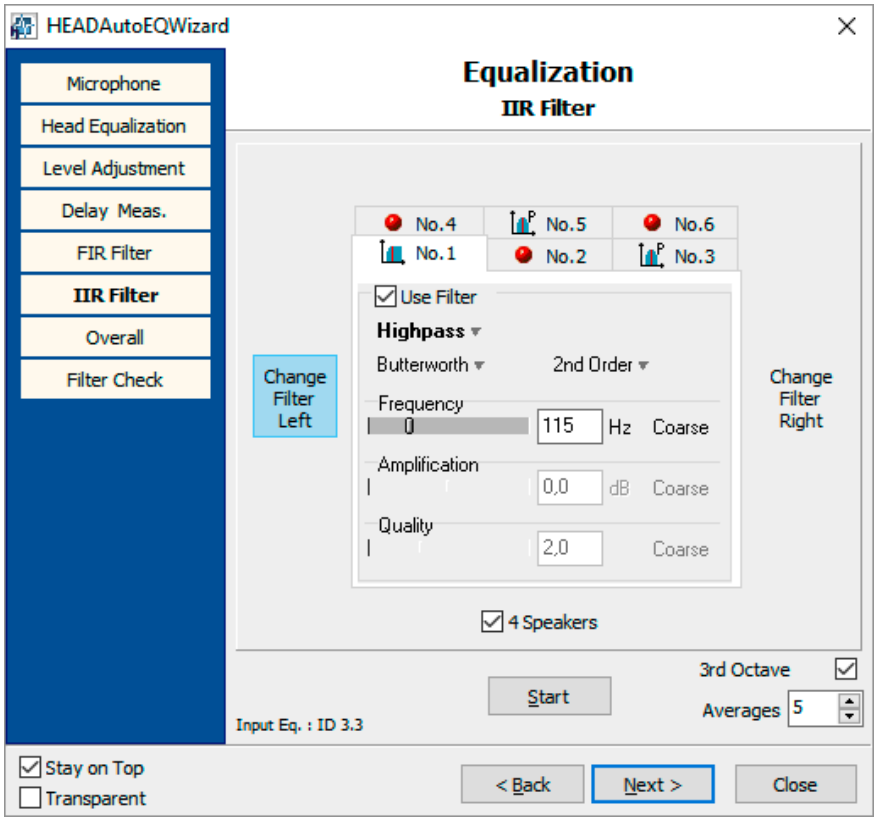
Options

- **PSB III (Code 6001)**, pulse splitter box (for synchronization of non-stationary noise with ACQUA)
- 2 x **CXX II.3 (Code 5177-3)**, Cable AES/EBU XLR male 3-pin <> XLR female 3-pin, 2.95 m
- **CUU I (Code 6085)**, Adapter USB <> USB for Remote Control HAE (Connection ACQUA PC <> HAE PC)

Delivery Items

- **HAE-BGN (Code 6971)**, Software including noise database as specified in ETSI ES 202 396-1
- **Dongle** (USB)
- **Manual** as PDF





The EQ wizard of HAE-BGN guides the user through the equalization procedure. The system uses a combination of FIR and IIR filters (see screenshots) to equalize the loudspeaker setup

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