Manual

GainStation 8 Mk2

Model 1180

Eight-channel microphone and instrument preamplifier

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The construction of the GainStation 8 Mk2, Model 1180, is in compliance with the standards and regulations of the European Community.

Notes on Environmental Protection

At the end of its operating life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The wheelie bin symbol on the product, user's manual and packaging indicates that. The materials can be re-used in accordance with their markings. Through re-use, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment. Your local administrative office can advise you of the responsible waste disposal point. WEEE Registration: 973 349 88

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Introduction

Input makes all the difference.

Modern audio production relies increasingly on digital systems for recording and mixing processes (DAW's, digital consoles etc.). The advantages of digital audio are manifold and include affordable storage, comfortable editing, recall capabilities and automation. On the downside, digital systems still do not offer the same audio qualities and sound characteristics of high-end analog equipment. Especially digital equalizers and other aspects of the mixing domain cannot compete with the open, transparent sound of the best analog gear. So today more than ever, your input signal has to sound as good as possible—the quality of your original tracks will largely define the end result. Lifeless or dynamically lacking signals are often over-processed with EQ, compression and other effects in an attempt to compensate—often an extremely tedious process in the digital domain that doesn't always produce the desired results.

Attacking this problem on the preamplification front, with the goal of noticeably improving a signal and sending it along its path with a healthy foundation, requires a great deal of thought and engineering effort. To this end, the GainStation 8 Mk2 employs technologies that not only satisfy test equipment, but also—and most importantly—the user. Components and circuits were carefully chosen and designed on the basis of extensive measurements and listening tests. In short, developing the GainStation 8 Mk2 was a major undertaking that required immense amounts of time and experience.

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Main technical features of the GainStation 8 Mk2

- Custom-designed and built, fully discrete, class A op-amps (no off-the-shelf stuff here). The GainStation's op-amps feature 60-Volt operating voltage—twice as high as most common op-amps—for an incredible dynamic range.
- An extremely high amplifier slew rate of 200 V/microsecond, ensuring clean transmission of high-frequency signal portions and rapid transients with virtually no cut-off.
- An almost entirely DC-coupled signal path, making signal-degenerating condensers unnecessary.
- An optimized layout guarantees the shortest possible signal paths, while generously proportioned grounding surfaces ensure low impedance and maximum shielding.
- All switching functions are handled by encapsulated relays with gold-plated contacts.
- All resistors are within 0.1% tolerance and were selected after extensive listening tests.
- A no-compromise power supply with extensive additional shielding and seven separately wound and regulated voltages. The power supply is of primary importance to audio quality; its importance should not be underestimated.
- A tube stage utilizing premium MKP foil condensers and a select tube for clear, dynamic audio.

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This cutting-edge technology ensures that signals recorded with the GainStation 8 Mk2 have more presence and substance and will easily cut through a mix even at lower levels. Extremely low-frequency signals are tight and transparent with clear intonation. Percussive transients are interpreted more precisely, which leads to a clearer rhythmic content and in turn a more solid rhythmic performance and perception.

If the GainStation 8 Mk2 is used as a preamp, musicians will immediately notice that they hear and feel what they are playing much better, which leads to improved playing and a better recording. The track will have more punch and dynamics, greatly improved presence and almost palpable detail. In short, the instrument sounds incredibly authentic and alive. Beta-tests with the GainStation 8 Mk2 showed that all instrumentalists enjoyed playing more and in many cases were truly amazed at what their trusty instrument was capable of.

Given this improvement in the input signal, one is much less inclined to equalize and compress—in many cases you will probably find that you can do without additional processing, which not only saves an enormous amount of time and processor power, but also has an extremely positive effect on the final result.

The GainStation 8 Mk2 itself offers effective sound-shaping capabilities at recording, most notably via the tube stage, which can be completely bypassed or continuously added to the preamp circuit, allowing everything from extremely subtle “warmth“ to a very noticeable tube saturation effect. The integrated limiter can be used to protect an internal or external AD converter from clipping, or for example to add punch to drum tracks, which in turn reduces or in many cases even eliminates the need for subsequent compression. Put simply, the more tracks are recorded with the GainStation 8 Mk2, the more solid and transparent—and easier to mix—the entire recording will be.

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It makes good sense to think about where you place your GainStation 8 Mk2 before connecting it. It should be positioned so that you can easily reach it, but there are other considerations. Try not to place it near heat sources or in direct sunlight, and avoid exposure to excessive vibrations, dust, heat, cold or moisture. It should also be kept away from transformers, motors, power amplifiers and digital processors.

IMPORTANT NOTE: When installing the GainStation 8 Mk2 in a rack, please be sure to leave about a unit (1.5 to 2 inches) of space above it to ensure sufficient circulation. If possible, install the unit in a rack with other analog units to avoid interference from digital units, such as clock frequencies. We recommend covering the empty rack space above the GainStation 8 Mk2 with a blind panel to reduce the amount of dust and debris sucked into the unit by its fan. The fan side of the housing must always be kept free.

IMPORTANT NOTE: Never disconnect the GainStation 8 Mk2 from its external power supply while the unit is switched on. Always turn it off first and wait at least one minute, so that all current can dissipate, before disconnecting the multipin connector. Failure to do so can cause severe damage to components.

In addition, please:

- Do not open the case. You may risk electric shock and damage to your equipment.
- Leave repairs and maintenance to a qualified service technician. Should foreign objects fall inside the case, contact your authorized dealer or support person.
- To avoid electric shock or fire hazards, do not expose your unit to rain or moisture.
- In case of lightning, unplug the unit.
- Always unplug the cable by pulling on the plug only; never pull on the cable.
- Never force a switch or knob.
- Use a soft, lint-free cloth to clean the case. Avoid cleaning agents as they may damage the unit.

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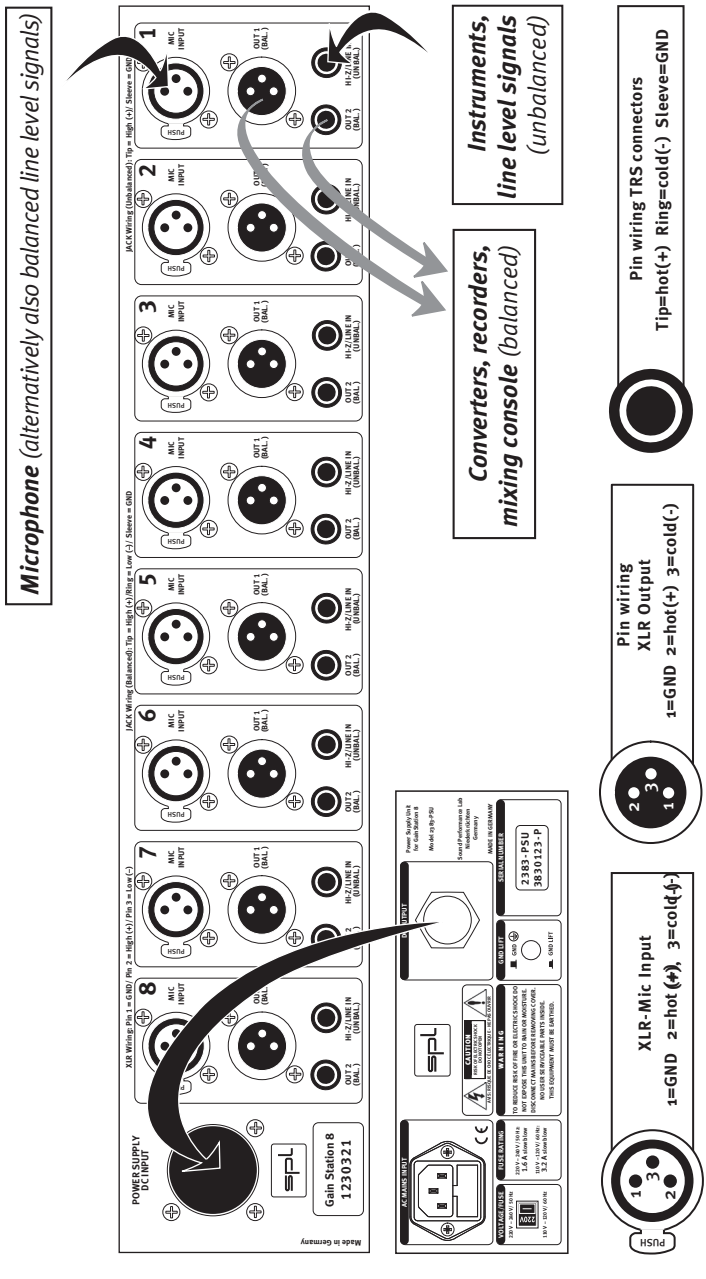

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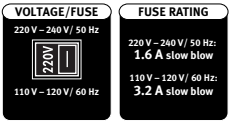
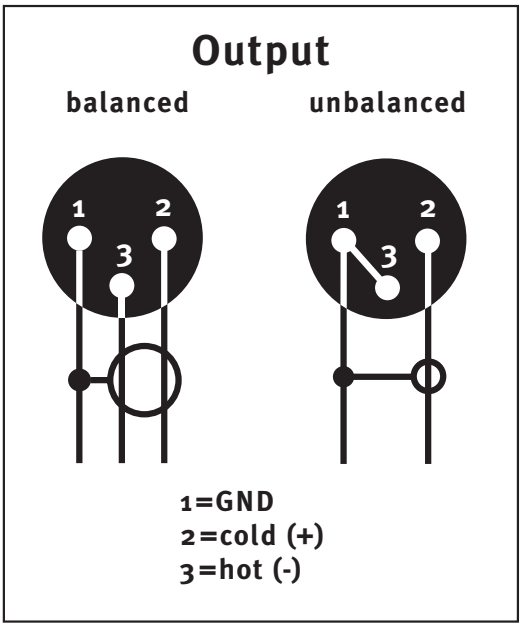


Again, while the GainStation 8 Mk2's housing is EMV-proof and protects against HF-interference, placement of the unit is very important since it amplifies microphone signals as well as other unwanted signals. Thus, it is extremely important that the external power supply not be positioned near the GainStation 8 Mk2.

IMPORTANT: Adjust the voltage setting on the back of the external power supply so that it corresponds with the power conditions. Before connecting the GainStation 8 Mk2 or any other equipment turn off all power.

The following graph shows the correct wiring for connecting



unbalanced signals to the balanced XLR connectors:

The Line Input connector is designed for unbalanced signals only.

The TRS output connector (see „Analog Outputs“, page 10) can be operated both with balanced and unbalanced wiring. Simply use a mono 1/4" plug for unbalanced operation.

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Rear panel/connections

MIC INPUT

Dynamic, condenser or tube microphones can be connected to the Mic Input. The 48 V switch provides the phantom power necessary for some microphones (see also „Control elements/ Phantom“ on page 13).

The MIc Input can also be used as a balanced connection for professional audio equipment with a maximum output level of +20 dBu. The Clean Gain already delivers 10 dB of minimum preamplification, this leaves you with 4 dB of headroom.

IMPORTANT NOTE: Always switch the phantom power (48 V) off before connecting anything other than phantom-powered condenser microphones.

INSTRUMENT/LINE INPUT

The Instr. In is for electric guitars and basses or other high-impedance, line-level signals such as keyboards, samplers, drum machines etc. with unbalanced outputs. If a balanced connector (TRS) is inserted, the ring of the plug is automatically connected to the ground to ensure proper unbalanced operation.

ANALOG OUTPUTS 1/2

The preamplified output signal is fed to the balanced Analog Outputs. Since the XLR and 1/4" TRS connectors are wired in parallel, an unbalanced connection at one connector will cause the other connector to operate unbalanced, e.g. if a mono 1/4" plug is inserted into the 1/4" jack, the corresponding XLR socket will also operate unbalanced.

IMPORTANT NOTE: The output connectors can deliver an output level of up to +34 dBu. Please ensure that all other equipment can handle these levels to prevent possible damage.

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CLEAN GAIN

This potentiometer controls the amount of preamplification provided by the class A solid-state stage. A range of up to +63 dB is provided. For more information, please see “Setting levels on the GainStation 8 Mk2“ on page 16.

IMPORTANT NOTE: If a Lundahl input transformer is installed, add 7 dB to the printed values.

TUBE GAIN

This potentiometer controls the amount of preamplification provided by the tube stage. This stage follows the clean (solid-state) stage, so that the gain values of the two stages are additive. Setting Clean Gain at 20 dB and Tube Gain at 15 dB results in 35 dB of total preamplification.

Turning the Tube Gain control fully counter-clockwise causes the tube stage to be deactivated and bypassed via a relay.

TIP: For optimal signal-noise ratios at high preamplification values, the majority of preamplification should be achieved via the solid-state stage, adding just enough of the tube stage for the desired sound. Due to the nature of tubes and tube circuitry, the tube stage is somewhat noisier than the solid-state stage.

OUTPUT LEVEL

This potentiometer adapts the output level to devices following in the chain or to the converter. At 0 dB the output level is equal to the internal level indicated by the LED display. The OUTPUT LEVEL control allows an additional 6 dB of amplification or 26 dB of reduction. The output level control is post-limiter to allow maximum levels to an external converter.

IMPORTANT NOTE: If the internal level is noticeably above +18 dB (the orange +18 dB LED is brightly illuminated) and the output level is set to +6 dB, the output level at the analog outputs can be up to +34 dBu. Please ensure that all other equipment can handle these levels to prevent possible damage.

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Control elements

Source

vThis switch allows you to select between the Mic and Instrument inputs. Both inputs can remain connected at all times, regardless of which input is selected.

When first thrown after powering up the unit, this switch can cause a noticeable pop due to the discharge of residual current. This is normal and no cause for concern.

Hi-Pass

This switch activates the integrated high-pass filter, which operates at a 50-Hz center frequency and 12 dB/octave (often called a “rumble filter“). The filter is entirely passive, avoiding additional active circuitry that could potentially degrade the signal, and cuts 6 dB pre- and 6 dB post-solid-state preamplification to prevent the amplification of unwanted low-frequency signal portions.

Polarity

The phase reverse function reverses the polarity of the microphone signal, “turning“ the phase by 180° to correct phase-inverted signals caused by multiple signal sources.

A voice-over artist, for example, hears himself during recording through the headphones and simultaneously through the bones in his head. Phase inversion will cause an unnatural sound and even minimal variations in distance to the microphone will cause drastic variations in the sound. Phase inversion is also commonly encountered when using multiple microphones on a single sound source.

The GainStation 8 Mk2‘s phase reverse switching is achieved passively via a relay, pre-preamplification, to avoid additional active circuitry.

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Imped. Ω

This 3-way switch allows you to select between three input impedances for the Mic Input. In general, higher impedances increase levels and emphasize high frequencies, while mids and bass frequenices are dampened. Conversely, a lower impedance causes lower levels and emphasizes bass and mid frequencies.

The Imped. Ω-Wert does not have to be equivalent to the output impedance of the microphone. We recommend the highest impedance setting as starting position (10.000 Ohm). Now it must be evaluated acoustically, if lower settings are delivering better results.

Phantom

The GainStation 8 Mk2 provides 48 Volt phantom power for microphones requiring external current (generally condenser microphones). Such microphones are dependent upon a clean, consistent and noise-free power supply for optimal operation and audio quality. The GainStation 8 Mk2 continuously delivers precisely 48 V and a maximum of 14 mA, which will power all microphones.

IMPORTANT NOTE: All microphones with balanced, ground-free outputs, including tube microphones, can be used with the phantom power activated. First connect the microphone to the GainStation 8 Mk2, then activate the phantom power. When finished, first deactivate the phantom power and wait at least 30 seconds before disconnecting the microphone to allow residual current to discharge.

Phantom power should only be activated when using microphones that require it. Please be sure to deactivate phantom power with all other microphones. Unbalanced microphones may only be used with phantom power deactivated. The 48V LED illuminates to indicate activated phantom power. When deactivating phantom power, it can take several seconds for the LED to go out, since the 48 V current dissipates rather slowly. When changing microphones, you should wait until the LED is completely dark before re-patching.

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Limiter

The GainStation 8 Mk2 offers two types of output level limiting: Germanium and Tube. The limiter is pre-output level control, so that the limited signal can be optimally adapted to an external converter.

The germanium limiter operates with special diodes that convert signal peaks into a type of saturation. Depending on the signal, this allows levels to be effectively and subtly limited. This type of limiting works very quickly, reliably limiting even microsecond-long transients, and is very effective for drums and percussion. The germanium limiter also enables maximum loudness. Operation is displayed via the Limit LED.

The tube limiter is additionally available when the tube stage is activated. This circuit operates with a Field Effect Transistor (FET), which is connected to the tube and enables—always in conjunction with the germanium limiter—a reduction of signal amplitude. Thus this limiter works in a similar fashion to a compressor, which makes it very effective for signals that undergo unforeseeable level changes (i.e. vocals, speech, guitar, bass, piano etc.) and where minimum loss in signal quality is desired. The germanium limiter is always active post-tube limiter to ensure reliable protection. The Limit LED also displays the operation of the tube limiter (always somewhat more calmly than with germanium limiting).

IMPORTANT NOTE: If the tube stage is deactivated while tube limiting is active, the LED will continue to display in tube limiting mode.

For more information on using the limiters please see page 18, ”Limiter”.

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POWER

Switches the unit on or off. The switch illuminates with delay, because it is fed by the 250 V anode power – don't panic.

If the tube stage is active when the unit is switched on, it can take several seconds before a signal can be heard—this time is necessary for the tube to reach operating temperature.

IMPORTANT NOTE: Never disconnect the GainStation 8 Mk2 from its external power supply while the unit is switched on. Always turn it off first and wait at least one minute, so that all current can dissipate, before disconnecting the multipin connector. Failure to do so can cause severe damage to components.

LED Level Display

The level display shows the peak level before output level control. A special circuit allows the LED's to vary in brightness to display in-between values. The -30 LED illuminates weakly at -30 dB and reaches full brightness at 0 dB. The 0 dB LED illuminates weakly at 0 dB and reaches full brightness at +9 dB and so on.

The CLIP LED operates post-CLEAN GAIN stage and displays clipping at this point in the signal path. It will not react to tube saturation in the tube stage, since this can be a desired effect.

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Operation

In spite of its quality and flexibility, the GainStation 8 Mk2's transparent user interface allows quick, intuitive operation. The unit is suited for a wide variety of applications. The following sections will provide an overview of the most important operational concepts and several application examples.

Setting levels on the GainStation 8 Mk2

Start with the limiter switched off. With a representative signal present at either the MIC or HI-Z input, set the desired combination of Clean and Tube Gain so that the 9 dB LED illuminates brightly. When this LED illuminates weakly, you have 9 dB of gain. When brightly lit, you have 15-17 dB, which still leaves you with a good 9 dB of headroom (in the range displayed by the orange 18 dB LED) before clipping. The orange LED illuminates dimly at 18 dB and brightly at around 26 dB. The red Clip LED should never illuminate—this indicates clipping in the clean stage, which generally should be avoided, as it will lead to distortion of the solid-state circuitry. (You may find this desirable in some rare cases—we had lots of fun creating heavily distorted guitar sounds...)

The Clip LED does not display high amplification levels in the tube stage that could lead to distortion. The GainStation 8 Mk2 intentionally allows tube saturation, since tube distortion—contrary to transistor distortion—is often a desirable effect.

Once you have adjusted the gain levels as described above, use the Output Level control to set the optimal output level for subsequent devices in the chain.

IMPORTANT NOTE: The Output Level control should not be set above 0 dB when working with high internal levels of more than 18 dBu. Otherwise, extremely high output voltages of up to 34 dBu (approximately 38 Veff) can occur, which can damage other equipment. Please refer to the documentation of your other equipment regarding maximum input levels.

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Combining different amounts of clean and tube gain will create various effects. The GainStation 8 Mk2 operates virtually distortion-free with the tube stage bypassed. The sound is clean and transparent with extreme detail and very low noise. The clean stage is ideal for most acoustic instruments, as well as jazz or classical recordings. If you activate the tube stage and increase the gain setting slowly, you will notice that once you reach a certain level, harmonic distortion enters the signal. The sound becomes punchier and "fatter", and attains more loudness. At this setting the tube stage is still relatively noise-free, and ideal for adding a bit of presence and liveliness to signals that may otherwise sound dull or lifeless. This setting works very well with stringed instruments like acoustic guitars, electric and acoustic basses and violins, since it highlights the harmonics of the strings.

Naturally, these effects become more pronounced as the amount of Tube Gain is increased. The tube can be driven to full saturation to produce pronounced distortion, which can be very effective with synthesizers, samplers and drum machines that lack punch. Signals recorded in this fashion will generally cut through a mix with no trouble at all.

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Limiter

To achieve the desired results with the integrated limiter, it is important to understand its operation. The threshold value is fixed at 20 dBu. The clean and/or tube gain settings determine the amount of limiting, so that these settings more or less work like a threshold control. When the limiter is activated, it levels everything above 20 dBu. The orange 18 dB LED, which displays this level range, varies in brightness depending on limiting. The actual amount of limiting is displayed by the Limit LED, which becomes brighter as more level reduction is applied.

The germanium limiter sounds different with the tube stage activated, since leveling occurs somewhat asymmetrically with the tube in the signal path, so that the negative half-wave is leveled with a much flatter curve.

To determine the ideal limiter setting for the internal converter, activate the germanium limiting mode and adjust the Clean and/or Tube Gain to a setting well above your working level, so that the Limit LED illuminates brightly. Then reduce the Output Level until the AD OVL LED goes out. Now your gain levels can be returned to their normal settings and the limiter can be switched into tube mode if desired. The same method should be used with an external converter, except that in this case the external unit‘s clip LED is used for calibration. If you are only using the tube limiter and your program material contains few fast transients, the output level can be set somewhat higher.

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The GainStation 8 Mk2 is predestined to act as a premium recording front end, ensuring that signals of all kinds are preamplified with the highest quality, whether as an alternative to existing console preamps or as a stand-alone solution between source and A/D converter.

The quality of your recordings has a major influence on the subsequent mixing process – good recordings require less processing in later stages. Improved transparence and intelligibility can be achieved with less equalization and compression if the signals are recorded optimally, often allowing individual signals to be mixed at lower levels without compromising their presence.

The GainStation 8 Mk2 can also effectively improve live recordings and mixes. Particularly in live situations, microphone signals must often travel extremely long distances to reach the FOH or mobile console, resulting in high cable capacities, which can degrade and color the sound. In this application, we recommend placing the GainStation 8 Mk2 on stage. This allows for short cable runs to the preamps, whereas the GainStation's gain structure and fast output stages can easily drive the longer runs that ensue.

The following section, while not attempting to represent a complete guide or answer all questions, provides several operational tips for various instruments.

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Application Examples

Vocals/Speech

The tube stage is well suited for adding presence to vocals. Exercise caution when setting levels, particularly with the clean stage, since vocals can be extremely dynamic. The tube limiter can be very helpful here to level peaks in a subtle, musical fashion and ensure safe levels for AD conversion. Once the limiter is properly set (see ”Limiter”, page 20), tube gain can be added as required.

Acoustic Instruments/Orchestra

The tube stage should be used very sparingly, if at all, when miking/recording orchestras or acoustic instruments, to ensure the highest possible S/N ratio. Levels should be set with the utmost care, since distortion and clipping are easily heard and absolutely undesirable in classical and most acoustic recordings. In general, the limiter should only be used to protect the A/D converter or digital recorder.

Acoustic Guitar with Pickup

A combination of clean and tube stages will deliver good results here. Lower tube gain settings between 1 and 9 dB will result in a very acceptable S/N ratio. Moderate use of the germanium limiter will provide the best protection against clipping.

Guitar Amps

As with acoustic guitars, combining the clean and tube stages is especially effective when miking guitar amps. Higher Tube Gain settings result in more punch and loudness. The more distorted the guitar sound, the less limiting is required, since the distortion process levels dynamics.

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Electric Bass

If an electric bass is directly connected to the instrument input, a combination of clean and tube stages is usually best. In the case of extreme dynamics, the tube limiter will deliver excellent results and a tight, punchy bass sound that usually needs no additional compression.

Keyboards/Samplers/Drum Machines

Electronic sound sources allow you to fully utilize the GainStation 8 Mk2's potential. The clean stage is excellent for clear, glassy sounds and pads, and a combination of clean and tube stages for most other sounds. The more dynamic the material, the more effectively you can utilize the limiter.

Tube Distortions with GainStation 8 Mk2

The GainStation can be a great creative tool for creating distortion effects for suitable instruments and loops. Try using very high tube gain settings, so that the 18 dB LED is constantly illuminated. Increasing the clean gain will feed more level to the tube stage, intensifying the tube saturation effect.

Activating the germanium limiter will add a different type of distortion with more overtones. The tube limiter will not add distortion, but will create "hard limited" sounds with an extreme loudness effect.

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Application Examples

Drums/Snare Drum

Exercise caution when setting levels to avoid clipping. Drums are notorious for fast, powerful transients that can easily add 10 dB to the average level. In addition, few drummers (or any musicians, for that matter) are so disciplined that they don‘t play louder during a take or concert than they do during sound check. Experiment to see whether or not you like the sound of the tube stage and in what proportion. It‘s definitely a good idea to use germanium limiting to protect converters and/or other equipment and prevent unwanted distortion (see “Limiter”, page 20). In tube mode, the limiter may be more audible than you‘d like it to be when used on drums.

Bass Drum

Here pretty much the same applies as for snare drum. The germanium limiter may tend to accentuate the attack or “click” of the bass drum, which can lead to undesirable sound variations with less disciplined drummers.

Toms

Level setting is not quite as critical with toms. Moderate use of the tube limiter will provide pleasant yet effective leveling.

Overheads

Using the tube stage on overheads can give the entire drum set extra punch and presence—don‘t worry if the 18 dB LED illuminates brightly in this case. Higher tube gain levels will increase the punch and loudness effect. The tube limiter is an additional creative tool on overheads.

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Inside the GainStation 8 Mk2

The most time-consuming part of the development of the GainStation 8 Mk2 was searching for, selecting and matching components, PCB's and IC's. One decisive factor in achieving impeccable audio quality is the refusal to accept any weak spots in the chain—the insistence upon each link being as good as the next. It makes no sense to use a world-class op-amp with an improperly engineered power supply or lower-quality passive components such as standard resistors and condensers.

The GainStation 8 Mk2 is based on fully discrete op-amps that operate in class A mode. Class A operation dictates that both end transistors are constantly conducting current to prevent distortion. In conventional class B amplifiers, each transistor carries a half-wave, and distortion occurs every time current moves from one transistor to the next. Class A operation requires much higher closed-circuit current—approximately 6 mA with this op-amps or roughly three times the total current consumption of a conventional amplifier—which in turn leads to increased heat generation.

Several months went into the development of the GainStation 8 Mk2 op-amp. First, we tested several different circuit configurations, using test equipment as well as listening tests with a wide variety of program material. It became more and more apparent that less complicated circuits provided better audio results.

The GainStation 8 Mk2's input differential amplifier utilizes an extremely low-tolerance, thermal-coupled matched transistor pair in a single casing. This prevents deviances between the transistors to ensure minimal THD (total harmonic distortion) even at various temperatures. The resistors in the initial differential amplifier are connected to a secondary differential amplifier—also based on a matched transistor pair—that handles current conversion.

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An output stage, which also operates in class A mode with over 6 mA of closed-circuit current, functions as a current amplifier.

The transistors and resistors utilized also had an enormous effect on the audio quality. To facilitate selection, we assembled several models and subjected them to extensive listening tests. All this trouble more than paid off: the final GainStation 8 Mk2 op-amp has a slew rate of over 100V/µs—several times faster than industrial op-amps. This is an absolute prerequisite for clean, transparent and dynamic audio. Transients are depicted with unparalleled accuracy, resulting in an open, airy and realistic sound.

The clean stage is based on a fully discrete, balanced instrument amplifier and also operates in class A mode. The special circuit configuration ensures consistent frequency response at virtually every gain setting. With its slew rate of over 200 V/µs, it is able to amplify fast transients and extremely high frequencies with almost no distortion. An op-amp subsequently converts the instrument amplifier‘s output signal into an unbalanced signal, which is fed to the tube.

A generously proportioned 2.2 µF WIMA-MKP decoupling capacitor is utilized to ensure clean, punchy low frequency response. An impedance converter adapts the tube‘s high-impedance signal to the output stage, which also utilizes fully discrete op-amps and can easily drive extreme cable lengths. Coupling condensers were used as sparingly as possible to avoid their inherent disadvantages such as diffuse sound, slurring and loss of dynamics. Instead, servo circuits were utilized to eliminate DC artifacts.

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The Instrument Input is a fully discrete impedance converter that also operates in class A mode. It is based on a low-noise field effect transistor that is especially well suited to this task due to its extremely high input impedance. The signal then passes to the clean gain stage.

In order to ensure the shortest possible signal paths, all switching functions are handled by optimally positioned, encapsulated, gas-filled relays with gold-plated contacts—the switches themselves only trigger the relays. Since resistors also greatly affect audio quality, the entire audio signal path utilizes painstakingly selected resistors with 0.1% tolerance.

The op-amp circuits use premium FKP foil condensers, which sound much more open than ceramic types and provide more natural dynamic response.

All circuit boards have oversized grounding surfaces for optimal shielding.

External Power Supply

In the case of the power supply, no expense was spared. After all, the power supply is one of the primary factors in the audio quality and overall sound of any device. Just like the best coffee beans in the world will not produce a good cup of coffee with poor water, the best circuits can‘t produce a great sound with unreliable, inconsistent current.

In order to provide optimal current, the GainStation 8 Mk2 was outfitted with an external power supply. Properly installed, transformer hum and interference should never be an issue and the unit should deliver clean, clear audio.

The 185 VA transformer is generously proportioned to ensure plenty of power in any situation and proper current for the various circuits. Further interference rejection is provided by a power-on relay, which requires only minimal current. The power supply design keeps the GainStation‘s internal circuitry free from AC power, which could negatively influence the sensitive preamps.

Entirely new circuit designs were developed to process the various direct currents. The +/- 30 V current, for example, utilizes a discrete voltage regulator with barely measurable noise. High-speed rectifier diodes and total capacities of 53,600 mF ensure sufficient current to process even the most powerful impulses. In addition, most currents are stabilized using 400 V/100 nF MKP foil condensers to ensure plenty of current for fast transients.

48 V phantom power is also processed using discrete, low-noise voltage regulators and fed directly to the microphone conductors through two resistors.

Last but not least, the +250 V anode current is regulated by a voltage regulator to compensate for AC influences.

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Frequency response (Clean Gain 30 dB, Tube Gain off, output level 0 dB, +/- 0.5 dB): **‹1 Hz-125 kHz**

Frequency response (Clean Gain 30 dB, Tube Gain off, output level 0 dB, +/- 3 dB): **‹1 Hz-310 kHz**

Frequency response (Clean Gain 30 dB, Tube Gain 1 dB, output level 0 dB, +/- 0.5 dB): **‹1Hz-125 kHz**

THD+N (Clean Gain 24 dB, Tube Gain off, output level +6 dB, 20-22 kHz, +25 dBu out): **0.00038 %**

THD+N (Clean Gain 23 dB, Tube Gain 1 dB, output level +6 dB, 20-22 kHz, +25 dBu out): **0.032 %**

Noise (Clean Gain 10 dB, Tube Gain off, output level 0 dB, 20-22 kHz, A-weighted): **-99.6 dBu**

Noise (Clean Gain 30 dB, Tube Gain off, output level 0 dB, 20-22 kHz, A-weighted): **-94.6 dBu**

Noise (Clean Gain 60 dB, Tube Gain off, output level 0 dB, 20-22 kHz, A-weighted): **-68.4 dBu**

Noise (Clean Gain 20 dB, Tube Gain 10 dB, output level 0 dB, 20-22kHz, A-weighted): **-86.5 dBu**

EIN (Clean Gain 60 dB, Tube Gain off, output level 0 dB, 20-22kHz, A-weighted, 40 Ω): **128.4 dB**

Dynamic response (20-22kHz, A-weighted): **›130 dB**

Common Mode Rejection (Clean Gain 30 dB, Tube Gain off, 1 kHz, Input -30 dBu, output level 0, w/o transformer): **›80 dB**

Maximum Output Level: **+34 dBu**

Max. Input Level (Mic Input, Hi-Z Input): **+17 dBu**

Input Impedance (Instrument input): **›1 MΩ**

Output impedance: **›75 Ω**

Slew Rate (Clean Gain 30 dB, Tube Gain off, Output Level +6 dB): **›40 V/µs**

Phantom power: **48 V +/-2 V**

Power consumption (w/o AD-Converter): **140 W**

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Dimensions/Weight

Dimensions (W x H x D):	482 x 88 x 237 mm
Weight (w/o Lundahl transformer):	6,3 kg
External power supply – dimensions:	219 x 85 x 257 mm
Weight:	6,8 kg

Technical specifications are subject to change without notice.

Options

The following accessory is optionally available:

- Lundahl input transformer (upgrades after sale by authorized service personnel or SPL only)

Information on Lundahl Input Transformers

We think a good part of the "warmth" that is commonly associated with vintage gear comes from transformers. With transformers the low end and lower mids sound rounder, full-bodied with more punch. The top end gets a silky touch and benefits from improved presence without sounding boosted. Reasons are reduced odd harmonics (which produce harsh top end impressions) and a slower characteristic compared to electronic stages which causes a more voluminous sound.

We recommend transformers especially for vocals while electronic stages can be better for highest precision in signal transmission (transients), but in the end it's a question of personal taste, applications or for example which mics are in use.

The GainStation 8 Mk2's input transformer delivers 7 dB of additional passive gain, which must be added to the printed values.

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Your Notes

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