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UPA192

Universal Power Amplifier

audiophile

true digital audio

General Features

► Unusual good resolution and richness of musical details

The UPA192 comprises of the latest technology to reveal the smallest details of the received audio signal in digital or analog domain. This is possible because these details are neither hidden in, nor overcast with additional noise. Such quality can only be achieved by using high grade components in an innovative new electronic circuit design. No capacitors are used in the signal path, due to the fact that all AD-converters are DC-coupled, nor other negative circuit designs like this. This enables a very high quality performance.

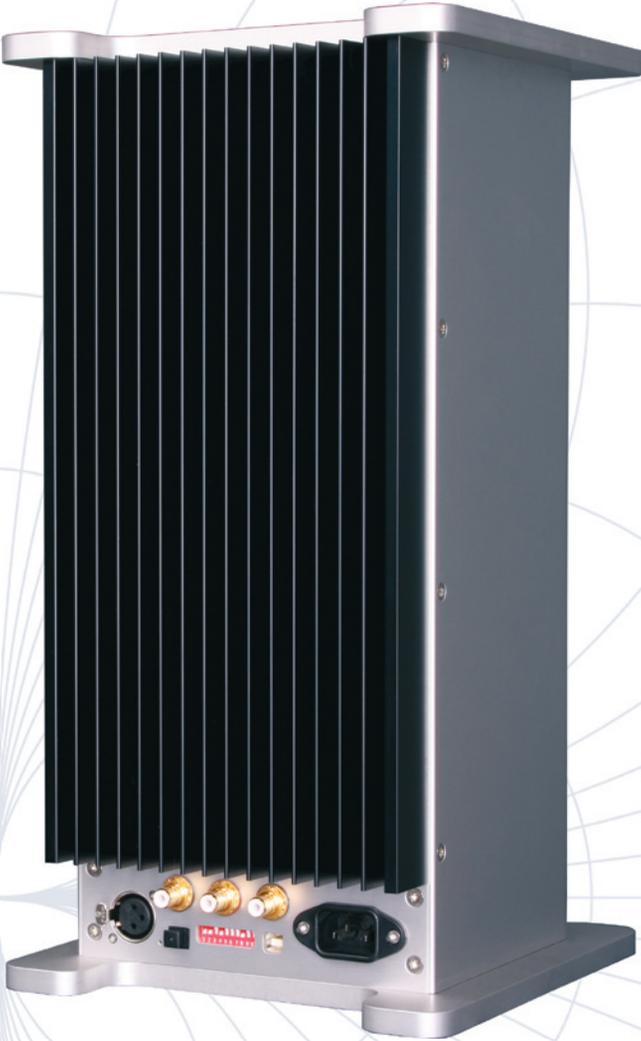
► Tri-Amping application

The design of the UPA192 indicates to feed loudspeakers offering three separate terminals for low-, mid- and high-range. In case only two ways should be fed, the switched mode amplifier can be turned off independent from the other both analog amplifiers. If the high power of the switched amplifier should be used but only two ways to feed, the high-range amplifier can be left open. But this way of usage should only be selected if the high power is really needed, since the switched amplifier serves with an open loop design which might not be applicable for frequencies above 500Hz.

Front panel view



Rear panel view



XLR input
analog & digital

blue LED indicator

Cinch input
analog & digital
(black lable)

Toslink input

DIP switch

Mains power connector.

Cinch analog input
(red lable)

USB connector

Cinch analog input
& digital output
(red lable)

► **Tri-Amping with active crossover**

The three different ways of power amplifiers contained in the UPA192 are driven by non-compromised phase-linear filters. This can only be done in digital domain by a signal processor. The DSP used is from Analog Devices, the ADSP-21369. It offers three band passes for the low-, mid- and high-range totally independent from each other. The resolution of the filter process works at a step size of 23Hz and can be used as low-pass, band-pass and high-pass. The filter slope can be selected from 1/1 octave to 1/12 octave.

► **Two double D/A converters**

Of course, a digitally based amplifier containing two analog power amplifiers needs to convert the digital audio signals from the digital to the analog domain to feed those both amplifiers. This is performed by two dedicated stereo monolithic D-to-A-converters (CS4392). Both work with fully balanced outputs.

► **Two different analog power amplifiers**

The UPA192 has two different analog power amplifiers, one for the mid frequency range and one for the upper. The mid range amplifier is serving up to 80W @ 4Ω out of a fully balanced design, it consists of two half bridges. Since the high range never needs that much power therefore one half bridge against ground is serving 20W @ 4Ω for tweeters. The large upright passive cooler on the rear of the UPA192 is decent in its shape and serves the both analog amplifiers with adequate heat sink.

► **One DSP each analog amplifier**

Both analog stages are controlled by DSP taking fully control of the power feeding MOS-FET making possible to serve A-class audio performance at an AB-class power consumption. This technical approach is common to all the behold power amplifiers, the BPA768 and the Gentle G192 and is unique in the High End Audio World. The result is the most clean sound as you expect from a conventional high power consuming A-class amplifier.

► **Digital Δ/Σ -Modulator at the switched mode amplifier**

The third amplifier contained is operating in switched mode offering 160W @ 4Ω. It is dedicated to drive the low frequency range of a speaker. The plus 3dB is very useful since, to get an excellent bass performance, additional power is needed. The final switching stages are driven by a digital Δ/Σ -modulator converting the PCM-format coming from the DSP to PWM-format (Pulse-Width-Modulated) operating at 192kHz sampling rate the full 24Bit audio bit word. So there is absolutely no D/A-converter present compared to other "class-D" designs since they are still analog. Besides other advantages the technology used in the UPA192 allows the operation with an open loop output circuit, totally insensitive against the feed back power of a low frequency speaker driver, which is very important, much more than a high value damping factor for this stage. Same as the analog power amplifiers for the mid-range the switched mode amplifier has a balanced output, for the identical reasons.

► **Analog and switched amplifiers have their own separate switch mode power supply**

This ensures not only a power conditioning just in front of the power feeding system of the amplifier but offers best way possible isolation of all the analog power amplifier channels against the switched mode amplifier. This is to be compared like using separate mono blocks. Besides that a third switch mode power supply feeds the lows level analog section as well as the microcontroller and DSP.

► **High precision, robust and fully isolated binding posts**

Fulfilling CE-norm fully isolated binding posts have to be used. We voted for the very high quality binding posts from Furutech for several reasons: they are fully isolated by offering no strict angle of setting the speaker cables, simply they are accessible from all sides. They offer also a very excellent let-off force allowing the speaker cables set for a very long time period without tightening the binding posts as needed with other systems. There is a very big through hole of 5.3mm diameter to fix thick wires directly too and last not least one can use banana plugs. Screwing them gives a very nice feeling of handling a high precision device.

► **Multi functional input sockets**

Due to the fact that the UPA192 accepts almost all common audio signals, regardless if they are analog or

digital domain, many different input sockets would be necessary. To reduce the total number to an absolute minimum, the present sockets have to be multi functional. The only single function is the optical input which is a Toslink. The XLR socket takes a fully balanced high level analog audio signal as well as the digital AES/EBU. The three Cinch take three different analog inputs to feed all three amplifiers separately with high level analog audio as well as a single mono analog as well as digital domain. The functionality, input or output, and the impedances are set automatically to the values according to the applicable needs.

➤ **Wiring in analog domain**

Since the UPA192 functions as a mono block it has to be fed accordingly. This means that one left or right channels analog signal must be applied to each UPA192 block. Besides that mains power supply is necessary, but nothing else. The volume scaling of the music must be done in the used pre-amplifier as usual. The UPA192 runs always on full scale (0dB gain). There is no volume control available on the device.

➤ **Wiring in digital domain**

Since the UPA192 functions as a mono block and the digital audio signal comes always with two channels a selection has to take place. The separation of the channels is done in the DSP. With the help of the DIP-switch on the rear of the UPA192 you can select for left or right channel. The pre-amplifier serves in most cases only one digital output. To feed the second UPA192 involved all the UPA192 have a repeating capability. In digital domain mode one of the Cinch sockets works as an output to forward the digital domain audio signal. The data rate at that point is always the same: 2x 24Bit @ 96kHz regardless of the digital domain input signal. No A-to-D conversion takes place this way, no analog fed input signal will be forwarded digitally.

➤ **Cascading UPA192**

Besides linking a second UPA192 to a first one to provide two channels for stereo, you can connect an endless number of UPA192 in a daisy chain. For example, if you need more than three channels per side two UPA192 can be placed left and selected for left channel to offer minimum 6 power amplifier paths with 6 totally independent frequency bands. This way a stereo set with active crossover up to 12 horns in total at a power rate of more than 1000W can be run with only four UPA192 devices. There is nothing more convenient.

➤ **50Ω and/or 75Ω wiring in digital domain**

Unbalanced digital audio signal come in most cases on 75Ω transmission cables. So the UPA192 is designed to accept this. But not to be limited to this world the UPA192 is also capable to run 50Ω or both. Both means that you can enter with 75Ω and cascade with 50Ω or vice versa.

➤ **USB connection**

The USB connection allows to transfer the room correction filter data from a WinXP or WinVista based PC to one of the UPA192 at a time to be processed in the DSP in stereo applications. Besides that the control centre "myUPA" communicates with the UPA192 via the USB connectivity.

➤ **"myUPA" control center**

This PC based tool allows to set all the filter banks parameters as there are frequencies, filter slopes and level offsets plus graphical display of the filter banks parameters. In addition the actual status of the unit can be checked there as well as the installed options. If an option should be added, the software key entry takes place here too.

➤ **Firmware update**

In case a later firmware for the UPA192 is available an update can be performed out of the "myUPA" control centre by having the UPA192 connected through USB and pushing the "Update Audio Proc." Button on the menu screen.

➤ **Auto-Power-Off function**

The UPA192 has the capability to turn off its power amplifiers automatically. This takes place when set active and the entering audio level is lower than the given threshold value. This value can be entered in steps of

“dB”. Besides the level a time needs to be selected too. This time determinates in which period an audio signal is able to set back the switch off process. When this period is over and no signal higher then the threshold occurred the UPA192 will switch its power amplifiers off. This lasts until audio occurs again, wake up begins and the full process starts from its beginning. This functionality applies for both input domains, analog and digital.

➤ **Type of loudspeaker**

The behold UPA192 has the capability to feed loudspeaker bi- or tri-amping. This can be done with “neutral” parameter setting or with a selectable out of eight sets, dedicated to have a better control of a specific speaker. Those sets of parameters enhances the performance by giving “aid” to the passive crossover or doing time alignment which a passive crossover never can do. Amplitude and phase correction can be applied too. The values of those sets are terminated by the manufacturer of the loudspeaker and can not be accessed by the customer. The customer can select according the attached speaker.

➤ **Bi-Amping mode**

If the UPA192 is dedicated to be in use with only the two analog power amplifiers on, the switched amplifier can be turned off completely. This reduces the power consumption by approx. 6W.

➤ **Multi-Channel-Analog mode**

The UPA192 is capable to drive every of its three amplifiers separately, totally independent, entering three different audio signals through its three Cinch connectors. This feature is dedicated for those who like to play around with their own analog crossover units or to use the UPA192 for multi channel applications.

➤ **Active room correction option**

The UPA192 can process an active room correction for stereo as the behold APU768 with its ADP192 can do or the behold Gentle G192. Room correction manipulation can take place ever 23Hz from DC to 24kHz. The generation of the applicable data can be done with the Ascendo Room-Tools. The data transfer takes place through the PC to UPA192 USB connection. The UPA192 must be fed one after the other. The corresponding channel, left or right, is selected automatically by the UPA192. This software option can be added at the customers site by entering once a dedicated software licence key.

➤ **“Advanced” option**

The “Advanced” processing is the most powerful software tool coming with the UPA192. It enables the access to any frequency point (23Hz steps) in:

- **Magnitude**
- **Delay**
- **Import**

- **Phase**
- **Export**
- **Edit**

The “Advanced” option allows to edit every single frequency point not only automatically by room correction but manually for every of the three filter bank channels too and is applicable for high sophisticated skilled persons only. The manipulation can take place on amplitude (+/-12.0dB) and phase (+/-2000°, no modulo). Those data can be ex- or imported via a TXT-file. Per filter bank channel a delay (0.00msec to 999.99msec) can be applied also.

➤ **Mains power supply from 100V to 240V step-less, 50Hz to 400Hz**

Never worry about the mains supply of the UPA192. It is accepting all voltages between 100V to 240V step-less, plus/minus common tolerances too. Frequencies from 50Hz to 400Hz can be applied due to the power conditioning design of all three switch mode power supplies. So the UPA192 is also suitable for boats and airplanes too. No power conditioner should be in line with the device.

➤ **Rugged aluminum housing**

The housing of the UPA192 is made from 2.5mm anodized aluminium and has a massive 10mm top and bottom cover, clearly underlining the high value of this product. Of cause all outside and inside is RoHS-conform.

Front Panel Connectors

► UPA192 output connections

The UPA192 binding posts should be connected to the speaker terminals through suitable speaker cables. None of the outputs is allowed to be connected to ground since the outputs work in balanced mode. “Ground” doesn’t only mean the aluminum chassis of the UPA192 but the ground supplied by the mains connection too. So, there is an internal galvanic connection between both according to VDE rules. This means that under no circumstances any single ended active speaker is allowed to connect grounded terminal of it’s input to any of the UPA192 binding posts.

Top pair: output of the analog amplifier 2 (20W) to feed the tweeter
Center pair: output of the analog amplifier 1 (80W) to feed the mid range chassis
Bottom pair: output of the switched amplifier (160W) to feed the low range chassis

Bottom and center binding posts are driven fully balanced and must not be connected to anything else but the speaker. Same applies to the positive binding post of the tweeter. The negative can be connected to ground since the tweeter output is driven by a half-bridge at the positive binding post and the negative has only a sensing line.

► UPA192 binding posts are versatile

The output connector Furutech binding posts at the “Analog Amplifier Left/Right” can be used in conjunction with 4mm banana plugs, fork terminals with a minimum width of 7.7mm/0.30” and direct wire up to 5.3mm/0.20”. Usually binding posts have for fork terminals a certain mounting angle but this is not the case here. Banana plugs can be used side by side with fork terminals or direct wire on one terminal.

► No need of readjustment of the binding posts

With other binding posts then on the UPA192 from time to time it’s necessary to readjust the setting while using fork terminals or direct wire connection. There is no need to do that here since the Furutech binding post have a certain mechanism to avoid this.

► No need of turning off during mounting the cables

It’s not necessary to turn off the UPA192 during cable assembly when volume is low (<-20dB) or mute. A processor controlled short circuit protection is present to avoid any damage during mounting. For sure this is not true for a fully modulated amplifier. The “Analog Amplifier 1 & 2” terminals (mid- and high-range) can be let open/floating any time without harming the amplifier. There is no minimum load. The “Switched Amplifier” terminals (low-range) should be terminated by a speaker or resistor (4 to 8) while in use and volume is higher then -6dB. Else the amplifier will overload itself and turn off to prevent damage. It will restart automatically after 500msec and retry. If the faulty condition still is present the procedure starts again.

Rear Panel Connectors



Multi functional sockets

XLR-Socket:

Digital mode: AES/EBU balanced digital input with transformer (DC short circuit)
 Analog mode: analog input fully balanced (2x 56kΩ)

Cinch-Socket (left black):

Digital mode: S/PDIF digital input with 50Ω or 75Ω termination
 Analog mode: analog unbalanced input (56kΩ)

Cinch-Socket (red):

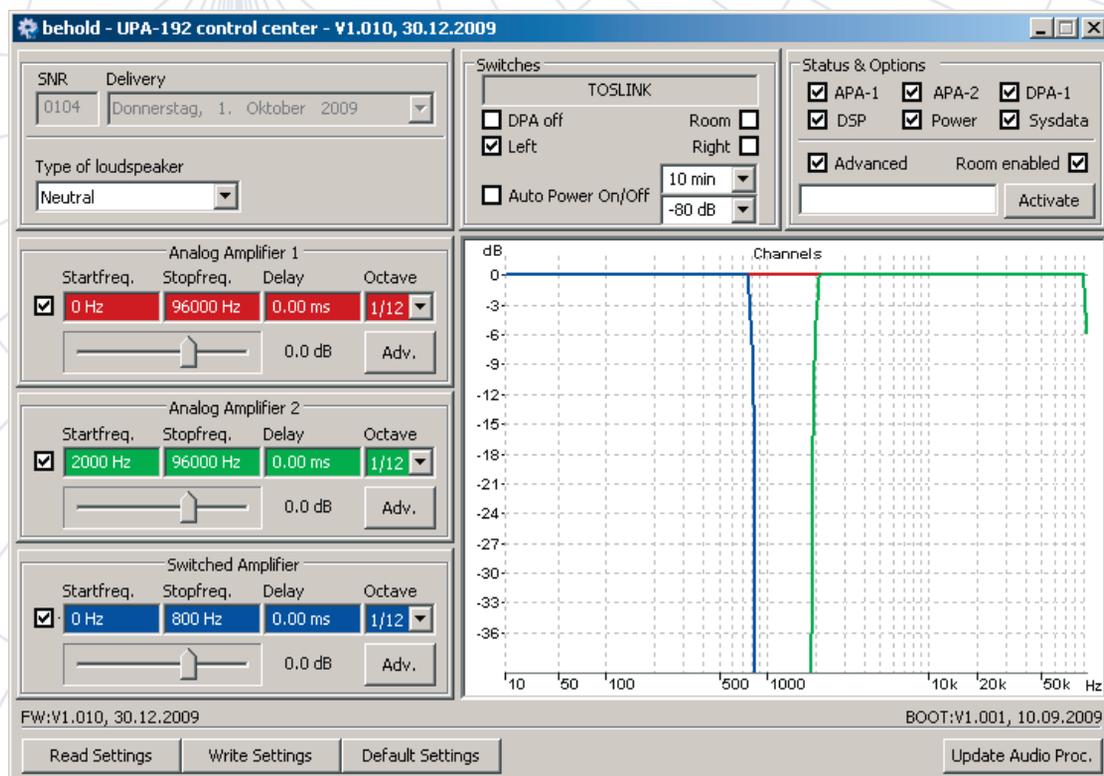
Digital mode: S/PDIF unbalanced digital output with 50Ω or 75Ω source
 Analog mode: analog unbalanced input (56kΩ)

The myUPA Control Center

On the right side in the top field the Status & Options are given. In the first row the flags of the amplifiers i.e. APA-1 (mid-range), APA-2 (high range) and DPA-1 (low range) show that they are correctly recognized. The second row indicate a complete loaded DSP and Sysdata. The Power flag indicates that the power amplifiers are switched on. If the unit is set to Auto-Power-Off this flag might be untagged while no music is present.

The flags below the line in the Status & Options field indicate the installed software options. The text field is used to enter a soft key to activate one or both of those options. The button "Activate" must be pushed after insertion of the soft key to get the registration process on it way. This process can't be undone.

In the field Switches the title of the actual selected input is given in the text box. Below that the following flags are given: DPA off tagged in case the switched mode amplifier is turned to off state. If room correction is tagged on the correction data are active. Left/Right indicate the audio channel active on this speaker. If the Auto-Power-Off is tagged the values given on the right side apply. The time can be entered in "sec", "min" or "hour" after a value (no blank) or simply selected from the given examples in the pull down box. This time is the time between the last music detected to the point of shut down. The level of threshold is to be entered in a value of negative dB. Both apply on all inputs and are getting into action while the Write Settings button is pushed, not before. If the level of music is higher then the threshold level the UPA192 will switch on its power amplifiers take a few seconds.



➤ Filter section settings

The following box contains the complete filter section for all setting necessary. The nomenclature is more or less self-explaining. The “Active” caskets show if the filter is active with its start and stop frequency or if tagged off music passes through without influence of those. The slider besides the value of “0.0dB” enables to set a permanent offset in volume each channel separately independent if the filter is tagged on or not. The “Delay” is coupled with the functions accessible together with the “Advanced” button. If they are colored gray there is no influence because this option is not valid. For more details on that please refer to the “Advanced” option. The filter setting will act in real time, permanent storage must be done by using the “Write Settings” button.

➤ Filter slope setting

The dialog box showing “1/3 Octave” allows to select the filter slope. It ranges from 1 Octave maximum to 1/12 Octave minimum.

➤ Gain Slider

For each amplifier channel there is a slider present to adjust the gain individually in steps of 0.1dB. It ranges from -20.0dB to +10.0dB. As long as the actual volume plus the gain doesn't exceed 0.0dB for the analog amplifiers (no positive room correction and “Advanced“ values present) no clipping will take place. For the switched amplifier this value is +3.0dB. Above those values a multiplication will be performed with the risk of clipping. The gain set will act in real time, permanent storage must be done by using the “Write Settings” button.

➤ Graphical display of the filters

The actual behavior of the filtering is shown in the graphical display. The red trace shows the values for the analog amplifier one (APA-1), the green for the analog amplifier two (APA-2) and the blue for the switched amplifier (DPA-1). If nothing is set the blue covers all of them. If filter flags are tagged on and different frequencies are set the behaviour of the filters can easily be seen as shown in the picture above. An automatic range system is able to display positive gains in case there are some.

➤ Actual software

The software version currently running in the UPA192 is displayed below filtersetting section. On the very left the current application version is available, on the very right the Boot-Strap-Loader.

➤ Four buttons in the bottom

Three of them are very easy to explain:

- Read Settings: it reads back all the parameters stored into the UPA192 EEPROM. This read will destroy some of the actual setting displayed and restores the status of power on condition. So, if its needed to clean up to the last state of writing this EEPROM this is the right button to push.

- Default Settings: this button does the same as the “Read Settings” button, but it uses factory values instead of those written to the EEPROM. At this point some data stored in the EEPROM are still present. One should be aware the using the “Default Settings” button will set back the “Type of loudspeaker” too. This is “Stereo” with “Type of loudspeaker” to “Neutral”. So in case of a setup different of that it will be necessary to switch this to the proper setting again.

- Write Settings: pushing this button will immediately write the current displayed parameters to the UPA192 EEPROM without a further prompt. So the parameters formerly stored there will be replaced. Action to all these buttons will cause the power amplifiers to switch on in case they are powered down while in Auto-Power-Off state active and no music present.

➤ Button: “Update Audio Proc.“

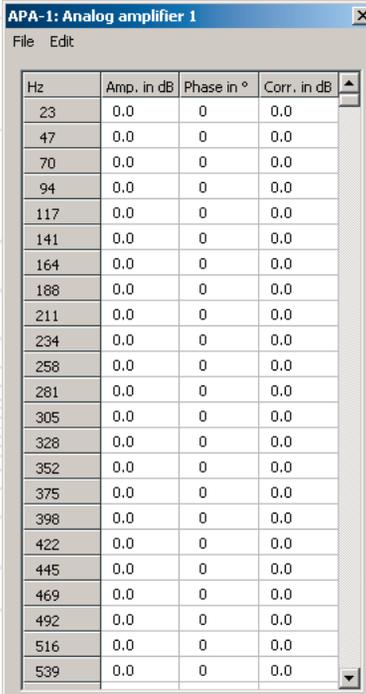
This buttons is present to perform firmware updates on the UPA192. The update process will take less then a minute and after its finish it will show the new version number on the left side above the “Read Settings” button. If the UPA192 was in Auto-Power-Off mode in on state and no music is present it will turn on for the time set on this feature.

The Advanced option

The Advanced Processing is the most powerful software tool coming with the UPA192. It enables the direct and individual access to any of the 1024 frequency points up to 24kHz in 23Hz steps. The manipulation of the audio data can be done to the magnitude and phase. The magnitude offers two columns of data, one for speaker related corrections and one for room correction data. The phase has one column and is dedicated to compensate speaker related contexts. The delay acts completely on the dedicated channel as a true delay, not continuous phase turning. The export and import functions allow to exchange and archive data.

► Delay

In order to get any channel delayed against others the value of time is to be inserted in the dialog box of the corresponding channel. Values can range from 0msec (default) to one second in steps of 10µsec. In regular the mid-range and high-range speakers are to be delayed against the low-range because the low-range speakers are always late due to their massive membrane.



Hz	Amp. in dB	Phase in °	Corr. in dB
23	0.0	0	0.0
47	0.0	0	0.0
70	0.0	0	0.0
94	0.0	0	0.0
117	0.0	0	0.0
141	0.0	0	0.0
164	0.0	0	0.0
188	0.0	0	0.0
211	0.0	0	0.0
234	0.0	0	0.0
258	0.0	0	0.0
281	0.0	0	0.0
305	0.0	0	0.0
328	0.0	0	0.0
352	0.0	0	0.0
375	0.0	0	0.0
398	0.0	0	0.0
422	0.0	0	0.0
445	0.0	0	0.0
469	0.0	0	0.0
492	0.0	0	0.0
516	0.0	0	0.0
539	0.0	0	0.0

► Advanced button / dialog

Pushing the Advanced button a dialog box appears showing a total of four columns. The first contains the frequency in Hz for the related row and can not be manipulated. The second allows to insert values to minimum/maximum of +/-12dB to gain/attenuate the amplitude of the audio signal. The third offers access to the phase by a minimum/maximum of +/-2000°, no modulo function of +/-180° applies here. And the fourth column acts the same way as the second, but allows values of -90dB to +25dB. This column is dedicated to carry the data for the room correction and will be influenced directly by a download from the RoomTools when it is sending those data.

► Store to UPA192

To get the data, valid in the Advanced dialog box, down to the UPA192 they have to be stored by activation this field. Doing this the data valid in the UPA192 will be completely overwritten.

► Reload from UPA192

It has the same functionality as the “Store to UPA192” but in the opposite direction.

► Import from file

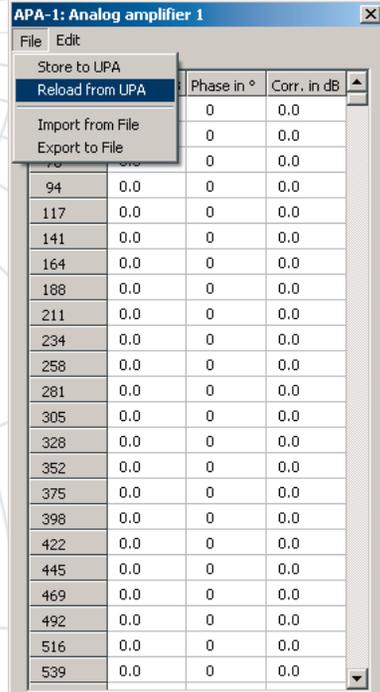
To get data from an external table into the UPA192 the import function is the one to use. It reads a TXT-file with a certain format to be generated or manipulated by an Excel-sheet or similar.

► Export to file

The export is offering the opposite direction to the “Import from file” functionality. Also the format of the TXT-file can be generated here simply by exporting an “empty” file. It will contain “0” in all columns if the content of the Advanced dialog box is neutral.

► Edit

The “Edit” menu allows to clear every single column separately.



Hz	Amp. in dB	Phase in °	Corr. in dB
94	0.0	0	0.0
117	0.0	0	0.0
141	0.0	0	0.0
164	0.0	0	0.0
188	0.0	0	0.0
211	0.0	0	0.0
234	0.0	0	0.0
258	0.0	0	0.0
281	0.0	0	0.0
305	0.0	0	0.0
328	0.0	0	0.0
352	0.0	0	0.0
375	0.0	0	0.0
398	0.0	0	0.0
422	0.0	0	0.0
445	0.0	0	0.0
469	0.0	0	0.0
492	0.0	0	0.0
516	0.0	0	0.0
539	0.0	0	0.0

Technical Data

The UPA192 is a digital three channel amplifier equipped with two analog power stages and oneswitched amplifier. The technical data given here are valid at room temperature (+20°C/68°F), maximum gain (0dB) and power supply of nominal 230V (200V to 264V, 50Hz +/-3%), other wise noted. dB-values given in brackets (-5dB) are valid for the actual measured and are scaled on the source, not on the UPA192. Software version V1.010 dated 30.12.2009

Features of the Analog Mid-Range Power Amplifier Output (APA-1):

Output voltage maximum (0dB):	50V _{ss} = 25.0dBV @ 1kHz 3.9Ω resistive
Output voltage maximum (-2dB):	40V _{ss} = 23.0dBV @ 1kHz 1.95Ω resistive
Output power sinus maximum (0dB):	80W CW each channel @ 1kHz 3.9Ω resistive
Output power sinus maximum (-2dB):	100W CW each channel @ 1kHz 1.95Ω resistive
Output power (0dB) pulse Gaussian distribution 60Hz Sinus:	103W each channel @ 1.95Ω resistive 30% duty cycle
Maximum output current (short circuit limitation):	+/-12A DC up to 700Hz
Rest after exceeded maximum output current:	1sec.
Output impedance DC - 100Hz, 400Hz, 1kHz, 2kHz:	0.50mΩ, 0.62mΩ, 1.0mΩ, 1.3mΩ
Output impedance 5kHz, 10kHz, 20kHz:	2.5mΩ, 4.4mΩ, 8.0mΩ
Damping factor DC - 100Hz, 400Hz, 1kHz, 2kHz:	84dB, 82dB, 80dB, 76dB (8Ω load)
Damping factor 5kHz, 10kHz, 20kHz:	70dB, 65dB, 60dB (8Ω load)
THD+N vs frequency DC-3kHz A-weighted (-1dB):	< -90dB
Suppression of mains hum @ (-10dB) +15dBV = 8W	<-130dBc @ 50Hz; <-130dBc @ 100Hz; <-130dBc @ 150Hz;
Suppression of mains hum @ (0dB) +25dBV = 80W	<-135dBc @ 50Hz; <-135dBc @ 100Hz; <-135dBc @ 150Hz;
DC-offset voltage at the output:	+/- 100 mV max.
Coupling (balanced):	DC (no lower corner frequency, no coupling capacitors)
Frequency slope DC - 22kHz incl. D/A-converter:	+0dB / -0.40dB

Features of the Analog High-Range Power Amplifier Output (APA-2):

Output voltage maximum (0dB):	25V _{ss} = 19.0dBV @ 1kHz 3.9Ω resistive
Output voltage maximum (-2dB):	20V _{ss} = 17.0dBV @ 1kHz 1.95Ω resistive
Output power sinus maximum (0dB):	20W CW each channel @ 1kHz 3.9Ω resistive
Output power sinus maximum (-2dB):	25W CW each channel @ 1kHz 1.95Ω resistive
Output power (0dB) pulse Gaussian distribution 60Hz Sinus:	26W each channel @ 1.95Ω resistive 30% duty cycle
Maximum output current (short circuit limitation):	+/-12A DC up to 700Hz
Rest after exceeded maximum output current:	1sec.
Output impedance DC - 100Hz, 400Hz, 1kHz, 2kHz:	0.25mΩ, 0.31mΩ, 0.5mΩ, 0.7mΩ
Output impedance 5kHz, 10kHz, 20kHz:	1.3mΩ, 2.2mΩ, 4.0mΩ
Damping factor DC - 100Hz, 400Hz, 1kHz, 2kHz:	90dB, 88dB, 86dB, 82dB (8Ω load)
Damping factor 5kHz, 10kHz, 20kHz:	76dB, 71dB, 66dB (8Ω load)
THD+N vs frequency DC-3kHz A-weighted (-1dB):	< -90dB
Suppression of mains hum @ (-10dB) +9dBV = 2W	<-130dBc @ 50Hz; <-130dBc @ 100Hz; <-130dBc @ 150Hz;
Suppression of mains hum @ (0dB) +19dBV = 20W	<-135dBc @ 50Hz; <-135dBc @ 100Hz; <-135dBc @ 150Hz;
DC-offset voltage at the output:	+/- 50 mV max.
Coupling (unbalanced):	DC (no lower corner frequency, no coupling capacitors)
Frequency slope DC - 22kHz incl. D/A-converter:	+0dB / -0.40dB

Digital features of the both Analogue Power Amplifiers (APA-1 & -2):

Sampling frequency of the D/A-converter:	192kHz
Quantization:	24Bit
Operating frequency of the D/A-converter:	24.576MHz (512x 48kHz)
Number of D/A-Converters each channel:	2, (CS4392)

Analog features of the Low-Range Switched Power Amplifiers (DPA-1):

Output voltage maximum (0dB):	70V _{ss} = 28.0dBV @ 500Hz 3.9Ω resistive
Output voltage maximum (-2dB):	46V _{ss} = 24.2dBV @ 500Hz 1.95Ω resistive
Output power sinus maximum (0dB):	160W CW each channel @ 500Hz 3.9Ω resistive
Output power sinus maximum (-2dB):	135W CW each channel @ 500Hz 1.95Ω resistive
Output power (0dB) pulse Gaussian distribution 60Hz Sinus:	210W each channel @ 1.95Ω resistive 30% duty cycle
Maximum output current (short circuit limitation):	+/-15A DC
Rest after exceeded maximum output current:	0.5sec
Output impedance DC - 400Hz, 700Hz, 1kHz, 2kHz:	250mΩ, 320mΩ, 500mΩ, 800mΩ (open loop)
Damping factor DC - 400Hz, 700Hz, 1kHz, 2kHz:	30dB, 28dB, 25dB, 20dB (8Ω load)
THD+N vs frequency DC - 400Hz A-weighted (-1dB):	< -62dB
THD+N vs frequency 400Hz - 7.0kHz A-weighted (-1dB):	< -51dB
Suppression of mains hum @ (0dB) +28dBV = 160W	<-115dBc @ 50Hz; <-115dBc @ 100Hz; <-115dBc @ 150Hz;
DC-offset voltage at the output:	+/- 50 mV max.
Coupling (balanced):	DC (no lower corner frequency, no coupling capacitors)

Freq. slope DC-8.7kHz with Σ/Δ -converter at 6 Ω res. load:	+0.70 dB @ 5.2kHz / -3dB @ 8.7kHz
Peaking at 3.9 Ω resistive load, -3dB-point:	No peaking, 6.8kHz
Peaking at 5.9 Ω resistive load, -3dB-point:	+0.70dB at 5.2kHz, 8.7kHz
Peaking at 7.8 Ω resistive load, -3dB-point:	+2.0dB at 6.2kHz, 9.5kHz
Filter slope of the output filter at 5.9 Ω resistive load:	18dB/oct.

Digital features of the Switched Power Amplifiers (DPA-1):

Sampling frequency of the Σ/Δ -converter:	192kHz
Quantization:	24Bit
Operating frequency of the Σ/Δ -Wandlers:	24.576MHz (512x 48kHz)
Switching frequency of the output stages:	384kHz

Features of the signal processor section (DSP):

Method of audio manipulation:	Fast Convolution (FFT – Multiplication – IFFT)
Frequency resolution:	23.4375Hz
Length of FFT blocks:	43msec
Total delay caused by the Fast Convolution:	43msec
Available filter slope functions:	1 Oct., 1/2 Oct., 1/3 Oct., to 1/12 Oct.
Available filter characteristics:	low pass, band pass, high pass
Number of available filter channels:	3
Range of gain slider:	-20.0dB to +10.0dB
Step size of gain slider:	0.1dB
Graphical display frequency range:	10Hz to 96kHz
Graphical display gain range:	-36dB to +10dB (positive values automatic adjusted)

Digital inputs:

Number of digital audio inputs:	3, Toslink, XLR (balanced) and Cinch (unbalanced)
Sampling frequency of all digital inputs:	32kHz to 192kHz stepless
Quantization of all digital inputs:	2x 16Bit to 2x 24Bit, Stereo
Impedance of the Cinch (unbalanced) digital input:	50 Ω or 75 Ω (DIP-switch setting), AC-coupled
Maximal input level on the Cinch (unbalanced) digital input:	2.0Vpp
Impedance of the XLR (balanced) digital input:	110 Ω (transformer input)
Maximal input level on the XLR (balanced) digital input:	4.0Vpp
Deviation of the XLR-ground against UPA-chassis:	+/-6V maximal DC-coupled

Digital output:

Number of digital audio outputs:	1, Cinch (unbalanced)
Sampling frequency of the Cinch output:	96kHz
Quantization of the Cinch output:	2x 24Bit, Stereo
Impedance of the Cinch (unbalanced) digital output:	50 Ω or 75 Ω (DIP-switch setting), DC-coupled (+1.5V)

Analog inputs:

Number of analog audio inputs:	4, XLR (balanced) and 3x Cinch (unbalanced)
Sampling frequency for all analog inputs:	192kHz
Quantization of all analog inputs:	24Bit, Mono
Frequency slope DC-22kHz:	+0 / -0.40dB
THD+N vs frequency DC-22kHz unweighted (-1dB):	< -90dB
Signal to noise ratio unweighted:	> 96dB
Coupling on all analog inputs:	DC (no lower corner frequency, no coupling capacitors)
Input voltage max. (0dB) on the XLR (bal.) analog input:	4.6Vrms = +13.2dBV
Impedance of the XLR (balanced) analog input:	2x 56k Ω // <10pF against UPA-chassis
Acceptable DC offset XLR (balanced) against UPA ground:	+/-6V (+/-200mA max.)
Acceptable DC input offset voltage XLR (balanced):	TBD
Input voltage max. (0dB) on all Cinch (unbal.) analog inputs:	2.3Vrms = +7.2dBV
Impedance of all Cinch (unbalanced) analog inputs:	56k Ω // <10pF against UPA-chassis
Acceptable DC input offset voltage Cinch (unbal.):	+/- 100 mV max.

Other connections:

Loudspeaker connections:	6x High precision Furutech FP-800B(G) gold plated
USB connection:	1x device
Standard of USB connection:	USB 1.1
Power supply connector:	3-pole standard IEK mains socket

Parameters of power supply:

Mains single phase (nominal):	100V to 240V, 50 to 400Hz
Mains for operation (physically):	90V to 264V, 47 to 420Hz
Power consumption Auto-Power-Off mode:	ca. 7.0W @ 230V
Power consumption in operation without modulation:	48W to 55W
Power consumption in operation without DPA active and without modulation:	42W to 49W
Power consumption switched off (standby):	0W
Power consumption operating under full modulation:	450W max.

Temperatures:

Housing temperature operating (room temperature: +20°C/68°F):	+10°C/+50°F to +45°C/+104°F
Regular operating temp. on top of the cooler at room temperature:	+10°C/+50°F to +50°C/+113°F
Maximum operating temperature in the middle of top of the coolers:	+65°C/+149°F
Temperature range storage (transportation also):	0°C/+32°C to +70°C/+158°F

Mechanical Figure

Type of housing:	Aluminum (2.5mm), top & bottom: 10mm (milled)
Threaded connections (for service only):	8x TORX 25 in top & bottom cover
Available colour:	Al-nature anodically oxidized
Dimensions incl. binding posts, no feet in mm (BxHxT):	204 x 220 x 396
Weight:	ca. 9kg/19.8lbs
Weight of the packaging and accessories:	ca. TBD
Maximum weight with packaging and accessories:	ca. TBD

Safety and CE-Approval:

Electrical Safety:	according EN 60065: 2002
Safety against squirting water:	according IPX4
Emission:	EN 55013: 2000, EN 61000-3-2: 2000 and EN 61000-3-3: 1996
Disturbing influence:	EN 55020: 2000
Electrical discharge:	EN 61000-6-1: 2001

Features of the Advanced-Option:

Frequency range:	DC to 24kHz
Variables:	magnitude and phase plus room correction data
Range for magnitude:	-12.0dB to +12.0dB
Range for room correction data:	-90.0dB to +12.0dB
Step size for magnitude:	0.1dB
Range for phase:	+/-2000° (no modulo function)
Step size for phase:	1°
Range for delay:	0msec to 1000msec
Step size for delay:	0.01msec
Functions:	Store, Reload, Export, Import, 3x Clear (separately)
Format of export/import:	*.TXT (for use with an Excel-sheet)
Size of the export/import table:	1024 lines by 3 values

State of information: 17. March 2010. Data given are subject of change without notice.

Company Information



Build in 1728



Manufacturing

Manufacturer:

Ballmann Electronica GmbH

Subsidiary and postal address for behold:

Theaterplatz 14, D-91054 Erlangen
Phone +49 9131 503700
Fax +49 9131 503709
www.behold.eu

Company main office: D-91080 Marloffstein
Commercial register: Fuerth HRB 5822
VAT-ID-Nr.: DE168225369
Original share capital: € 150.000.-
President: Dipl.-Ing. Ralf Ballmann
Vice-President: Gisela Ballmann

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Responsible for content and design: Ralf Ballmann
Author: Ralf Ballmann

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