

**APPLICATION
EXAMPLES
INCLUDED**



Code 7782

coreBT2

labCORE I/O Module, Bluetooth® Reference Access Point, Version 2

OVERVIEW

coreBT2

Code 7782

labCORE I/O Module, Bluetooth® Reference Access Point, Version 2

coreBT2 is a hardware/software extension for the *labCORE* multi-channel hardware platform. It enables *labCORE* to become a Bluetooth reference access point. Including *coreBT2*, *labCORE* pairs with any Bluetooth capable voice and audio device to perform acoustic and electric measurements.

coreBT2 comprises a dedicated software stack supporting Bluetooth version 5.2 and a transceiver with Bluetooth version 5.0. It supports a wide variety of Bluetooth profiles and configuration options to generate arbitrary test cases. The transceiver quickly connects to *labCORE* via USB.



KEY FEATURES

Bluetooth pairing of *labCORE* as headset/hands-free device, audio gateway or as a universal A2DP source/sink

Various Bluetooth profiles and appropriate audio codecs for Bluetooth Classic

Various configuration options to generate any desired test case

Enforcing desired connection types/settings for the device under test

Quick and easy setup with *labCORE*

APPLICATIONS

Performing electrical and acoustic measurements of Bluetooth devices

DETAILS

coreBT2 is an interaction of a Bluetooth transceiver and a dedicated software stack within the firmware of *labCORE*. This enables the *labCORE* hardware platform to connect to many Bluetooth Classic capable voice and audio devices (e.g., mobile phones, headsets, headphones, hands-free devices, loudspeakers, etc.). Control, configuration, and electric or acoustic measurements of the Bluetooth connection are executed via ACQUA.

DESCRIPTION

Bluetooth profiles

Selectable profiles enable *labCORE* to act as any type of Bluetooth connected device:

- › Hands-free audio device (HFP) / Gateway for a hands-free audio device (HFP-AG)
- › Headset audio device (HSP) / Gateway for a headset audio device (HSP-AG)
- › Advanced Audio Distribution Profile (A2DP), audio sink/source device
- › Audio/Video Remote Control Profile (AVRCP)

Connection and security

coreBT2 is delivered with a Bluetooth transceiver (CBA IV-V1) and an antenna cable extension (CSM II.10) for flexible positioning of the transceiver, e.g., inside the measurement cabin. The cable has a male SMA connector and a female SMA socket to connect it to the antenna as well as SMA socket of the Bluetooth transceiver.

coreBT2 supports a wide variety of configuration options to create any desired test scenario and/or force the device under test (DUT) into desired modes of operation for in-depth testing. Known levels and delays allow precise analysis of device characteristics and behavior. The status of a connection can be retrieved and Bluetooth data packets can be recorded for debugging operations.

coreBT2 supports Bluetooth security levels 1-3 and automatically matches with the DUT upon request, e.g.:

- › PIN for the pairing process
- › Man-in-the-middle protection (on/off)

- › Bit encryption length (8 to 128 bit)
- › Security level (encryption/signing)

Audio codecs

coreBT2 supports various audio codecs for Bluetooth profiles:

- › CVSD (HFP/HFP-AG)
- › mSBC (HFP/HFP-AG)
- › SBC (A2DP sink/source)
- › Qualcomm® aptX™ audio codec (A2DP source)
- › AAC (A2DP sink/source, payable option)
- › LDAC (A2DP source, payable option)
- › LC3 (HFP/HFP-AG, payable option)
- › LC3plus (A2DP sink/source, payable option)

Additionally, supported sampling rates as well as parameters can be manually set for each codec.

Miscellaneous functionalities

coreBT2 also supports the following Bluetooth functions:

- › Communication over control/audio channels for headset profiles (HSP/HSP-AG) including loudspeaker and microphone volume control
- › Communication over control/audio channels for hands-free profiles (HFP/HFP-AG) including loudspeaker and microphone volume control
- › Selection of an SCO and eSCO link for speech transmission
- › AT command mode
- › Echo Cancellation (EC) and Noise Reduction (NR) can be enabled/disabled in the DUT as desired

Transceiver certifications

The transceiver (CBA IV-V1) has the following certifications:

- › Anatel (Brazil)
- › Bluetooth SIG (UK)
- › BTK (Turkey)
- › CE RED (Europe)
- › EAC (Russia)
- › Enacom (Argentina)
- › FCC (United States)
- › IC (Canada)
- › ICASA (South Africa)
- › IDMA (Singapore)
- › KCC (Korea)
- › Kominfo (Indonesia)
- › MoC (India)
- › NCC (Taiwan)
- › NBTC (Thailand)
- › NOM and NYCE (Mexico)
- › NTC (Phillipines)
- › PTA (Pakistan)
- › QAS SIRIM (Malaysia)
- › RCM (Australia and New Zealand)
- › SRRC (China)
- › Telec (Japan)
- › TRA (United Arab Emirates)
- › Vietnam

OPTIONAL CODECS AND PROTOCOLS

Advanced audio codec (AAC)

The AAC codec is available with *coreBT2-AAC-LDAC*. AAC supports a sampling rate up to 96 kHz and has a maximal bit rate of 320 kbps.

LDAC codec

The LDAC codec is available with *coreBT2-AAC-LDAC*. LDAC supports a sampling rate up to 96 kHz and high bit rates.

LC3 for hands-free profile

coreBT2-LC3-HFP provides the LC3 codec for the hands-free profile (HFP). The LC3 codec assures high speech and audio transmission quality (super-wideband). Thus, the EVS speech quality in VoLTE calls is maintained while using Bluetooth. Therefore, *coreBT2-LC3-HFP* enables measurements with super-wideband signal transmission of Bluetooth devices applying the hands-free profile.

LC3plus codec for A2DP profile

The LC3plus codec is available with *coreBT2-LC3plus-A2DP*. LC3plus supports a sampling rate up to 96 kHz and a bit rate adaption up to 500 kbps per channel. It allows high speech and audio transmission quality (super-wideband) and has an increased robustness against transmission errors.

HID protocol

The HID functionality is available with *coreBT2HID*. It enables *labCORE* to act as a human interface device. Thus, *labCORE* can send control commands via Bluetooth to a connected device, e.g., volume control commands.

OPTIONS

coreBT2-AAC-LDAC (7783)

- › *labCORE* Bluetooth AAC and LDAC codec option

coreBT2-LC3plus-A2DP (Code 7784)

- › *labCORE* Bluetooth LC3plus option for A2DP

coreBT2-LC3-HFP (Code 7785)

- › *labCORE* Bluetooth LC3 option for HFP

coreBT2HID (Code 7786)

- › *labCORE* Bluetooth Human Interface Device

GENERAL REQUIREMENTS

Hardware

labCORE (Code 7700)

- › Modular multi-channel hardware platform

Software

One of the following software applications:

ACQUA (Code 6810)

- › Advanced Communication Quality Analysis Software, full license version

or

ACQUA Compact (Code 6860)

- › Compact test system

or

RC-*labCORE* (Code 6984)

- › Remote control software for *labCORE*

SCOPE OF DELIVERY

coreBT2 (Code 7782)

- › *labCORE* I/O module, Bluetooth reference access point, version 2

CBA IV-V1 (Code 6599-V1)

- › Bluetooth transceiver for *labCORE* module coreBT2 (USB-based, includes antenna)

CSM II.10 (Code 6115-10)

- › Antenna cable, SMA plug <> SMA socket, RG 174, 10 m

Software stack (embedded in *labCORE* firmware)

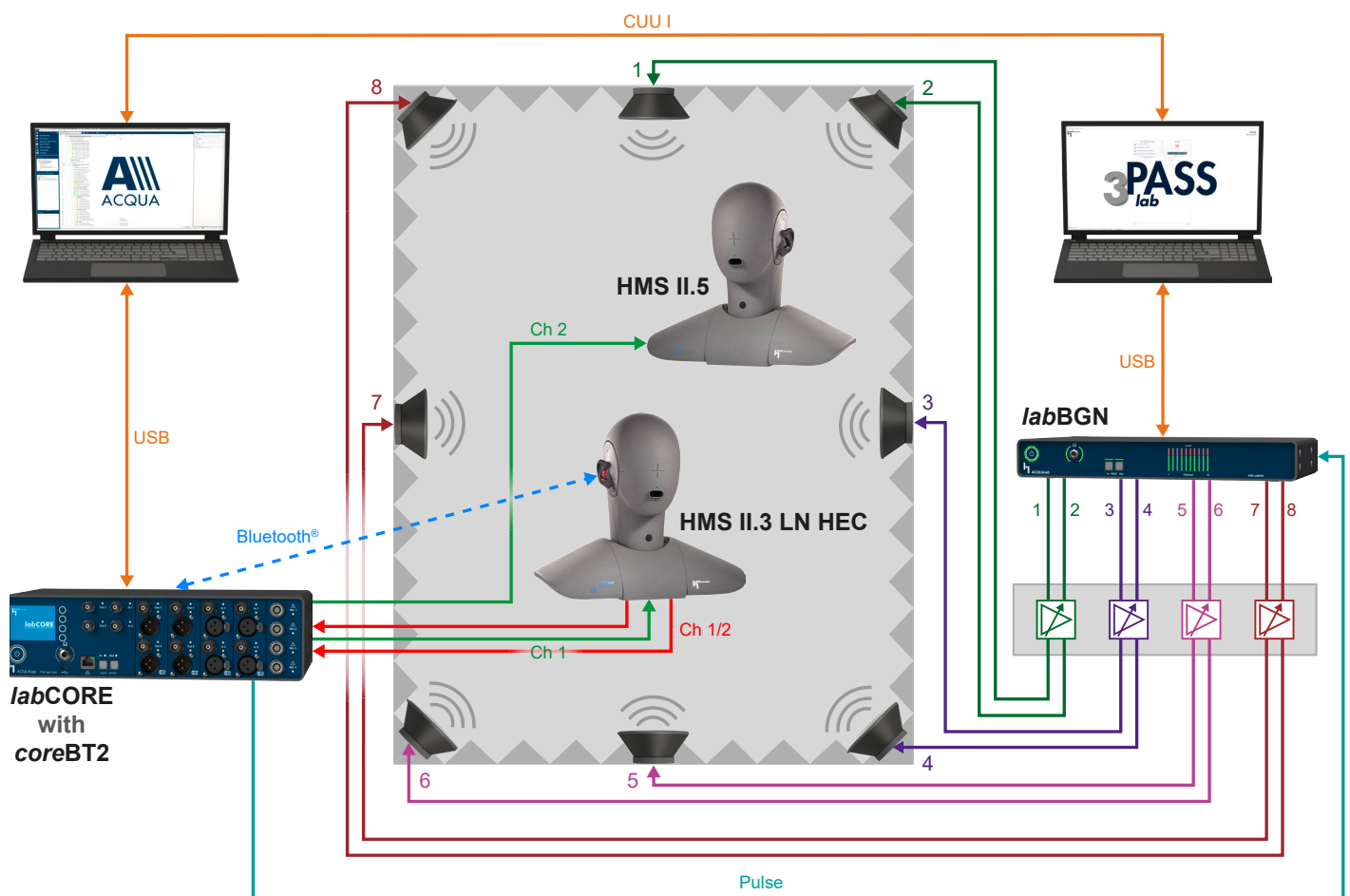
IN PRACTICE

APPLICATION EXAMPLES

Measurement of a Bluetooth true wireless in-ear headset (exemplary)

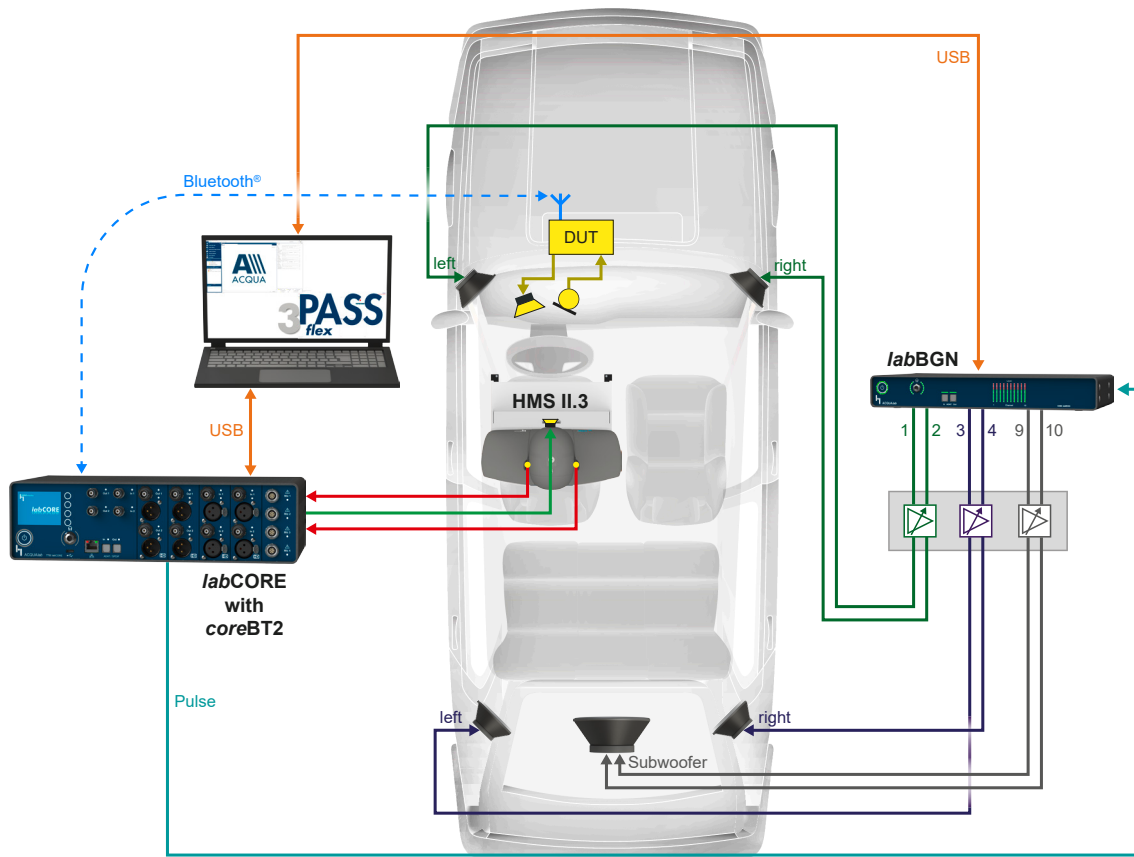
This exemplary test scenario depicts testing of a wireless in-ear headset with coreBT2. HMS II.3 LN HEC wears the in-ear headset. HMS II.5 simulates a second talker to test performance with interference by external speech.

labCORE connects to the in-ear headset via coreBT2. Background noise is simulated with 3PASS lab. For full repeatability of measurements, background noise playback is synchronized by labCORE through a pulse connection to the labBGN hardware platform. ACQUA operates as the central software to generate, receive, and analyze signals.



Measurement of the head unit in a vehicle (exemplary)

The head unit of this vehicle provides Bluetooth for hands-free phone calls. *labCORE* connects directly to the head unit via *coreBT2*. HMS II.3 connects to *labCORE* for operation of artificial ear and artificial mouth. Background noise is simulated with 3PASS *flex*. For full repeatability of measurements, background noise playback is synchronized by *labCORE* through a pulse connection to the *labBGN* hardware platform. ACQUA operates as the central software to generate, receive, and analyze signals.



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LDAC and the LDAC logo are trademarks of Sony Corporation.

<https://www.iis.fraunhofer.de/audio>: Low Complexity Communication Codec for High-Resolution mode by Fraunhofer IIS and Ericsson.



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