HEAD acoustics®

WINNER of the VO.IP Germany AWARD 2008 Category Services

lines

Telecom HEAD*lines*

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New ACQUA Version

Version 2.3.400 of the Advanced Communication Quality Analysis System ACQUA has recently been released and distributed to all ACQUA users with a valid software maintenance agreement.

One of the main new features is the new algorithm "3QUEST" for objective evaluation of transmitted speech with background noise based on the new ETSI standard EG 202 396-3. 3QUEST is now available as ACQUA Option ACOPT 21 (cf. detailed article further below).

Furthermore, the new options ACOPT 23 and 24 are now available which considerably facilitate GCF/PTCRB approval of 2G and 3G mobile equipment (cf. detailed article further below).

Audio playback is now also possible with a PEQ V connected via USB.For generating measurement reports, OpenOffice can now be used as an alternative to MS Word.

For measurement frontends MFE VII and MFE VIII with clock control hardware option, the sampling rate can now be auto adjusted to that of the measurement object.

Of course there are numerous other improvements which cannot be presented here due to lack of space, so you better install the new version as soon as possible and get your own impression.

GCF/PTCRB Approval Now Made Easy

The Global Certification Forum (GCF) and their American counterpart PCS Type Certification Review Board (PTCRB) both defined test criteria for the certification of 2G and 3G mobile equipment. As a member of GCF, HEAD acoustics is now able to offer GCF/PTCRB-approved test platforms which cover audio test cases for 2G and 3G according to 3GPP TS 26.131/TS 26.132 and TS 51.010-1.

In combination with the test platforms TP89 or TP90 (see below), Option GCF (ACOPT 23) and Option PTCRB (ACOPT 24) for the Advanced Communication Quality Analysis System ACQUA enable manufacturers and test laboratories to submit test cases of 2G and 3G mobile equipment validated on any of these two test platforms to GCF or PTCRB for official approval.

The GCF/PTCRB-certified test platforms TP89 and TP90 consist of the following HEAD acoustics hardware and software components:

- ACQUA (Code 6810 or compact systems), Version 2.3.300 or higher: Test system
- TS 26131-32 (Code 6777), Rev.03, Ver. A23300.3: Test Standard 3GPP TS 26.131/TS 26.132 V7.1.0 (2008-01) Release 7
- TS 51.010-1 (Code 6742), Rev.06, Ver. A23300.6: Test Standard 3GPP TS 51.010-1, section 30, V7.8.0 (2008-01) Release 7

approved by GCF Global Certification Forum PTCRB PCS Type Certification Review Board

- HMS II.3 (Code 1230): Head and Torso Simulator
- HER IV.2 (Code 1381): Ear Type 3.3
- HER III.1 (Code 1249): Ear Type 3.4
- HHP III (Code 1400): Handset Positioner
- *for TP89:* MFE III (Code 6201 or 6202): Frontend for Signal Conditioning
- *for TP90:* MFE VI.1 (Code 6462): Frontend for Signal Conditioning

Moreover, for users of R&S UPL 16 measurement systems a special discount of 20% is available on the price of the new compact system ACQUA-UMTS Compact GCF (Code 6860.15), consisting of ACQUA-Compact Software, MFE VI.1, TS 26.131-32 and ACOPT 23 (GCF-approved).For more information on this special offer which is only valid until 01 May 2009, please contact your regional HEAD acoustics sales partner.

Objective Speech Quality Evaluation with 3QUEST

The new prediction model "3QUEST" for objective evaluation of transmitted speech with background noise developed by HEAD acoustics is now available with ACQUA Option ACOPT 21 (Code 6844). It is based on the new ETSI standard EG 202 396-3. In addition to the wideband scenarios of the ETSI standard, however, narrowband scenarios can also be evaluated with 3QUEST. Essential parts of the wideband database from the ETSI project STF 294 which was carried out in preparation of the above-mentioned standard as well as the complete narrowband database (each consisting of samples from listening tests with subjective evaluation by test persons) were created by HEAD acoustics.

The main differences to other objective evaluation models such as TOSQA or PESQ lies in the consideration of the influence of different background noises and the calculation of three MOS values which allows a more meaningful statement regarding the causes of the quality impression.

An application note with detailed information on the new 3QUEST algorithm will be made available shortly in the HEAD acoustics download center at www.head-acoustics.de.

3QUEST

MFE IX: VoIP Impairment Simulator with Monitoring Port & WLAN Access Point

As a new addition to the range of VoIP related products, HEAD acoustics has just announced MFE IX, the new measurement frontend for simulation and monitoring of various VoIP network conditions.

A typical setup for measuring VoIP devices (phones, gateways, etc.) always includes a nearly perfect transmission between the device under test (DUT) and the reference gateway (MFE VIII). But in reality, this transmission between a device and the provider has a high (and often unknown) variance in bandwidth, delay, connections between different providers, etc. This leads to effects like variable delay of the packets, packet drops and other impairments, which may decrease the quality of the transmitted audio data.

The new measurement frontend MFE IX offers the statistical simulation of an IP channel using the well-known component Netem of the Linux operating system. The modelling is done with the statistical parameters:

- Base delay
- Jitter (variable delay), with first order correlation
- Duplication rate, with first order correlation
- Drop rate, with first order correlation
- Bit error rate, with first order correlation

The new device is placed between the DUT and the reference gateway to modify the IP traffic. To add it to an existing setup, the packet processing is carried out on two bridged Ethernet connectors (one for DUT, one for reference gateway/MFE VIII).

To allow the integration of wireless devices, MFE IX also includes a WLAN access point (IEEE 802.11b/g). The network impairments for the direction towards the DUT are also applied to the WLAN interface, thus allowing to simulate typical wireless scenarios.

The device interacts with ACQUA, so each setting with certain impairments can be stored in ACQUA. In addition, impairment settings can be changed automatically for each measurement.

To trace the traffic which is passing the two Ethernet connectors, the MFE IX is equipped with a monitoring port.

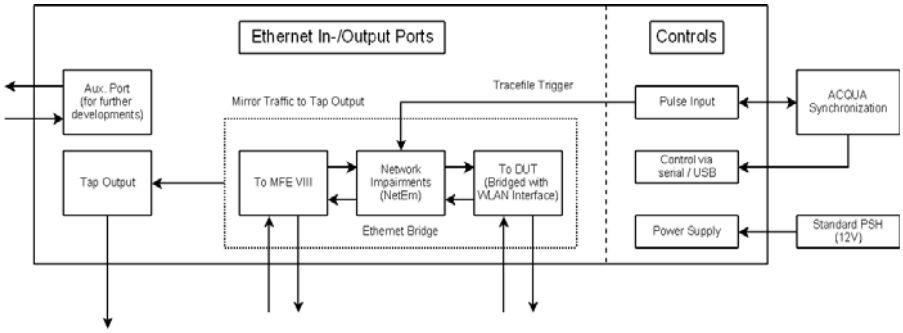
Another feature of the MFE IX is the ability to reproduce specific patterns of impairments during a measurement. For this purpose, an extension to the so-called Trace Control for Netem (TCN) was included in the software of the device. This add-on manipulates each incoming IP packet according to a pre-defined set of instructions, a so-called TCN-File. A single instruction for an IP packet of a TCN file may be:

- drop a packet
- set delay of packet
- set delay and/or duplicate packet
- set delay and/or corrupt packet

With these instructions, nearly all complex IP networks can be reproducibly modelled. Also systematic impairments according to the source file of the measurement can be realized with this solution (disturbance of single sections in a speech signal, e.g.).

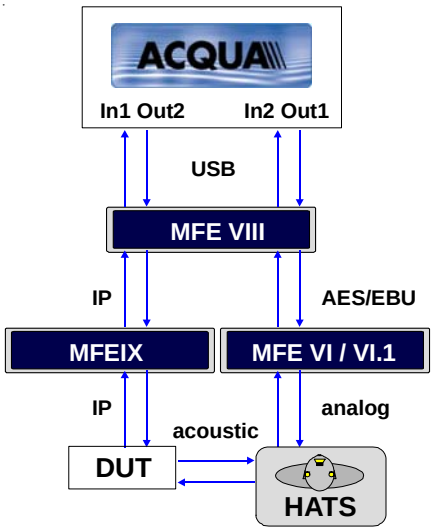
The beginning of a TCN file is triggered with the beginning of a measurement in ACQUA. The synchronization between ACQUA and MFE IX is done with a pulse connector.

VoIP data in IP networks is always transported via the RTP protocol, which itself is located in the payload of UDP data packets. To avoid manipulation on other traffic passing the Ethernet Bridge (which may falsify measurement results), a special traffic shaping filter can be applied, so that only active audio transmissions are marked for the use of Netem.



Equipped with the network impairment bridge, a monitoring port and a WLAN access point, this frontend offers a complete solution in combination with the communication analysis system ACQUA, the measurement frontend MFE VI.1, the reference gateway MFE VIII and the artificial head measurement system HMS II.3.

MFE IX is planned to be ready for delivery by the end of this year.



Configuration example MFE IX

Key Features:

- Statistical IP channel simulation
- Deterministic channel simulation:
- Guarantees reproducibility of network impairments for all measurements
- Put specific and systematic impairments to a special point of time during a measurement
- WLAN access point (for Wi-Fi phone testing, e.g.)
- Impairments also applicable for the wireless path
- Different impairments for each transmission direction (for DUT and gateway port)
- UDP/RTP packet filtering based on IP address and port, including auto-detection of RTP streams
- Monitoring the impaired or unimpaired traffic to an additional monitoring port
- Full control and full automation in ACQUA, storage of impairment settings

HEAD GPS Timebase HGT

This new device allows the generation of exact GPS time data and thus serves as a timebase for delay measurements.

Initially, HGT I is calibrated in standalone operation. For GPS reception the antenna of HGT I must be positioned outside with free view to the sky. Via the display and a short beep signal (can be switched off via menu) the device indicates a valid GPS reception and automatically starts the calibration process.

During calibration the GPS clock within the device is synchronized with the UTC time of the GPS system. If the device was already calibrated and its position was not changed significantly, only the clock of the GPS module is adjusted.

The conditions of reception and a fixed position are monitored during the calibration process and are indicated on the display. The longer the time of unimpaired GPS reception, the higher is the resulting accuracy of the clock during the holdover phase. The menu offers a choice of three different accuracies (low/normal/high).

The successful completion of the calibration process is indicated via the display and a beep signal. Upon successful calibration the remaining holdover time is shown on the display.

Subsequently, HGT I can be used inside buildings without requiring further GPS signal reception, because the internal clock now generates clock pulses (1 per second) with a maximum deviation of ±1ms within 8, 24 or 72 hours.

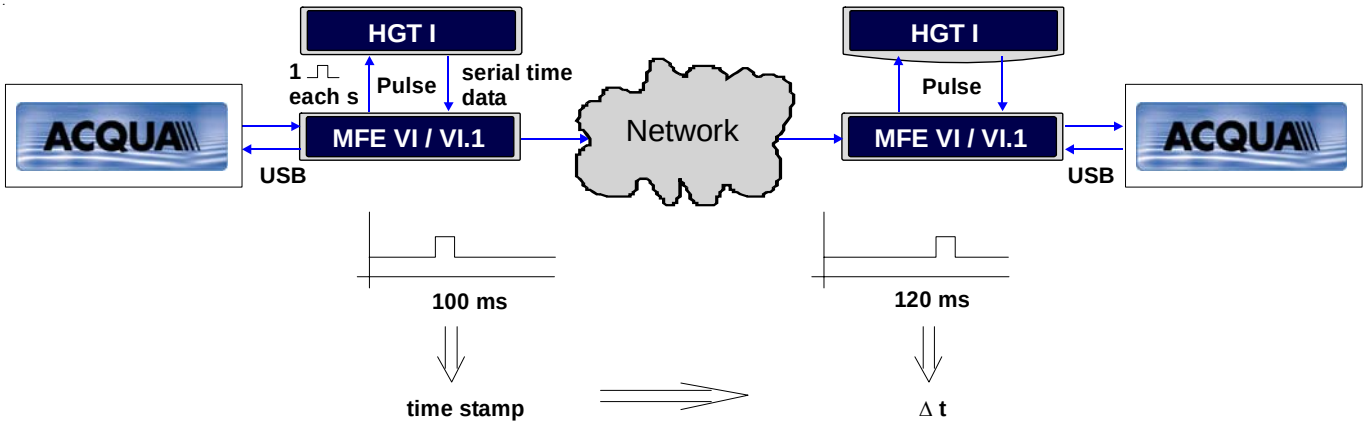
Front and rear view HGT I

The pulse outputs (I: Status, II: PPS) are connected to the pulse inputs of MFE VI/VI.1. Via USB the device is connected to the analysis system ACQUA. The GPS clock pulses are merged with the measurement signal and the GPS status information of HGT I can be read out.

For highly precise delay measurements between any two global locations, two systems each consisting of HGT I, MFE VI/VI.1 and ACQUA are required. After one-way transmission of the time stamped signal through the network, the time stamp resulting at the far end of the connection is compared with that of the near end and the difference Δt is transferred (cf. diagram below).

Key Features HGT I

- Max. deviation ± 1ms (during 8, 24, 72 hours)
- 3 accuracy modes
- Up to 72 hours holdover phase
- Display with status information
- Simple menu selection via rotary knob
- Firmware updates supported
- Compatible with HEAD acoustics front ends
- Battery or mains power supply



Typical setup for delay measurements

HEAD Audio Router HARO

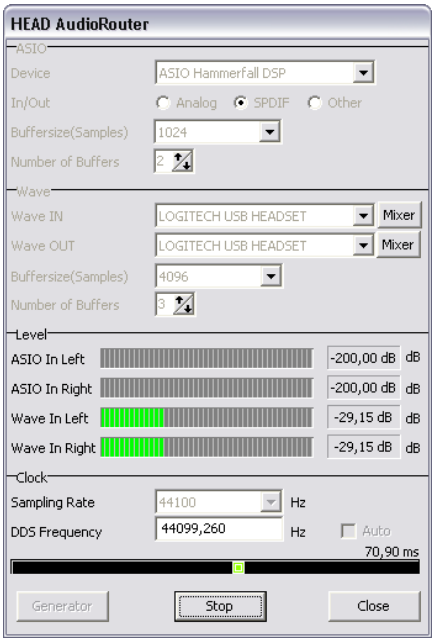
HARO works as a router between audio interfaces including sample rate adaptation to the device under test:

- USB devices (headphones)
- Bluetooth devices
- Clock adaptation range: ~20 – 100 kHz

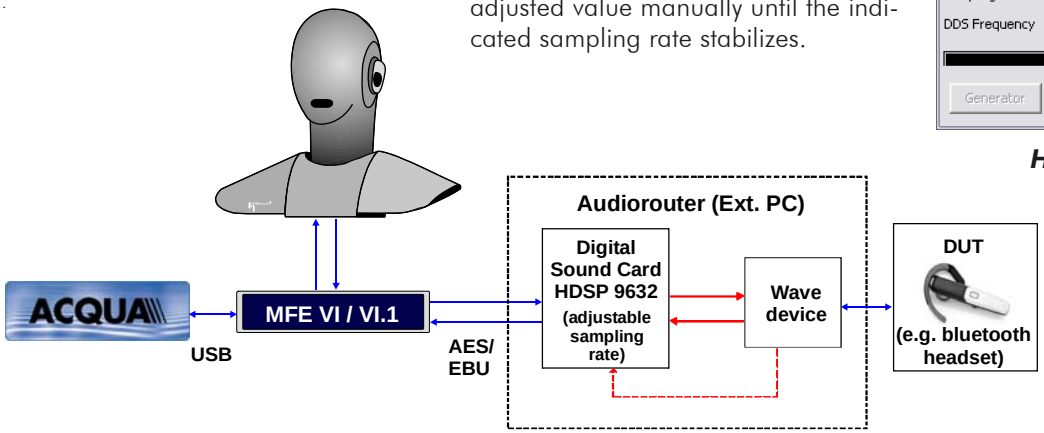
HARO is required for all measurement setups with USB, Bluetooth and other devices with non synchronized sampling rate.

The HARO software module runs on an external windows PC equipped with the digital sound card HDSP 9632. The sound card is connected via AES/EBU to MFE VI/VI.1 which in turn is connected to the analysis system ACQUA via USB (cf. block diagram below).

The DUT (device under test), e.g. a bluetooth headset, is selected in the HARO settings window as Wave IN/OUT device. The buffer size (samples) and the number of buffers can be set both for the sound card and the wave device. As soon as the clock adaptation is started, the sampling rate can be adjusted with a slider or by entering the adjusted value manually until the indicated sampling rate stabilizes.



HARO settings window



Configuration example HARO

HEAD POTS Adapter HPO

HPO is required for testing IP-based home gateways, DSL- and cable modems as well as other POTS devices.

Controlled by the analysis system ACQUA, it is transformer isolated and features a calibrated access to analog networks as well as on hook/off hook control.

The device can be connected to all analog extension lines or local loops. It transfers the signal coming from the extension line e.g. to MFE VI and sends signals received e.g. from an MFE VI via the a/b line to the remote station.

The device comes with an RJ11 socket (as used by telephones) and can thus be connected to a TAE socket with a standard adapter cable. In addition the a/b line is fed through via a telecom socket (4mm laboratory socket).

Internally, HPO can be terminated with 600 Ohm, 900 Ohm and Zr (cf. TBR 21, approx. 1014 Ohm + capacity). An external connection is possible via a telecom socket.

HPO front plate

The integrated holding circuit with a DC resistance of 300 Ohm enables the remote station to recognize whether a call is arriving or established. An external resistance can be connected via the telecom socket. To avoid short-circuiting, this resistance is always connected in series to a 100 Ohm resistance.

A ring detection signals an incoming call in the display. ACQUA can set the device to a trigger mode, so that HPO automatically accepts an incoming call.

HPO can be controlled via ACQUA (set resistance, on hook, off hook etc.) or via the LCD menu (button-controlled). To establish a call, the call number is generated by ACQUA and sent by DTMF after off hook.

The device is equipped with USB port, power is supplied via an external power unit (e.g. PSH I.1).

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