INFRA-QSOURCES

User instruction
Qam measurement power amplifier

Updated: **190305 V4**
By: **LMB, PJGL, Qsources BVBA**

Content:

Please always use ear protection when working with this product.

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1. Intended application

The Qam measurement amplifier is designed to power sound sources and electro-dynamic shakers. The amplifier is intended for indoor use, but can be used outdoors as long as it is protected against rain, excessive dust, etc.

The standard version Qam will have a signal generating module for use with Qohm, Qm, etc. sound sources. A remote control allows activation and deactivation.

A special version QamS lacks the signal and remote function, and is intended as a slave unit only, to increase the total power output.

The Qam amplifier will generate low crest factor random noise signals for measurements, and amplify any reasonable external signal. Different modes and equalization settings are available:

- Continuous operation, or 20 seconds pulsating mode
- White and pink noise
- Sound source specific equalization
- Low frequency tuning in third octave bands

The internal noise signals are crest factor optimized to allow a higher output level from the connected source and from the amplifier. This may sound unnatural or distorted. But it is normal and it is the undistorted low crest factor noise signal.

Externals signals of different nature can be used like; sine and chirps, random noise, music or other communication signals. But it is the responsibility of the user to choose feasible and safe signals for the amplifier and its attached source or shaker.

2. Positioning, connections and powering

Do not place any objects on top of the amplifier. The upper surface is needed for cooling and can sometimes become very warm when the amplifier has been active or stand-by over a longer time. This is normal and related to the high power density electronics in the amplifier. There is an overheat protection in the amplifier which will light up an LED in the display only when a critical temperature is attained.

When used in an environment >30degrees - <50 degrees Celsius, the total operating time may be limited. In such cases it is advised to turn the amplifier off when not being used or to add external cooling for a longer operation time.

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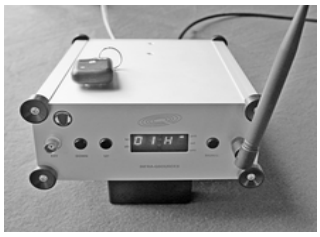
A small antenna is provided, as well as a standard mains cable and a remote control button.

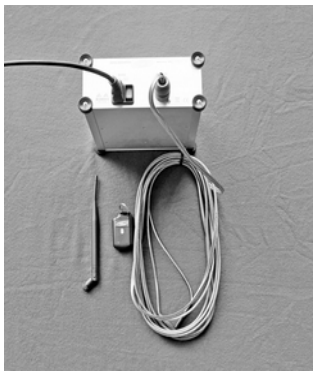
Front connections:



There is a SMA socket on the right side for the antenna, marked “RF”.

There is one BNC socket on the left, marked “EXT” for an external input signal. The external input signal must be limited to O.7 V pk-pk to prevent distortion. The BNC socket is inactive when the internal signal generator is used.

Rear connections:



There is a 2 pole speakon socket on the rear for the source/speaker or shaker load.

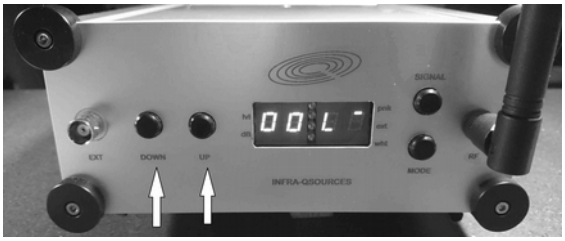
The mains power socket for 23OV (or 115V for some markets) is located on the rear. **Connecting a 115 V version amplifier to 23O V will fatally damage the amplifier.** So the 115V version cannot be used in 23OV regions, and vice verso.

3. Operation of the amplifier

Turn the amplifier on by pressing the on/off switch on the rear, next to the mains socket. It can take up to 8 seconds for the amplifier to activate.

The amplifier will initially show a setting of zero output level and pink noise.

Remote activation and de-activation:



To de-activate the amplifier into a standby mode, press the button on the remote. To activate the amplifier, press the button on the remote. As small led in the display will light up to mark/indicate that the remote is used. The signal settings are retained. The amplifier will become active again when the button is pressed again.

Mount the supplied antenna if the remote reception is weak. However, if there is a substantial amount of metal structure between the remote and amplifier, then the 1OO meter control distance will not be reached. Or in extremely well shielded cases the remote may not work at all as the metal structure will block its signal.

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Level setting:

To set the output level or signal gain, the up and down buttons are used, marked "UP" and "DOWN". Pushing once will induce a 1 dB level step. Holding down the button will make the level scroll up or down. The level setting is indicated by red LEDs in the display, in dB, marked "dB".

When O dB is indicated a very low to no (zero) output signal is given. When 6O dB is indicated the maximum amplification is reached. Depending on the selected signal the amplifier may reach its maximum output voltage before reaching the 6O dB setting.

Selecting a signal:

The right led in the display will indicate which type of signal is active. And a letter L/A shows the equalization setting **for Qohm.**

To select a signal press the button on the top right, marked "signal". The output signal will toggle between:

- pink noise L. linear output between 45-2OOOO Hz*
- pink noise A. shaped spectrum 45-16OOO Hz* equalizing the source
- pink noise E. shaped spectrum 45-16OOO Hz, with low frequency tuning
- white noise L. linear output between 45-2OOOO Hz*
- white noise A. shaped spectrum 45-16OOO Hz* equalizing the source
- white noise E. shaped spectrum 45--16OOO Hz, with low frequency tuning per octave band.
- external signal** L. linear output spectrum 2O-2OOOO Hz
- external signal** A. shaped spectrum 45-16OOO Hz* equalizing the source
- external signal E. shaped spectrum 45--2OOOO Hz, with low freq. tuning per third octave

In each case the letter for the equalization is displayed and the LED bar on the far right will point to the type of signal as printed next to the LED bar. The level of output power/noise will vary significantly when going from L to A and E filtering.

** The frequency range depend on the selected and pre-programmed product (sound source or other) the shown numbers are valid for the Qohm, Qohm2 or Qm products.*
*** For linear amplification the external signal is limited to O.35 V sspk or O.7V pk-pk.*

Selecting interrupted mode:

Short depression of the mode button will make the amplifier run in interrupted mode. It will put the amplifier is stand-by mode for 2Os, automatically followed by 2Os activity, followed by standby, etc. To de-activate this mode just briefly push the mode button again.

Central LED meaning:

Four red warning LEDs are located in the middle of the display.
The top one will clearly light up when the amplifier reaches saturation and goes into a non-linear mode. In this mode the peak voltages are limited to a + 75V and -75V maximum. It is well possible to let the amplifier work in this non-linear range. But it may not be safe for the source or speaker or shaker, because the amount of electric power going into the speaker is increasing even if the peak voltage is limited.

The second LED down indicates an overheating of the amplifier. This may occur after long periods of stand-by in warm environments or when the amplifier is covered by an other object hampering the normal cooling. The amplifier will restart automatically when

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the temperature has dropped to an acceptable level. Be aware that this may re-activate the speaker/shaker.

The third and fourth LEDs down are only for diagnostic purposes by the manufacturer.

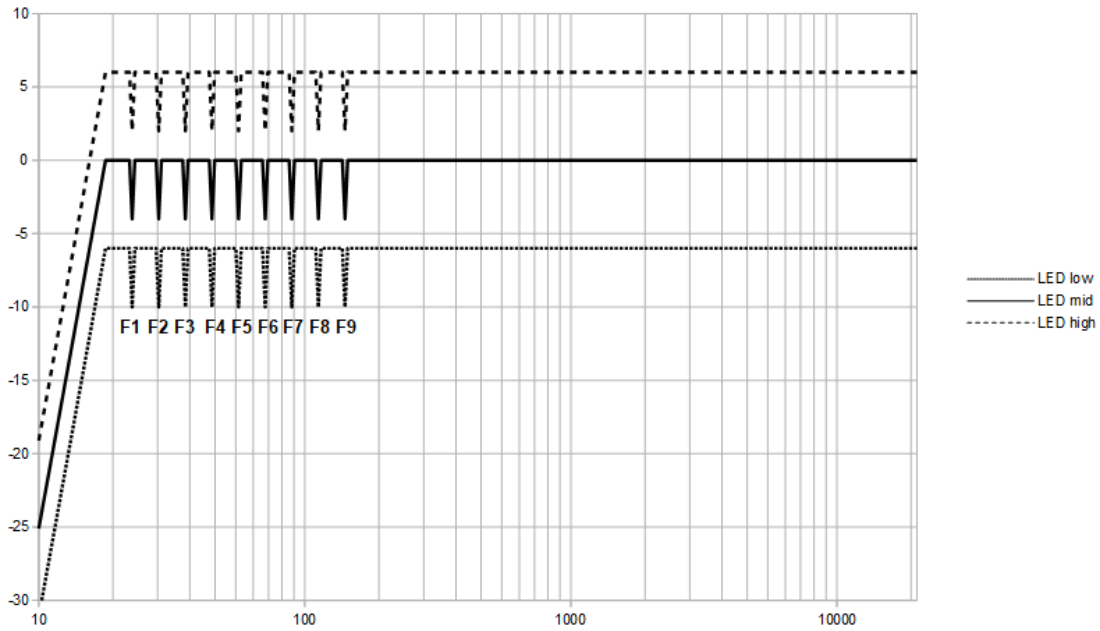
4. Low Frequency Tuning

In some situations it can be desired to adapt the low frequency levels per third octave band to compensate for strong reflections of nearby large walls, or to correct for the standing waves in a room. In that case the third octave band levels below 4OO Hz can be adapted in level.

The level of the following third bands can be adapted:

F1 : 5O Hz -6dB/OdB/+6dB
F2 : 63 Hz -6dB/OdB/+6dB
F3 : 8O Hz -6dB/OdB/+6dB
F4 : 1OO Hz -6dB/OdB/+6dB
F5 : 125 Hz -6dB/OdB/+6dB
F6 : 163 Hz -6dB/OdB/+6dB
F7: 2OO Hz -6dB/OdB/+6dB
F8: 25O Hz -6dB/OdB/+6dB
F9: 315 Hz -6dB/OdB/+6dB

And the level can be reduced of the remaining frequency range.
FO : 4OO-2OOOO Hz -6dB/OdB/+6dB

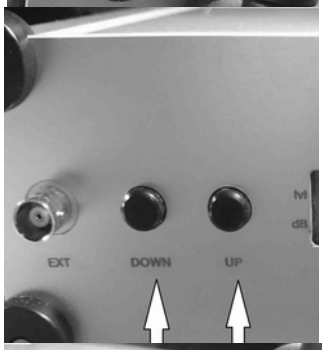


It is advised to first measure the microphone spectrum with the amplifier in pink/white or external in ""E"" setting, and take a note on which third octave bands need level adaptation. You will notice that the output level in ""E"" is always 6dB lower than the ""L"" and ""A"" settings. This is needed for protection of the sound source.

Very long depression of the Mode button, during 4s or longer, will make the amplifier go in tuning mode and display F1. This mode will only have an effect on the E type signals. The L and A signals will not change.

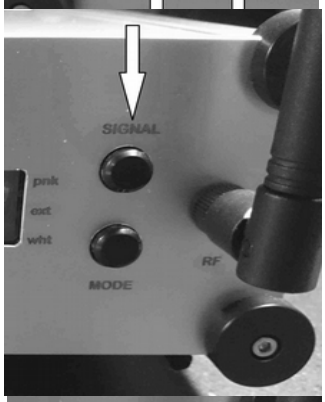
When “”F1”” is displayed the first filter band level can be adjusted in level. To change the level in the F1 band:

- Pressing “”up”” brings the level up in F1
- Pressing “”down”” brings the level down in F1



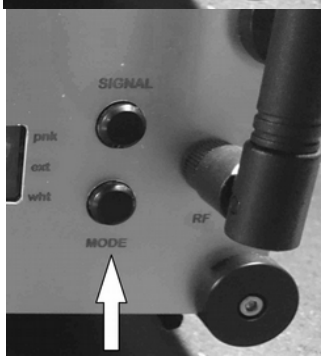
The set level is shown by the LED bar on the far right.
- When in highest position +6 dB is indicated
- When in middle position O dB is indicated
- When in lowest position -6 dB is indicated

Pressing the “”signal”” button will shift the third octave band up to the next band. This way it is possible to scroll through the bands, from F1 to F2, up till F9. After F9 it will display FO which is not a third octave, but all frequencies above 4OO Hz. Pressing “”signal”” again will jump to F1, etc.



This way of scrolling allows to read the levels which are set and it allows to change the levels in each band. In this way the levels per band can be tuned.

To exit the tuning mode, again press the “”mode”” button for 4s or longer.



For safety reasons, the amplifier always returns to O level and pink noise in “”L”” after the tuning. But the levels per band are stored and accessible by selecting one of the “E” signals.

When the amplifier is turned off, or its mains supply is removed, it will retain the band settings.

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5. Prevent electrical damage

The amplifier is internally protected against:

- mains surge
- over-current on the output
- excessive heating
- DC connect of the input signal

Any of these events may cause the amplifier to halt for a short period, limit the signal output, or blow the internal melt fuse. A red warning led will also light up in most of those cases to inform the user.
Still damage can occur if:

- the amplifier is exposed to excessive input signals on the external signal socket
- excessive mains voltages on the mains socket
- load impedance lower than 2 Ohm on the output speakon socket
- capacitive or inductive loads on the output speakon socket
- adverse contact of mains power leads to the housing

Connecting a 115V amplifier to 230V will fatally damage the amplifier.
Connecting a 230V amplifier to 115V mains will not work.
This Qam amplifier has fixed mains settings and will not adapt outside a +- 10% range.

6. Prevent mechanical damage

Always follow the shipment instructions below for any carrier of flight shipment.
And do not expose the amplifier to:

- excessive dust
- shocks in excess of 25 G or a 10 cm drop or equivalent.
- temperatures above 50 degrees Celsius or below -20 degrees Celsius.

This is electronic measurement equipment that requires care in handling and shipping.

7. Safety instruction

- Do not expose the amplifier to water, other fluids, combustible gases. (If the outside of the case becomes dirty or stained, carefully wipe the surface with a dry cloth only.)
- Do not place objects against or on top of the amplifier.
- Allow free flow of air around the amplifier.
- Only use a triple line, earthed, mains cable with a standard IEC socket and with a cable suitable for 10 Ampere or more, and only the specified type of fuses.
- Wear ear protection when the amplifier is connected to a source or loudspeaker.

8. Technical specification

Specifications*:

Frequency range with an external signal:	20-20000 Hz
Frequency range white and pink noise:	50-20000 Hz third octave bands
Amplification setting accuracy:	+- 0.5 dB
Maximum voltage output:	150 Volt pk-pk
Maximum current output:	20 Ampere RMS
Maximum continuous power output:	up to 1000 Watt RMS**
Minimum load impedance:	2 Ohm

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Maximum external signal input:	0.35 V sspk, 0.7 V pk-pk.
Remote range and carrier frequency: up to 100 meter, 433 MHz	
Weight:	2.3 kg
Dimension:	24.5 * 19 * 9 cm
Maximum mains power requirement:	1200 Watt
	230V-50Hz/115V-60Hz/100V-60 Hz***

* These specifications may be adapted if necessary to improve the quality of the product.
**Depending on the used signal and the connected load (sound sources or shaker or other)
***Proportionally lower power output, when used on 100V instead of 115Vmains.

9. Warranty and Liability

Two years full warranty on all supplied materials, workmanship and early failure in normal and moderate use, from date of delivery, with the following conditions:

- Mechanical damages due to non-careful handling, transportation (after delivery), excessive environmental conditions, etc. are excluded from warranty.
- In case of a need of service under warranty or other, the client is responsible for shipment to and from Qsources in Belgium, insure that the shipment does not incur taxes or other charges for the incoming and return shipment.
- Qsources is not liable for any damage directly or indirectly resulting from the use of the amplifier, regardless whether the damage occurs to the customer, to property of the customer, to a third party or to the property of a third party.

This is electronic measurement equipement that requires care in handling and shipping.

10. Questions and answers

How long does it take the temperature protection to reset?

The internal modules have to cool down considerably before restart, and this will be much faster in 15 Celsius, then in 35 degrees Celsius. But in normal working conditions it can take up to 30 miuntes before this safety resets.

I use an external signal, but the amplifier does not give much power, or it shuts down when trying to use this.

Sometimes an external signal device will generate signals outside the normal band (20-20000 Hz) of the amplifier. This is not always obvious. For example; digitalization noise at 50 Khz, or residual DC content, or residual 50/60 Hz. This may cause the amplifier to shut down, or to limit the power in the normal band. Some protective filtering is provided internally in the amplifier, but it is best to filter out of band signal before entering the Qam amplifier.

When using an external input signal, could I damage the amplifier or the sources?

The amplifier input will withstand any type of normal signal coming from any measurement device or computer on the headphone outlet. The output of the Qam amplifier will just try to follow the input signal up to ss 0.35V.

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But if mains power is somehow in electric contact with the input signal, or if the power output of the amplifier is in electric contact with the input BNC, then this will damage the amplfier.

For the sound source, or shaker, or other load, which is driven by the amplifier an external signal can be harmfull depending on the type of source and type of signal. For example because it contains power outside the normal frequency range of the sound source, or because it cannot withstand the high power, or because all energy is concentrated at one frequency, etc.

Why is distortion of the internally generated random noise signals normal?

The random noises from the signal can "sound" discontinuous,stuttering,distorted. We do crest factor optimization on noise signals, which makes the random noise "sound" different from normal high crest factor white- or pink random noise. This can seem to be distortion, and is especially noticeable with pink noise on any level. This may sound like a cough, or stuttering. It is a side effect of what we do with random noise to get a maximum output level from the source and amplifier. It is normal, and not harmful. This is not the same as distortion, because the actual distortion is very low. The TDH is below O.1 % up to 5O% of maximum power on input signal below O.35V sspk.

Audible distortion on external signals, only in the case when the overload LED is activated, it indicates that the maxiumum level of linear operation on this external signal is exceeded.

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CE
Declaration of conformity

Product:

Infra Qsources measurement power amplifier

Model:

Qam

Hereby is certified that the above mentioned product complies with the following standards:

EN 60065

EN 61010-1

Responsible for this declaration is the producer

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Declared by

P. J. G. van der Linden

Diest, June 2017