RFcreations
...a different perspective

Audio latency measurements for your LE Audio or Auracast™ product, including 'presentation delay'. Be first to market and bring the next generation of Bluetooth® audio to life, today!

KEY FEATURES:

- **AUDIO THAT YOU CAN MEASURE**
  - Audio latency measured end-to-end, between-channels or relative to on-air packets in real time.
  - Audio capture and generation accurately timestamped relative to Bluetooth packets.

- **AUDIO USAGE SENARIOS**
  - Measure LE Audio Presentation Delay.
  - Measure SYNC between Left and Right channels.

- **ADVANCED LOGIC ANALYSIS**
  - Up to 16 logic lines.
  - Configurable voltage threshold and hysteresis.

- **CURRENT MEASUREMENT**
  - Selectable full-scale deflection.
  - 8µs resolution
  - 13-bit precision.

- **TIMELINE VIEW**
  - Audio streams visible on blueSPY timeline.
  - Logic lines and buses visualised in real-time.
  - Device power consumption displayed in real-time.

- **COMPATABILITY**
  - Can be used with all RFcreations mini-moreph and moreph30 blueSPY protocol analysers.

OVERVIEW:

audiopod offers an industry first! A USB powered audio measurement tool which integrates seamlessly with the RFcreations mini-moreph and moreph30 hardware platforms to generate and record audio over a variety of analogue and digital interfaces.

Each audio stream is timestamped using the same clock as the Bluetooth packets, allowing the audio streams to be aligned with Bluetooth packets and displayed in the blueSPY GUI. This timestamping enables a variety of audio latency measurements to be made, including end-to-end, between-channel, and on-air packets to captured audio streams. This is a must-have to ensure compliance with the presentation delay requirement of the LE audio specification.

SYSTEM DIAGRAM:
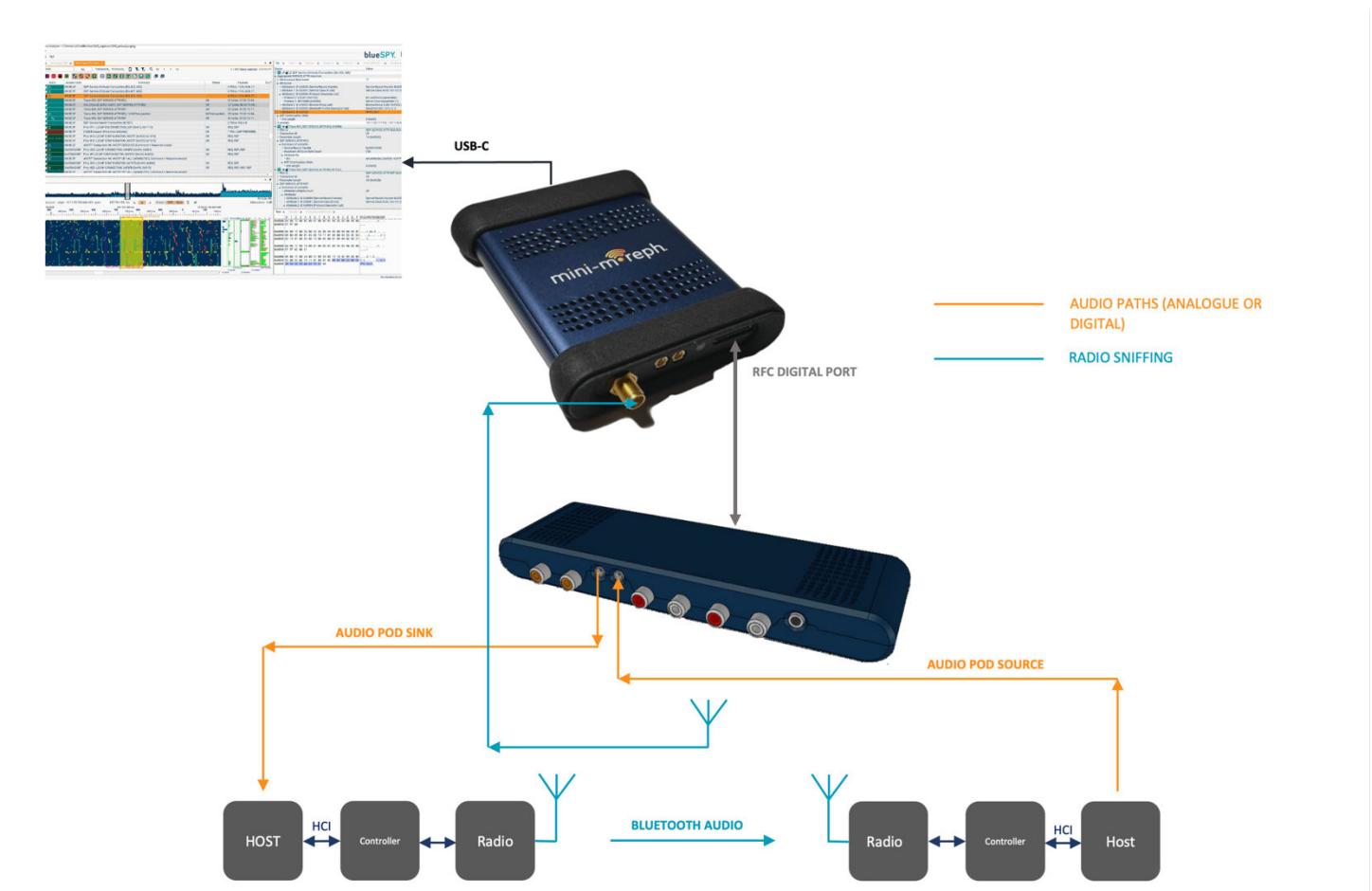
AUDIO INTERFACES:

INTERFACE	CHANNELS
Headset	Stereo out, mono in
3.5mm jack	Stereo in & out
RCA	Stereo in & out
S/PDIF coax	Stereo in & out
S/PDIF optical	Stereo in & out
On-board microphones	Stereo in
Digital I2S	Multi-channel in & out

The digital I2S interface can be configured for:

- Signal polarity
- Number of channels
- Number of bits per channel
- LSB or MSB first
- Latency between word clock and first sample
- IO voltage (0.8 to 3.3V)
- I2S master or slave

Master clock accuracy of the digital I2S interface is ±50ppm, -40°C to +85°C.

Supported sample rates are 8kHz, 11.025kHz, 16kHz, 22.05kHz, 32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz and 192kHz. Simultaneous analogue capture and generation are restricted to be the same sample rate.

There is selectable automatic gain control on capture and dynamic range compression on playback. A manual volume control is included in the blueSPY UI.

Switchable microphone bias is available on all analogue inputs.

AUDIO INTERFACE DIAGRAM:

COAXIAL S/PDIF IN (RCA)

DUAL mode connector: Stereo
ANALOGUE audio IN or OPTICAL
S/PDIF IN (3.5mm jack).

MICROPHONE

ANALOGUE audio OUT (RCA)

MICROPHONE

COAXIAL S/PDIF OUT (RCA)

ANALOGUE audio IN (RCA)

OMTP headset/CTIA headset
Via adaptor (3.5mm jack).

DUAL mode connector: Stereo
ANALOGUE audio OUT or OPTICAL
S/PDIF OUT (3.5mm jack).

AUDIO LATENCY MEASUREMENTS:

- The audio generation feature permits audiopod to create an audio stream which can be fed into one end of a Bluetooth link. The timing of this audio stream is known precisely.

- The audio capture feature permits audiopod to record the audio stream from the other end of the Bluetooth link. These audio samples are accurately time stamped on capture.

- Integration with blueSPY permits an audio stream to be extracted from on-air packets and accurately time stamped. Latency measurements between channels within an audio stream are also supported.

- By comparing these audio streams and their associated timestamps, latencies can be measured between the original audio, on-air packets and the final audio output.

- By sniffing HCI traffic on UART or SPI interfaces, blueSPY can extend its latency measurements to include HCI audio streams.

INTEGRATION WITH blueSPY:

Decoded/decrypted Auracast™ CIS

Output volume controls

Input volume controls

Audio generation controls

Vu meters

Timeline view of audio waveforms

Timeline view of decoded & decrypted CIS packets

Live cross-correlation of audio streams

Input/Output spectra

Live cross-correlation of L/R channels

Latency measurements including presentation point

Piconet topography

RFcreations
St Johns Innovation Centre,
Cambridge, CB4 0WS, UK.

CURRENT CONSUMPTION MEASUREMENTS:

- audiopod contains an isolated current meter which can be used to measure the current consumption of a Bluetooth device. The current measurements are accurately timestamped and can be displayed in the blueSPY timeline view.
- Selectable full-scale deflection of 1mA, 10mA, 100mA or 1A.
- 13-bit resolution.
- 8µs sampling resolution.
- Power for the Bluetooth device can be supplied from the audiopod and is configurable in the range 0.6 to 5V.
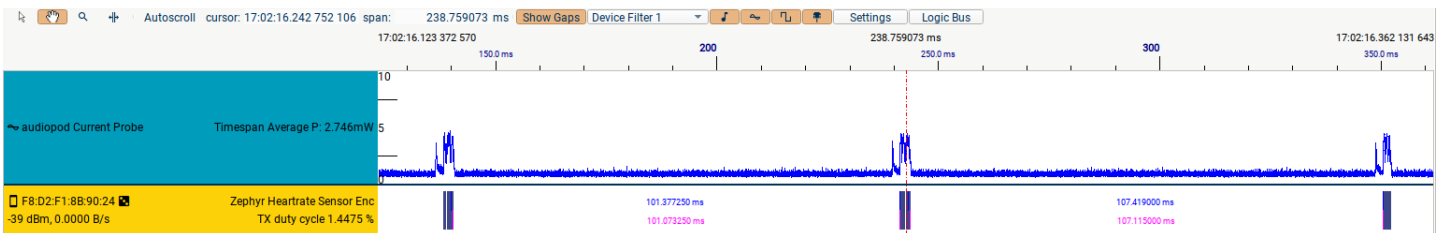
LOGIC ANALYSER:

- Lines in the RFC digital port interface which are not required for audio generation/capture are available for the logic analyser.
- The state of the logic lines/buses is displayed in the blueSPY timeline view.
- Logic low and high thresholds are independently programmable.
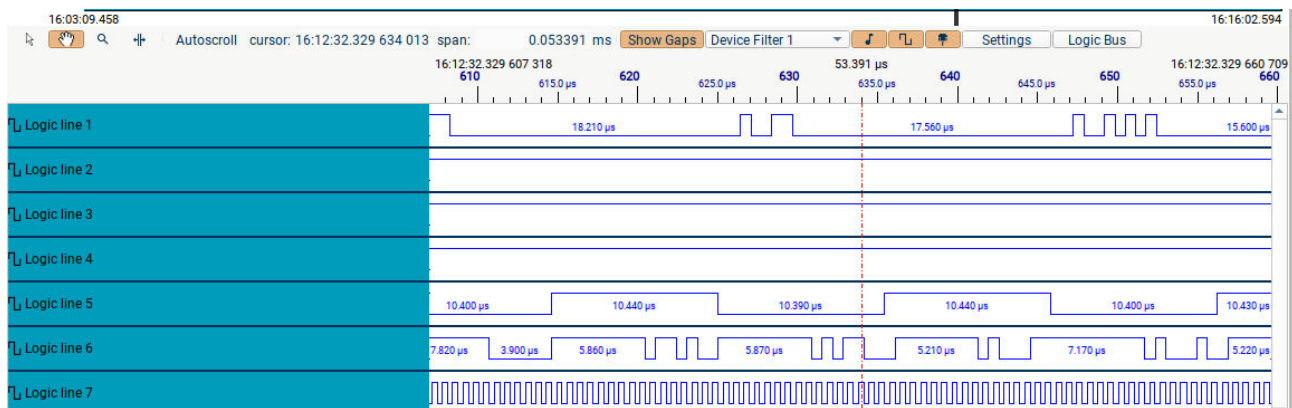
WHAT'S IN THE BOX:

- audiopod.
- 2 x ear canal microphones for headset measurements.
- RFC digital port cable. (connects audiopod to the moreph hardware platform.)
- 1 x OMTP ↔ CTIA headset adapter.
- 1 x 3.5mm stereo to mono splitter.
- 2 x BNC to RCA cables.
- Logic probe cables.
- Logic probe clips.

- USB power cable.

GENERAL:

- USB powered: 200mW typical.
- Dimensions: 19 x 7 x 2cm (7.48 x 2.8 x 0.8 inches approx.)
- Weight: 300g

CONTACT RFCREATIONS TODAY TO FIND OUT MORE AND SEE OUR DIFFERENT PERSPECTIVE!

enquiry@rfcreations.com
www.rfcreations.com