Hughes & Kettner®
TECHNOLOGY OF TONE

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HU0212

GM 36

Head

Note!
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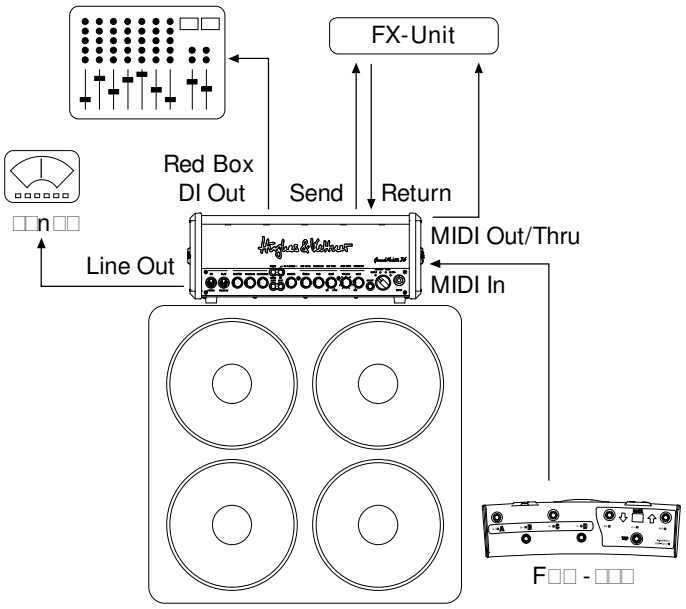
Directory

GrandMeister 36

Undigital. Total recall.

1 Quick Start



Mains In: Connect the factory-included power cord (Mains Lead) to this socket.

MIDI In: Connect the MIDI Out of your favourite MIDI controller to the MIDI In. Though this is a 7-pin interface, you can connect a standard 5-pin MIDI cable and use any standard MIDI controller. The two additional terminals (1 and 7) serve to supply phantom power to the Hughes & Kettner FSM-432 MIDI board.
The MIDI In is as important as the Input for your guitar! Only via MIDI you will have access to all 128 presets of the GrandMeister 36.

Input: Connect your guitar to this input using a shielded cord equipped with 6.3 mm (1/4") jack plugs.

Speaker: Connect a speaker cabinet designed for guitar amps to this jack. Using a single speaker cord, you can connect any cab with an impedance of 8 □ to 16 □. We recommend the matching cabs Hughes & Kettner TM 112 or TM 212.

Power/On Switch: Set this switch to On to get the mains power flowing. The amp lights up, and the tubes will begin to heat up.

Play/Standby Switch: Give the tubes about 30 seconds to get toasty; then you can flip the "Standby" switch to "Play". The amp is now ready to operate. When taking a longer break from playing, please use the "Standby" switch so the tubes remain at operating temperature. This protects them and ensures they last longer.

2 The fundamentals of handling GrandMeister 36

GrandMeister 36 is a tube amp, and it works much like other tube amps. But its handling concept is more advanced, so time spent getting to know how it operates is time well spent. The following basic facts will help you understand the amp's operating concept:

- Although GrandMeister 36 is an analog tube amplifier, all its switching and controlling functions (except the Master knob) are programmable.
- Depending on the amp's operation mode, some knobs and switches have different functions.
- All settings can be saved and recalled via MIDI. For this purpose, you can store your sound settings into 128 memory slots, the so-called presets.

2.1 How the knobs work

GrandMeister 36 is a four-channel tube amp. All four channels are controlled by the same set of knobs. Your choice of channel determines the knob's assignment. For example, when you have chosen the Clean channel via the chicken-head selector switch (see chapter 3), the Gain knob will determine the Clean channel's amount of gain. If you switch to the Lead channel, you can use the Gain knob to control the Lead channel's gain amount. The great advantage of this design is that the channels are truly independent and do not share Gain, Volume, or tone controls. You can even adjust Presence, Resonance and Reverb settings separately for every channel if you like!

Note: The knobs look and feel like standard-issue pots with a 300-degree control range and left and right stops. But there's a difference that may take some time getting used to: The knob setting programmed in a preset is independent of the knob's physical position. In other words, when

you switch from one preset to another, the knob's actual position may not reflect the setting programmed in the preset, and you may well hear something other than what you're seeing would suggest. The knob will respond like any other conventional pot as soon as you move it. The Store LED in the Master section tells you the knob's
setting stored in the preset. It lights up when the physical position of the knob corresponds to the preset setting. You can learn more on this in section 2.4.

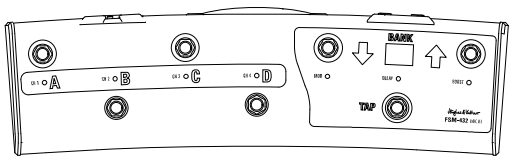
Heads Up: You may hear a soft background noise when twisting knobs. This sound is made by the Programmable Resistor Network (PRN™), as it switches its 256 resistors: Each of these rotary controls consists of 256 individual resistors in serial array, 256 switches, and a memory with the ability to save and recall every switch's position.

2.2 Selecting presets

Presets can only be changed via MIDI. You can use any MIDI footswitch, MIDI controller, or MIDI equipped pedal board to switch presets. Both MIDI devices, amp (receiver) and the controller (sender), should use the same channel. Otherwise, MIDI commands will be ignored or get lost. The factory default is MIDI channel 1 and "Omni On" (amp receives on all 16 MIDI channels) to guarantee instant operation. If the GrandMeister 36 does not react on program changes properly, see chapter 8.1 to change the MIDI channel or refer to the manual of your favourite MIDI controller.

2.3 Using the Hughes & Kettner FSM-432 MIDI Board

Let's have a look on the Hughes & Kettner FSM-432 first. It serves to select the 128 memory slots arranged in 32 banks of four presets each. You can easily configure setups any way you wish, say by assigning the four presets of a bank to a song.



Preset A, B, C, D
Presets within a bank activate directly, that is, you can switch straight from A to B within the same bank. The LEDs above the A, B, C, and D buttons indicate the selected preset.

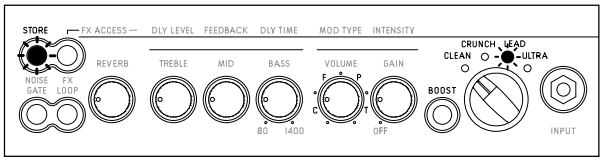
Bank Up/Down
To access a preset in another bank, select the target bank using the Up and Down buttons. You can continue playing with the current preset while you're navigating. The display of the FSM-432 shows the banks number; it flashes until you select a preset in the target bank by pressing A, B, C, or D. The FSM-432 will not switch over to the new preset until you do this.

Tap
Tap offers you a quick, convenient way of adjusting delay time. It's particularly handy on stage: Simply tap your foot on the Tap button in time with the beat to match delay time to the tempo. See section 4.3 for more info.

2.4 Programming a preset

Programming a preset is as simple as it can get. Once you have found your favourite setting, exactly that setting of every single knob and switch (except the Master Volume) can be stored into a preset with the Store button. This is pretty much like playing a tube amp with 128 channels, each with its own Gain, Volume, EQ and even effects setting.

Storing settings by overwriting the currently selected preset



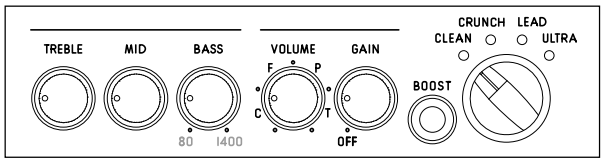
An easy way to store edited settings is to simply overwrite the most recently selected preset. To do this, press and hold the Store button for about two seconds until its light flashes briefly and then extinguishes. The Channel LED (see chapter 3) also flashes to confirm the write operation. Release the Store button, and your settings will be stored.

Storing settings by selecting a new memory slot
If you do not wish to overwrite the current preset, you can easily select a new memory slot instead. In this case, rather than holding the Store button down for two seconds, press it briefly and then release it. Its light stays on to signify that GrandMeister 36 is primed and ready to receive a MIDI program change to define a memory slot.

- From the FSM-432: Select a MIDI bank from 1 to 32 on the FSM-432. The bank number in the display flashes to signify that the FSM-432 is waiting for input via one of the four preset buttons A to D. Then engage preset button A, B, C, or D. The display stops flashing, the light on the Store button extinguishes, and the preset is stored.
- From any other MIDI device: as soon a program change is sent, the preset will be stored and can be recalled just by sending that program change again.

Reading out stored knob settings
When you select a preset, the single knobs' actual positions may not represent their stored values. But it is easy enough to read the information out: Select a preset, grab the knob of your choice and twist it to the left or right until the Store button lights up. Now the knob's position matches the setting stored in the preset.

3 The channel section



GrandMeister 36 sports four channels, each voiced very differently and accessible via a chicken-head selector switch. The power amp feedback circuit, which has a formative hand in shaping your tone, is also reconfigured during channel switching. The programmable knobs (see 2.1) afford you full access to all sound parameters in every channel. We even painstakingly fine-tuned the knobs' control ranges and characteristics to match the selected channel's voicing.

1 Clean Channel: GrandMeisters Clean channel certainly merits its name. It delivers sparkling fresh sounds and offers tons of headroom. It's worth your while to experiment with different Gain settings in combination with the switchable Boost.

2 Drive Channel: Your first stop for classic overdrive at its finest. This channel sweeps the sonic spectrum from clean to mean, and countless tones in between. Engage Boost to conjure a rude rock roar.

3 Lead Channel: This channels masterfully musical compression sends those riffs and licks flying off your fingertips. Hit Boost for an extra helping of in-your-face solo sound.

4 Ultra Channel: Get your high-gain tone right here. The Ultra channel's top end slices, dices, but never sacrifices its thunderous low end for raging metal riffs and larger-than-life lead tone. Dropped tuning conjures a quasi religious experience.

5 Gain: The Gain knob determines input sensitivity and therefore the preamps saturation level. Paired with Boost, it is your most important sound-sculpting tool.

6 Boost: Boost targets specific frequency ranges and kicks them up a notch. This yields even more assertive, creamier, or punchier tone, depending on the channel.

7 Bass, Mid, Treble: The three-band voicing section's sound-shaping action is fine-tuned for each channel, and it specifically addresses the frequency ranges that define each channels characteristic tone.
Heads Up: These are classic passive tone controls that influence one another. For example, if you crank the Mid knob, the Bass knob will be less effective than when you back the Mid knob down. Presence and Resonance are independent of the three-band voicing controls; that is, their action remains unaffected by other knobs settings.

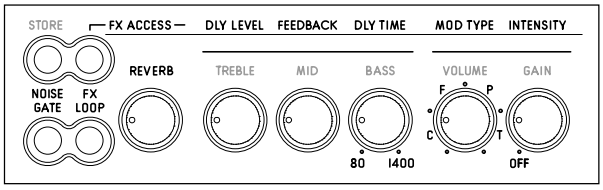
8 Volume: Use the Volume knob to adjust preset levels and adjust their relative balance to other presets.
Heads Up: Unlike a conventional Volume control, this knob does not bring the level all the way down; it merely boosts or cuts the given level. The 12 o'clock position is the best starting point for adjusting volume.

Caution: Please don't use this knob to control the amp's overall output level – that's the Master knob's job (see 5.1)!

4 The effects section

GrandMeister 36 offers three independent effect modules with reverb, delay and modulation effects as well as a noise gate. All of them can be used simultaneously.

Heads Up: The far left knob positions of the "Reverb", "Dly Level", and "Intensity" knobs bypass the given effect. Twisting those knobs counter clockwise to the far left takes the given effect module out of the signal path.



1 Reverb: GrandMeister's digital reverb matches the warmth and musicality of classic spring reverbs. A genuine improvement over its analog forebears, it automatically adjusts the reverb tail – the higher the Reverb volume setting, the longer the reverb time.

2 FX-Access: You always have direct access to the "Reverb". In order to access the Delay and Modulation effects, just press the FX-Access button – it will start flashing. Now you are in the FX-mode, and the channel control knobs now serve as effects controls. To exit the FX-mode, press FX-Access again. It stops flashing and you are back to the tone control mode.

3 Delay: The Delay module's "Dly Level", "Feedback" and "Dly Time" knobs afford you total control over all parameters.

3.1 Dly Level: Adjusts the volume of repetitions, sweeping from all the way off to just as loud as the original signal.

3.2 Feedback: Adjusts the number of repetitions from one to infinite.

3.3 Dly Time: Adjusts the time to the next repetition from 80 milliseconds to 1.4 seconds. When you're tapping in delay time on the FSM-432's Tap button (see section 2.3), the effect adopts the new time after your second tap. The Tap LED flashes for about five seconds in sync with the beat to give you a visual indication of delay time. The Tap function only works when the Delay is active. If the Delay is off – or more accurately, bypassed – the effect will not adopt your Tap tempo.

4 Modulation FX: This module serves up four modulation effects – Chorus, Flanger, Phaser, and Tremolo.

4.1 Mod Type: Each effect is assigned to one quarter of this knob's control range. The first quarter addresses Chorus, the second addresses Flanger, the third addresses Phaser, and the final quarter addresses Tremolo. You can adjust the modulation effect's rate within its assigned quarter. The more you turn "Mod Type" up, the faster the rate gets.

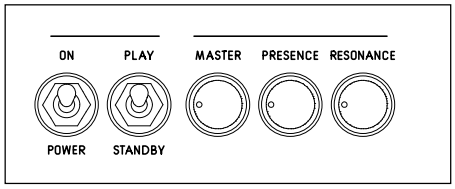
4.2 Intensity: This knob adjusts the volume of the modulation effects.

5 FX-Loop: This serial loop lets you patch in external effects devices: Connect the Send jack in the FX-Loop section on the amp's rear panel to your effects processor's input and the Return jack to the processor's output (see chapter 6.6). The FX-Loop button activates and deactivates the loop.

6 Noise Gate: The programmable Noise Gate button switches the IDB™ noise gate on and off for each preset. When activated, the noise gate kicks in to mute the amp as the signal level drops below a certain threshold. The gate remains shut until you hit the guitar strings. When you do so, it opens up again. The Noise Gate Hard/Soft knob on the amp's rear panel controls the noise gate's response, see chapter 6.5.

5 The Master Section

The Master section lets you adjust the amp's overall volume, Resonance and Presence.



1 Master: As the name suggests, this knob puts the power amp and its volume level at your thumb and forefinger's command. Handle it carefully and you will enjoy a gratifying rather than an agonizing aural experience.
Heads Up: Unlike channel and effect controls, the Master knob is not programmable! It works like any conventional knob, and its physical position indicates the actual setting. It's always a good idea to back the Master knob off by twisting it to the far left position before powering the amp up.

2 Resonance: Set the Resonance knob to 12 o'clock, and you will hear the normal resonance created by the amp-and-cabinet combination. Twisting it counter clockwise dampens the speakers and the cabinets resonance for a looser, softer sound that sweetens up clean tone. Turning the knob clockwise intensifies resonance for a tighter, punchier low-end that works well with distorted sounds.

3 Presence: This knob controls the amount of harmonic overtones generated by the amp – the higher the setting, the more intense the effect.

Heads Up: Resonance and Presence can be programmed into every preset, or these controls can be used as a master control that is not changed by switching presets, like the Master Volume control. If you want to use Resonance and Presence as a global control, press Store and FX-Access simultaneously for three seconds until the Store LED starts flashing. Now the FX-Access LED indicates if you are in Global Mode (flashing) or in Preset Mode (not flashing). You can change the mode with the FX-Access button: if it does not flash (Preset Mode), press it to change to Global Mode. If it flashes (Global Mode), press it to change to Preset Mode. To store your changes press Store for three seconds until it stops flashing.

6 Rear panel

1 Speaker: GrandMeister 36 offers one speaker output for 8 Ω to 16 Ω cabinets. Connect a speaker cabinet designed for guitar amps to this jack.

Using a single speaker cord, you can connect any cabinet or combination of cabinets whose total impedance ranges between 8 Ω and 16 Ω. The formulas below serve to calculate the overall impedance (R) of two cabinets with different impedances (R1 and R2):

• For cabinets wired in series:
R = R1 + R2

Example: If you connect two 8 Ω cabinets, the overall impedance is 16 Ω. However, very few modern cabinets are wired in series. Parallel circuits are far more common.

• For cabinets wired in parallel:
R = (R1 x R2) / (R1 + R2)

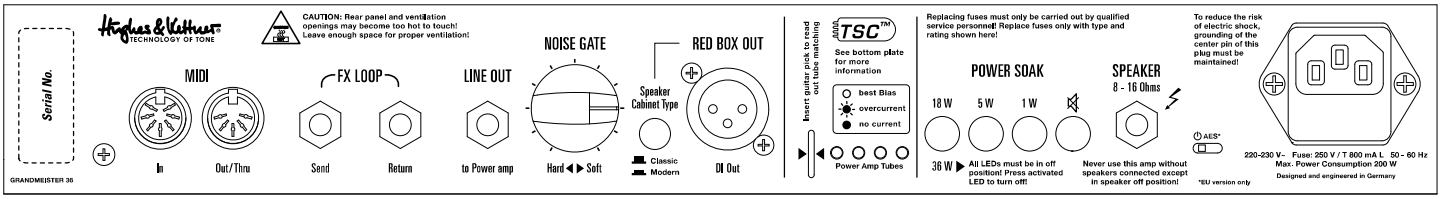
Here is an example with two 16 Ω cabs:
R = (16 x 16) / (16 + 16)
R = 256 / 32 = 8 Ω

2 Power Soak: This feature lets you enjoy the benefits of full-blown power amp saturation at low volume, so you can play at home in your living room without alienating the neighbours. Its silent recording capability lets you capture genuine tube-driven tone via a mixing console without having to drive speakers. And if you want to rehearse in silence any time day or night, simply plug a set of headphones into the mixer. Thanks to the amp's programmability, you can easily program your own set of studio and home presets.

None of the buttons in this section lights up when the amp is in 'normal' operating mode (36 watts of output power). Pushing one of the four buttons will activate the output power reducing function. When you press the 18W button, TSC™ disables two tubes to reduce the output power by half to 18 watts. When you press the 5W and 1W buttons, some of the power is converted into heat to further reduce the output to 5 watts and 1 watt, respectively. In Speaker Off mode, all the power is converted into heat and the amp is muted. Re-pressing the currently selected and therefore illuminated button will deactivate the Power Soak and bring you back to 36 watts of output power.

Note that if you choose to mute the amp, you do not need to connect a speaker. Designed to enable silent recording, this option provides the full signal to the Red Box output. To protect the power amp, GrandMeister 36 automatically engages this mute circuit as soon as the plug is pulled from the Speaker Out port.

Heads Up: Cutting down the power from 36 to 18 watts is done by TSC™ shutting down one pair of tubes (see section 7.1), which is why two TSC™ LEDs always light up when the amp is in 18 W, 5 W, 1 W and Speaker Off modes. In this case, TSC™ is simply indicating that two tubes are off, and not that it has detected a fault.



3 Tube Safety Control (TSC™): We devoted an entire chapter to the Tube Safety Control. See section 7 to learn more about it.

4 Red Box Out: Invented by Hughes & Kettner, the Red Box has for years set the industry standard for analog guitar DI boxes with built-in speaker emulation. Built into the GrandMeister's output section, it converts the amp's speaker out signal, which is tapped post power amp and pre Power Soak, into a balanced, frequency-compensated signal that you can patch directly to a mixing console. This signal sounds very authentic when piped through a PA or studio monitors. It always sounds like the cab itself, not like a mic'ed cab! Feel free to add some ambience or room effects.

Note: Use a microphone cord to patch this signal to a mixing console. Make sure the mixing console's XLR input is set to line level. If the mixing console lacks XLR inputs or if these cannot be set to line level, you will need an XLR to 6.3 mm (1/4") jack adapter readily available in music stores.
Heads Up: The amp's Master knob settings and the selected Power Soak mode directly affect the signal level: Stepping up to 36 watts from 18 watts changes the Red Box Out level as it does the Speaker Out level. Stepping down from 18 watts to 5 watts, 1 watt and Speaker Off (for silent recording) does not change the level! So you can step up from 18 watts to 36 watts on the fly (via preset change), for example, to boost the volume for leads when playing live. The level of the signal sent to the Red Box Out (and to the mixing console) will be bumped up accordingly. The signal level of the 18 W, 5 W, 1 W and Speaker Off modes remains the same for a very good reason: That way you can choose the right Speaker Out level for the rehearsal room, home practicing and silent recording without having to adjust Master knob settings.
48 volts phantom power: If you want to switch on your mixing desk's 48 volts phantom power, you can do so without any problems. The Red Box Out automatically filters DC phantom power of mixing desks' microphone inputs.

4.1 Speaker Cabinet Type: This button lets you select a classic or modern type of cabinet. Please note that this feature is rather a subtle pre-filter than a radical sound shaping tool.

5 Noise Gate Hard/Soft: This knob controls the noise gate's sensitivity. The noise gate's IDB™ technology automatically adapts the standard attack and threshold parameters. Its far left position is labeled Hard; its far right position is labeled Soft. The further you twist the Noise Gate Hard/Soft knob to the right, the more sensitive the noise gate's response. Set it to 12 o'clock if you want it to open up at very soft signal levels. The further you twist the knob to the left, the harder the noise gate kicks in and cuts off signals.

Outboard noise gates sandwiched between the guitar and amp or plugged into the FX loop can only measure the signal at one point. The Intelligent Dual Breakpoint (IDB™) technology gauges the signal at two points, directly at the Input jack and post preamp, but pre effects. The noise gate uses these two values to calculate the optimum response. What's more, it does not cut off Reverb and Delay signals.

Heads Up: The Sensitivity knob's setting applies to all presets that incorporate the noise gate. This is convenient and intentional: If conditions on stage are different in the rehearsal room, you can adjust the noise gate's response for all presets with one simple tweak.

Tip: 12 o'clock is the universal setting. It you wish to use the noise gate as a stylistic device when playing fast staccato riffs at high gain levels, then dial in a setting towards the Hard end of the control range

6 Line Out, FX Send, FX Return

6.1 Line Out: The Line Out offers the preamp signal to patch it to another power amp or to a tuner.

6.2 FX Send: Connect the FX Send to your external effects processor's input.

6.3 FX Return: Connect the FX Return to your external effects processor's output.

Tip: If you're a stomp-box user, you may want to try the four-cord method: For devices that work best plugged into the front end of the amp, simply connect the guitar to the input of the first pedal in the chain, and the last pedal's output to the amp's Input. Now do the same for devices that work best in the FX loop: Connect the pedal's output to the amp's FX Return and the amp's FX Send to the pedal's input. This lets you route chorused, phased and other modulated signals into the GrandMeister´s preamp and time-based effects such as reverb and delay after the preamp.

If your multi effector features amp models, you can patch these straight to the GrandMeister´s power amp via the FX Return. In combination with the Power Soak and the Red Box Recording Out, this gives you a powerful recording front end that offers very interesting re-amping and sound-shaping options for just about every conceivable signal.

Heads Up: You can bypass the GrandMeister's preamp by routing amp models into the FX Return. However, when you switch channels its power amp is re-voiced to deliver the best tone for that channel. This means every channel sounds different, even if you decide to use only the power amp! You probably want the amp model's sound and volume to remain consistent with your original programming. If so, you'll have to remember which channel you used for programming and select it when you activate the amp model. However, the better option is to program a preset to do this for you.

7 MIDI In: MIDI In is a 7-pin interface, you can connect a standard 5-pin MIDI cable. The two additional terminals serve to supply phantom power to the Hughes & Kettner FSM 432 MIDI board.

Heads Up: The FSM-432 comes with a 7-pin MIDI cable. You do not need a power source for the FSM-432 because phantom power is provided. If you wish to use a 5-pin MIDI cable, you will however need a wall wart. For such cases, the FSM-432 provides an innovative mains port that accepts any AC or DC adapter rated for 9 to 15 volts.

8 MIDI Out/Thru: MIDI Out/Thru forwards signals patched into MIDI In to other devices. You can connect any external MIDI-enabled signal processor that you wish to switch synchronously with GrandMeister 36.

7 Tube Safety Control (TSC)

TSC™ adjusts the bias to improve the amp's tonal and technical stability and to extend the power tubes' lives. It does this automatically and continuously, so there is nothing for you to do but to enjoy the convenience. You can swap tubes easily, quickly, and safely: All the hard work of biasing gets done automatically, so swapping tubes is an exercise in speed and convenience. This is a big help not only in case of a defect, but also when you want to compare different brands of replacement tubes.
Caution: Replacing tubes is a job best left to qualified professionals! TSC™ merely spares the technician the biasing effort.

To use the full information TSC™ can provide you with, you will have to look at the four LEDs in the TSC™ section on the rear panel of the amp. Each LED is assigned to the power tube occupying that corresponding position. The LEDs will give you two different kinds of information: Firstly, they indicate the operating status of the tubes see section 7.1). TSC™ constantly performs an error diagnosis and will even shut down defective tubes if necessary in order to avoid a total failure of the amp. In addition, you can easily get a read-out of the individual tube's bias points, using any standard guitar pick (see section 7.2).

7.1 Automatic Status Indications

All LEDs light up and stay on

All LEDs remain on for as long as the amp is in standby mode. When you flip the "Standby" switch to "Play", they will extinguish after a few seconds. If all of the LEDs remain illuminated, the most likely cause is a blown anode fuse that needs to be replaced by a technician. The anode fuse can trip if a tube is already defective when the amp is switched on, and TSC™ does not have enough time to measure the idle current and to then shut the faulty tube down.

None of the LEDs lights up

The power tubes are operating normally.

One LED lights up continuously

If only one LED lights up, then the tube assigned to this LED is not delivering enough current and has been shut down. If the LED does not extinguish after a few minutes, this tube must be replaced.

Two LEDs light up continuously

This tells you one of two things: Either the two corresponding tubes are not delivering enough current and therefore have to be replaced (see the instructions for one illuminated LED, section 7.1), or the power soak is active. In the latter case, two tubes are switched off automatically, and the two illuminated LEDs are indicating this (also see section 6.2).

One LED flashes, another lights up continuously

The tube assigned to this flashing LED is generating too much current and therefore has been shut down. This tube has to be replaced. In this type of power amp, it takes a pair of tubes working together to produce the best sound. So TSC™ also switches the defective tube's counterpart off (indicated by the continuously lighting up LED), so it doesn't degrade the other pair's tone. There is no need to replace this tube, because there's nothing wrong with it.

Now this is where TSC™'s intelligence saves your gig: If a tube failure like this occurs in a conventional amp, its fuse usually trips and you can't operate it until you replace the tube and fuse. Thanks to TSC™, you can continue playing for as long as the LED remains illuminated. Anyway, please note that shutting down one pair of tubes will halve the amp's output power from 36 to 18 watts. And don't forget to replace the defective tube after your show.

7.2 Manual Read-Out

TSC™ is able to check the power amp tubes' bias points to let you determine if tube pairs are matching. This can easily be done by inserting a guitar pick into the slot right next to the LEDs while the amp is switched on (rather than in Standby mode). All LEDs will flash several times. The number of flashes of every single LED will give you information about the Hughes & Kettner tube rating of the assigned tube as well as about its bias. The tube ratings table below (7.3) shows the Hughes & Kettner tube ratings and how flash counts translate to a rating. For example, if the TSC™ LED flashes six times, the assigned tube has an S2 rating. The chart also tells you that the tube's bias point is set to 13 volts.
Please make sure that the difference in flash counts between the single LES is no greater than four flashes. Only if the difference is no greater than four flashes, TSC™ will ensure optimum sound. If the difference in flash counts is greater than four, we recommend installing a matched set of tubes to improve the tone. This is strictly a matter of tone – technically speaking, the amp will continue to operate safely.

Heads Up: The two inside tubes and the two outside are matched pairs. If just a single tube is swapped, ensure the replacement tube's rating matches that of its counterpart. If all tubes are replaced, ensure they all share the same ratings. You can buy replacement tubes from your local dealer. The original Hughes & Kettner rating (S1-S7, 0-12) is shown on a sticker on the tube.

7.3 Tube ratings tables

Flashes	Rating	Bias [V]
1	S7	10
2	S6	10.6
3	S5	11.2
4	S4	11.8
5	S3	12.4
6	S2	13
7	S1	13.6
8	0	14.2
9	1	14.8
10	2	15.4
11	3	16
12	4	16.6
13	5	17.2
14	6	17.8
15	7	18.4
16	8	19
17	9	19.6
18	10	20.2
19	11	20.8
20	12	21.4
21	*	22
22	*	22.6
23	*	23.2
24	*	23.8
25	*	24.4

8 MIDI

As you've learned in chapter 2.2, presets can only be changed via MIDI. Sender (controller) receiver (amp) must use the same channel. The factory default is MIDI channel 1 and "Omni On". If the amp does not react on program changes properly, the MIDI channel has to be changed.

8.1 Setting MIDI channels and switching Omni On/Off

Flip the Play/Standby switch to Standby. Now press and hold Noise Gate and FX-Loop simultaneously for three seconds. They will start flashing. This assigns special programming functions to the following LEDs and buttons:

- FX-Access: lights up to indicate GrandMeister 36 is configured to receive incoming program changes via all MIDI channels (Omni On, default). If the LED is not illuminated, the amp receives messages via the selected channel only (Omni Off). To change the Omni mode, just press the FX Access button.
- Noise Gate now serves as a +1/up button, FX Loop now serves as a -1/ down button. Use those buttons to change the MIDI channel.
- When configuring MIDI channels, the four Channel LEDs serve to indicate the MIDI channels. Consult the table below for the MIDI channel assignments. They show what in tech-speak is called binary code:

MIDI Channel	Clean	Crunch	Lead	Ultra
1 □	□	□	□	□
2 □	□	□	□	{
3 □	□	□	□	□
4 □	□	□	□	□
5 □	□	□	□	□
6 □	□	□	□	□
7 □	□	□	□	□
8 □	□	□	□	□
9 □	□	□	□	□
10 □	□	□	□	□
11 □	□	□	□	□
12 □	□	□	□	□
13 □	□	□	□	□
14 □	□	□	□	□
15 □	□	□	□	□
16 □	□	□	□	□

Press and hold the two buttons "Noise Gate" and "FX Loop" simultaneously for more than three seconds to save the settings and quit MIDI setup mode. The buttons will stop flashing to indicate the amp is back in normal operating mode.

8.2 MIDI implementation chart / controller list

In addition to controlling all switching functions via sending MIDI program changes, you can also change the parameters of every single editing function of the amp in real time via sending MIDI control changes. The following chart shows the editable functions and the corresponding controller numbers:

Controller number	Function
1	□ □□□□□□□□ □□□□□□□□
4	□□□□ □□□ □□128 □□□□□51 □ □□□1360 □ □
7	□□□□ □ □□□□□
9	□ □□□ □□□□□□. □□ □□□□□□□ □□□ □□□□ □□□□□□ □□□□□□□ □□ □ □□□□□□□□□ □□□□□□□□ □□□ □□□□□ □ □□□□□ □□□□□□□□ □□□□□ □□ □ □□□□□□□□□□.
12	□ □□□□□ □□□□
20	□□□□ □□□□□
21	□□□□
22	□ □□
23	□□□□□□
24	□□□□□□□□□
25	□□□□□□□□
26	□ □□□□□□□□ S□□□□ □□□□ □□□□ □□□□□ □□□□ □ □□□□□□□ □□□□□
27	□□□□ □□□□□□□□
28	□□□□ □□□□□ □
29	□□□□□ □□□□ □
30	□□□ □□S□□□S□□□□□ 5 □□□□□□
31	□□□□□□S□□□□□□ 4 □□□□□□
52	□ □□□□ □□□□□
53	□□□□ □□□□□
54	□□□□ □□□□□
55	□□□□□ □□□□□
56	□□□ □□□□□
57	□□□□ □ □□□□□
63	□□□□ □□□□ □□□□□
64	□□□□□ □□□□

8.3 Factory Reset

A factory reset is a seldom-needed feature. Nonetheless, please read these instructions carefully to ensure you don't accidentally delete your presets. You can perform a factory reset by doing the following:
Press "Store" and "FX Access" simultaneously while powering the amp up by using the Power/On switch. Both buttons will flash three times to indicate the successful factory reset.

Caution: Please note that this procedure is a last-resort option. It will reset all settings, including the 128 MIDI-switchable presets (chapter 2) and the basic MIDI configuration (chapter 8.1).

9 AES

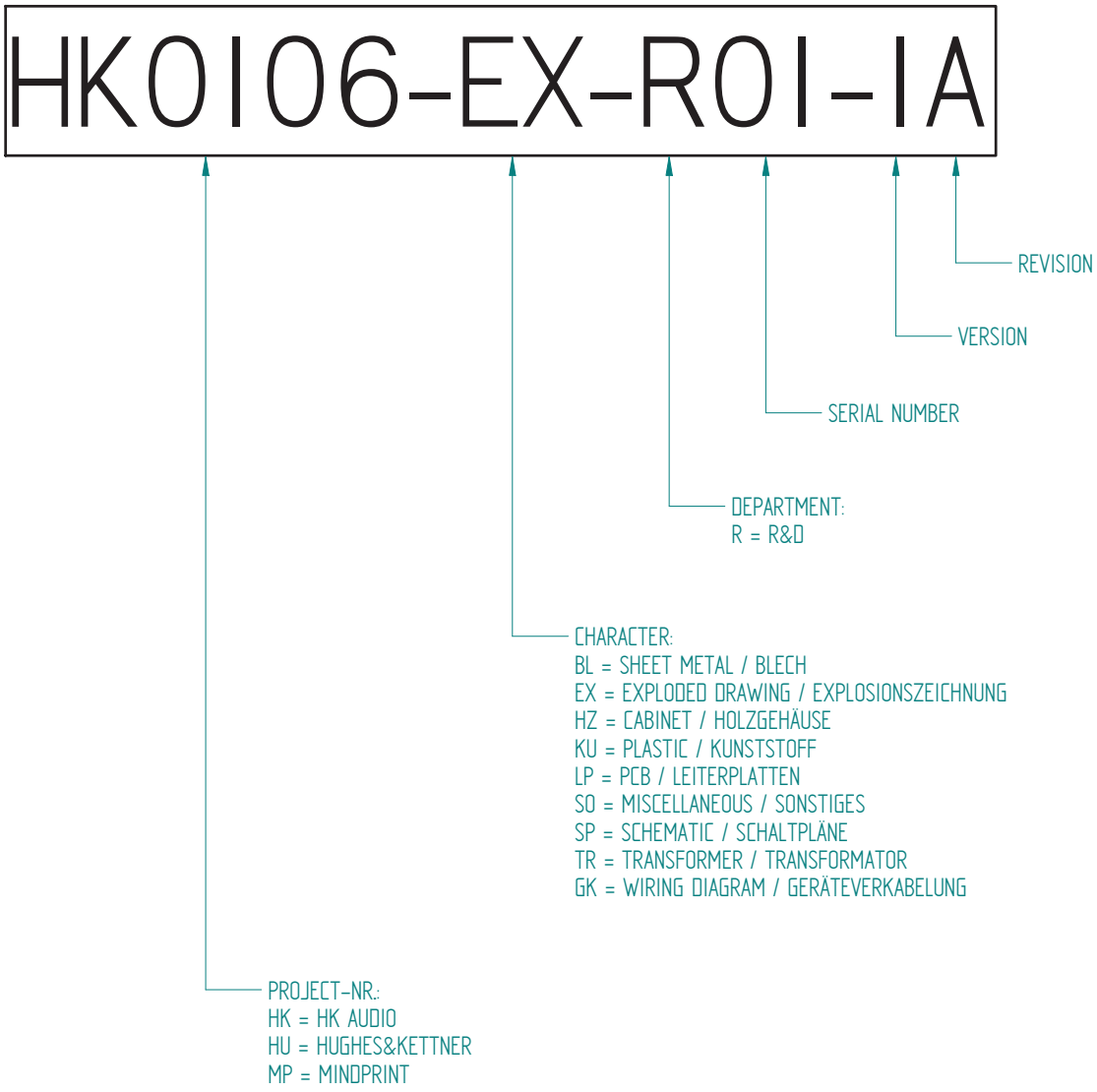
(EU version only, from serial number 50091001)

Referred to Commission Regulation (EC) No. 1275/2008, electrical and electronic devices need to be equipped with an energy saving mechanism which automatically switches the device off after not being used for a certain period of time. On your GrandMeister 36, this mechanism is called AES. It can be activated and deactivated with the mini switch right next to the speaker jack.
Factory default is AES on; the mini switch is in the left position. In this mode, the amp will automatically be switched off after a phase of silence of about 90 minutes. The phase of silence is reset and starts again, as soon as the amp receives an input signal (e.g. by playing a note). A quite gentle signal is enough to trigger the re-start of the 90 minutes phase of silence until the amp will switch off automatically. After automatically being shut down by AES, the amp can be switched back on by flipping the Power/ On switch off and then on again.
Moving the mini switch to the right will deactivate AES, so it will not shut down the amp.

10 Technical Data

GrandMeister 36 Head	
Preamp tubes	3[illegible]12[illegible]7
Power tubes	4[illegible]84
Power output	36 [illegible]
Max. power consumption	200 [illegible]
Mains voltage tolerance range	[illegible]10[illegible]
Ambient operating temperature range	0[illegible]35[illegible]
Mains fuse, 100 volts	250 [illegible]2 [illegible]
Mains fuse, 120 volts	250 [illegible]1.6 [illegible]
Mains fuse, 220-230 volts	250 [illegible]800 [illegible]
Mains fuse, 240 volts	250 [illegible]800 [illegible]
Input jack	6.3 [illegible]1[illegible]4[illegible]1 [illegible]
S[illegible]	[illegible]23 [illegible]
[illegible]	0 [illegible]
Return jack	6.3 [illegible]1[illegible]4[illegible]25 [illegible]
S[illegible]	0 [illegible]
S[illegible]	[illegible]10 [illegible]
[illegible]	[illegible]14 [illegible]
Send jack	6.3 [illegible]1[illegible]4[illegible]220 [illegible]
[illegible]	[illegible]10 [illegible]
[illegible]	[illegible]10 [illegible]
Line Out jack	6.3 [illegible]1[illegible]4[illegible]220 [illegible]
[illegible]	[illegible]10 [illegible]
[illegible]	[illegible]10 [illegible]
Red Box Out	[illegible]1360 [illegible]
[illegible]	[illegible]10 [illegible]3 [illegible]
[illegible]	[illegible]3 [illegible]
MIDI In	7[illegible]20 [illegible]150[illegible] 5[illegible]
MIDI Out/Thru	5[illegible]
Dimensions	446 [illegible]171 [illegible]152 [illegible]
Weight	7.7 [illegible]17 [illegible]

DRAWING-NUMBERS
EXAMPLE



Stamer Musikanlagen GmbH

Stand 17. Jun 04

Standard for single wire confection.

1015 → style 1015 according UL specifications

I → **I** = completely insulated with black shrinktube or appropriate sleeve
IT = partly insulated; only crimp connection insulated.
no marking = without insulation

Z → **Z** = with additional junction
no marking = without additional junction

W → **W** = angled faston
no marking = straight faston

485 → **Faston connector brass tin-plated DIN 46245**
638 = 6,3 * 0,8 [mm]
488 = 4,8 * 0,8 [mm]
485 = 4,8 * 0,5 [mm] if fully insulated (**I**) insulation with blue shrinktube
if partly insulated (**IT**) use IF 602 485 .
288 = 2,8 * 0,8 [mm]
285 = 2,8 * 0,5 [mm] if fully insulated (I) insulation with blue shrinktube
if partly insulated (IT) use IF 602 485
abiso = 5mm bared and tin-plated (teilabzug)
text for special constructions, (for example. 4mm ringshaped faston)

638 → the larger faston connector always mentioned at first. (Nathan drawing number controlling)

150 → lenght in mm within a 50 mm raster

B → **colour**
B = black (phase conductor)
R = red
BR = brown
BL = blue (neutral conductor)
W = white
YG = yellow-green (ground bonding/ earthing connection)

16 → **cross section**
16 = AWG 16 (prefered usage)
Q1.5 = H07VK 1,5mm² (prefered usage)

wire designation:
P + lfd Nr. = AWG single wire black, red, blue, brown or white
E + lfd Nr. = AWG single wire green- yellow
L + lfd Nr. = twisted AWG double wire, lenght specification always in twisted condition
FQL + lfd Nr. = crossover wiring H07VK

Regarding special wirings like wiring harness or similar, drawings will be prepared and appropriate drawing numbers will be stored in the article archive.

Hughes & Kettner®
TECHNOLOGY OF TONE

Service Documents

HU0212

GM 36 Head

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TECHNICAL SERVICE:
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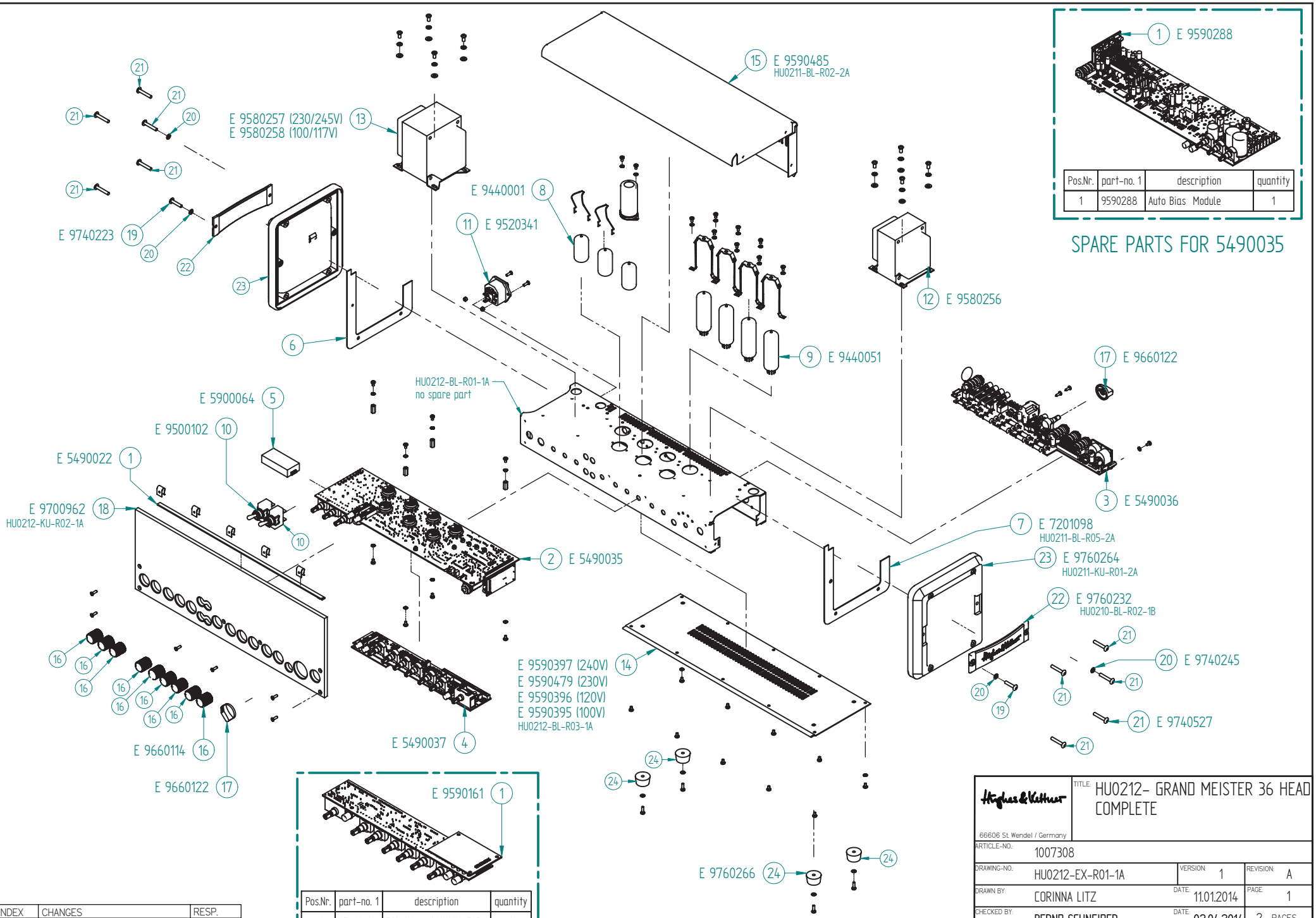
Music & Sales P.E. GmbH • Leipziger Str. 3 • 66606 St.Wendel • Germany



Pos.Nr.	part-no. 1	description	quantity
1	9590288	Auto Bias Module	1

SPARE PARTS FOR 5490035

Pos.Nr.	part-no. 1	description	quantity
1	9590161	Effectboard H&K 8xDSP	1

SPARE PARTS FOR 5490037

INDEX	CHANGES	RESP.

Hughes & Kettner
66606 St. Wendel / Germany

TITLE: HU0212- GRAND MEISTER 36 HEAD COMPLETE

ARTICLE-NO.:	1007308		
DRAWING-NO.:	HU0212-EX-R01-1A	VERSION: 1	REVISION: A
DRAWN BY:	CORINNA LITZ	DATE: 11.01.2014	PAGE: 1
CHECKED BY:	BERND SCHNEIDER	DATE: 02.04.2014	2 PAGES
MATERIAL:		FINISH: -	
FILENAME:	HU0212-EX-R01-1A_GRANDMEISTER36-HEAD		

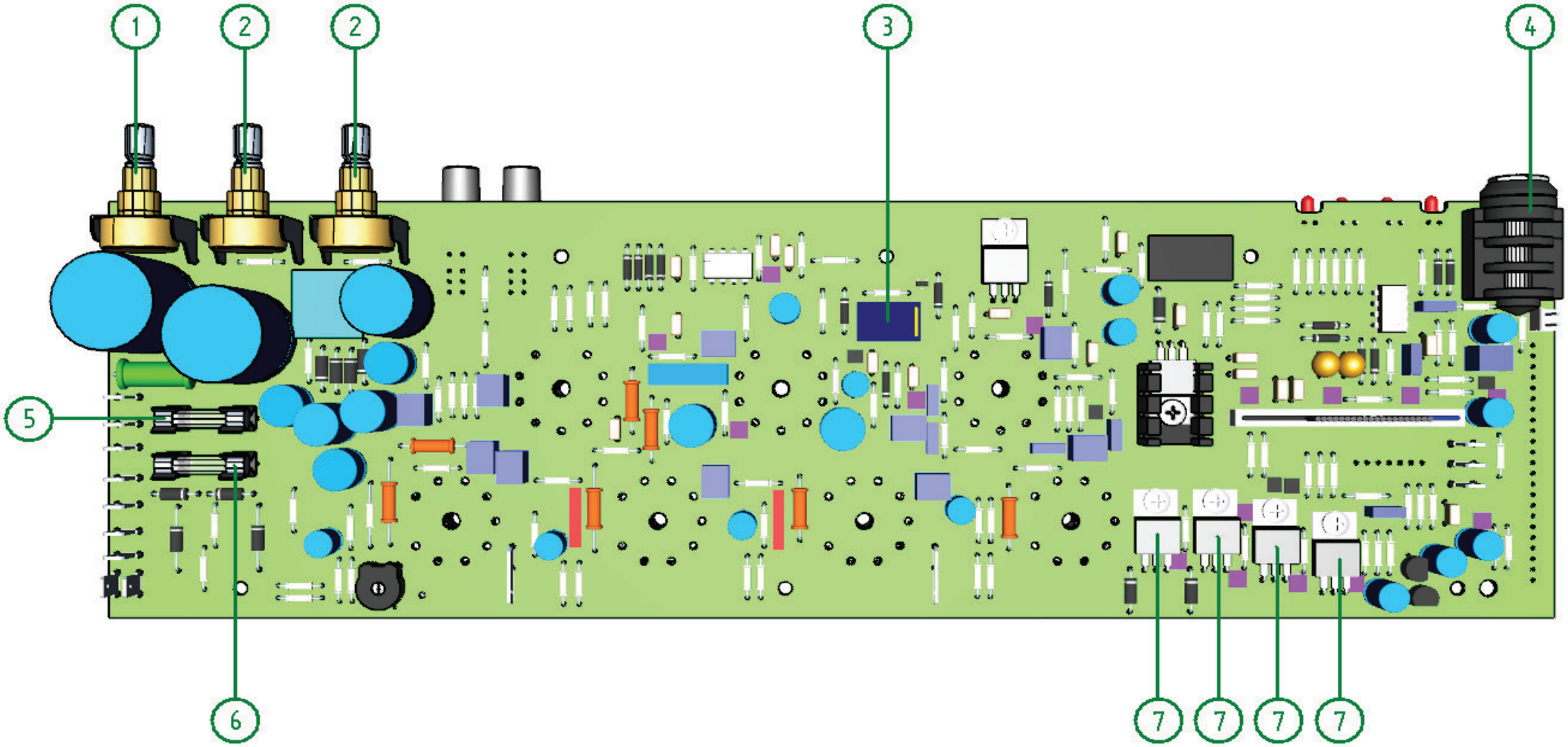
Pos.Nr.	part no. 1	part no. 2	part no. 3	part no. 4	description	Beschreibung	quantity
1	5490022				TM36H lightboard	TM36H Lightboard	1
2	5490035				TM36C Mainboard	TM36C Mainboard	1
3	5490036				GM36 Rearboard	Rearboard TM36	1
4	5490037				TM GM36 uC/µC Platine	TM GM36 uC/µC Platine	1
5	5900064				ERP Module with housing	ERP Modul mit Gehaeuse	1
6	7201097				metal sheet insert left TM36 Head	Einlegeblech links TM36 Head	1
7	7201098				metal sheet insert right TM36 Head	Einlegeblech rechts TM36 Head	1
8	9440001				Tube 12Ax7A China selected	Röhre 12Ax7A China selected	1
9	9440051				Power Tube EL84	Endst.Röhre EL84	1
10	9500102				toggle switch Tubemeister Series	Hebelschalter TM-Serie	2
11	9520341				mains inlet 3528 Typ T5 TM Serie	Netzbuchse Model 3528 Typ T5 TM Serie	1
12	9580256				Audio-Transformer TM36 H/C	Ausgangsübertrager TM36 H/C	1
13	9580257 (230/245V)	9580258 (100/117V)			Mains-Transformer TM36H/C	Netztrafo TM36H/C	1
14	9590397 (240V)	9590479 (230V)	9590396 (120V)	9590395 (100V)	bottom plate TM36 Head	Bodenplatte TM36 Head bedruckt	1
15	9590485				top cover black TM36H /GM36H	Deckel schwarz TM36H /GM36H	1
16	9660114				knurled cylinder knob Chrome TM Series	Knopf Chrome TM Series	9
17	9660122				knob GM36 chicken head flat	Knopf GM36 Chicken Head	2
18	9700962				HU0210 Plexiglas	HU0210 Plexiglas	1
19	9740223				lens flange head screw M4x20 black	Linsenflanschkopfschraube M4x20sw	2
20	9740245				toothed lock washer, D=4.3, IZ, zinc plated	Fächer-Scheibe iz, 4,3 vz	4
21	9740527				lens flange head screw M4x25 black	Linsenflanschkopfschraube M4x25sw	10
22	9760232				handle TM18 Head	Griff TM18 Head	2
23	9760264				side part TM36 H	Kunststoff-Seitenteil TM36 H	2
24	9760266				Rubber Foot 22x12 TM-H Series	Gummifuß 22x12 Tubemeister H	4

INDEX	CHANGES	RESP.

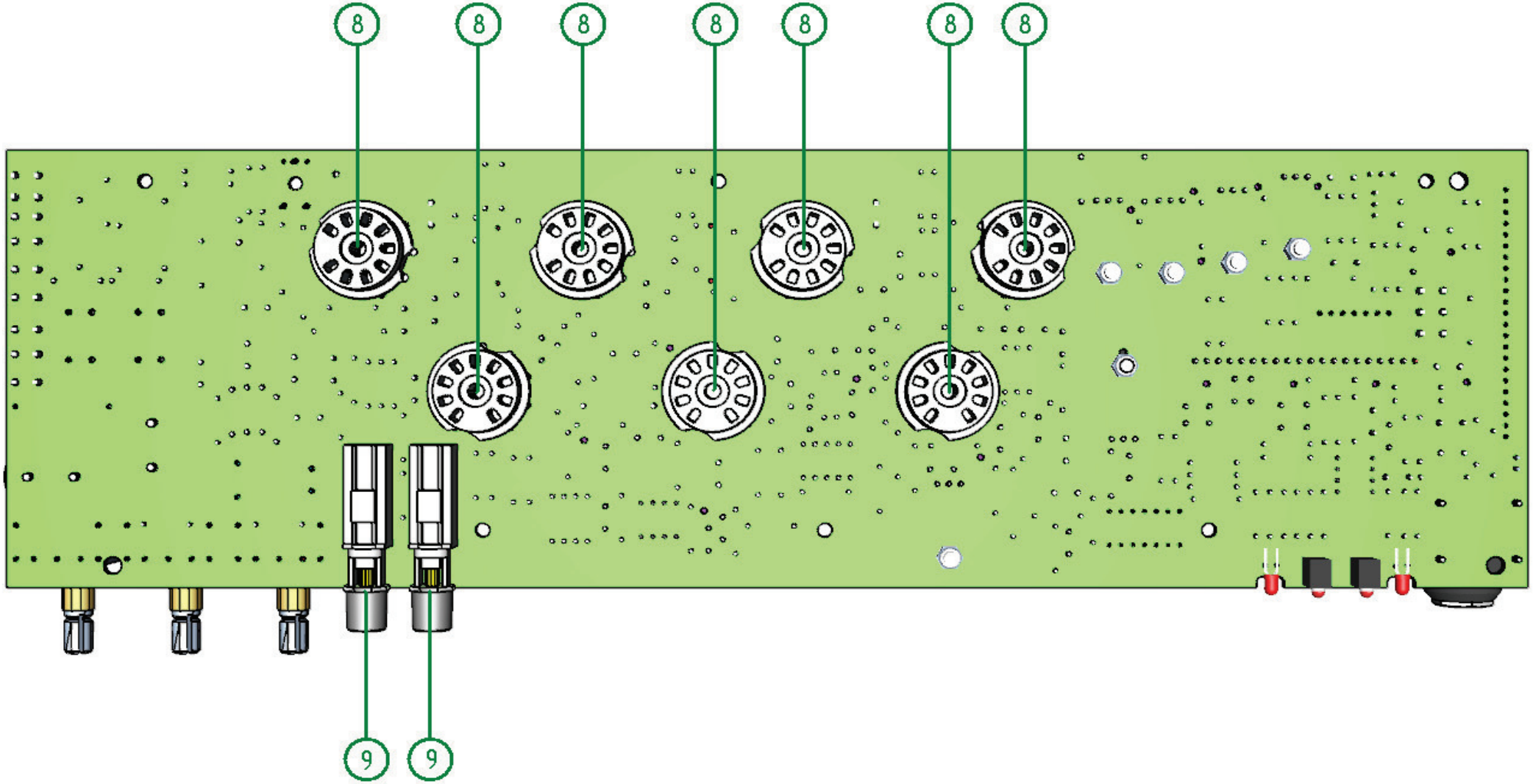
Hughes & Kettner
66606 St. Wendel / Germany

TITLE: HU0212- GRAND MEISTER 36 HEAD COMPLETE

ARTICLE-NO.: 1007308			
DRAWING-NO.: HU0212-EX-R01-1A	VERSION: 1	REVISION: A	
DRAWN BY: CORINNA LITZ	DATE: 11.01.2014	PAGE: 2	
CHECKED BY: BERND SCHNEIDER	DATE: 02.04.2014	2 PAGES	
MATERIAL:	FINISH: -		
FILENAME: HU0212-EX-R01-1A_GRANDMEISTER36-HEAD			



Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 POWERAMP PCB	
DRAWING-NO	VERSION: 1	REVISION: A
DRAWN BY: C. SCHMIDT	DATE: 30.6.14	PAGE: 1
CHECKED BY	DATE	3 PAGES
FILENAME: HU0212-LP-R01_SPAREPARTSLIST		

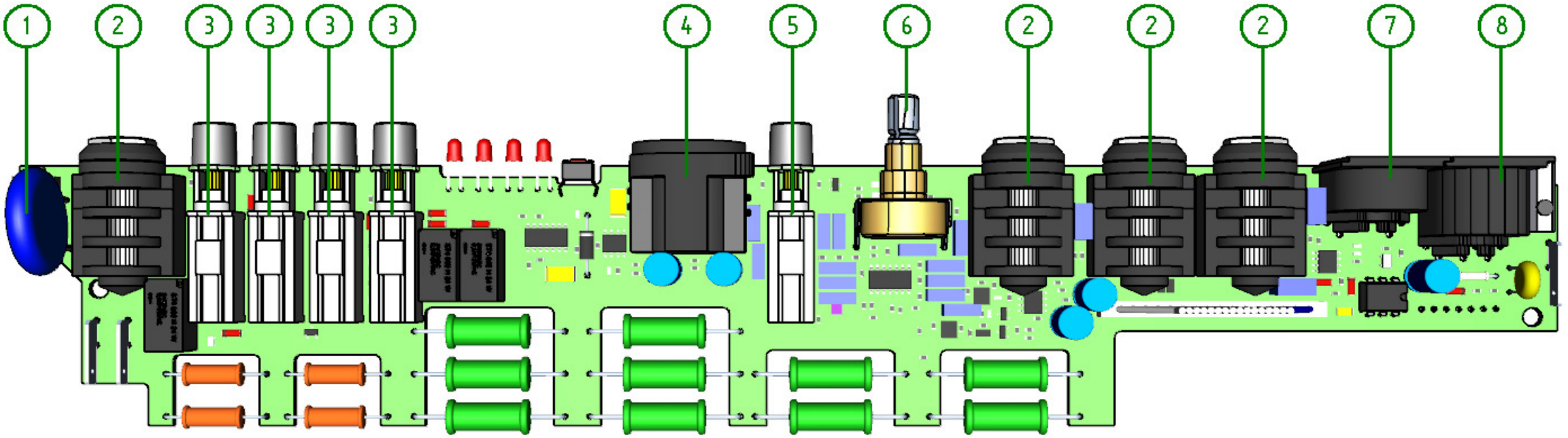


Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 POWERAMP PCB	
DRAWING-NO	VERSION 1	REVISION A
DRAWN BY C. SCHMIDT	DATE 30.6.14	PAGE 2
CHECKED BY	DATE	3 PAGES
FILENAME HU0212-LP-R01_SPAREPARTSLIST		

Spare Parts List for:	HU0212-LP-R01
Project:	Grandmeister 36 Head
Project Number	HU0212
Assembly:	Poweramp PCB

pos.	part. no.	describtion	Bezeichnung	reference designators
1	9140044	pot A250K log mono RK16	Poti A250K log mono RK16	P9 (**Master**)
2	9140033	pot B10K lin mono RK16	Poti B10K lin mono RK16	P8 (**Presence**)
2	9140033	pot B10K lin mono RK16	Poti B10K lin mono RK16	P7 (**Resonance**)
3	9460016	relais FRT5 DC 24V print	Relais FRT5 DC 24V print	REL 1
4	9520360	jack 6.3mm mono prn, switch	Klinkenbuchse 6,3mm mono, print, schalt	J1 (**Input**)
5	9320001	glass tube fuse T800mA / 250V	Feinsicherung T800mA / 250V	FU2 (**Mainfuse**)
6	9320051	glass tube fuse T400mA / 250V	Feinsicherung T400mA / 250V	FU1 (**Anodefuse**)
7	9380077	transistor STP13NK60ZFP	Transistor STP13NK60ZFP	Q14, Q15, Q23, Q24
8	9440003	tube socket 9 pin	Röhrensockel 9 polig	T1 - T7
9	9500109	push botton switch CIC WPML-2BL-NL	Drucktaster CIC WPML-2BL-NL	SW3, SW4 (**FX-Access, Store**)

Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 POWERAMP PCB	
DRAWING-NO	VERSION 1	REVISION A
DRAWN BY C. SCHMIDT	DATE 30.6.14	PAGE 3
CHECKED BY	DATE	3 PAGES
FILENAME HU0212-LP-R01_SPAREPARTSLIST		



Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 REARBOARD PCB	
DRAWING-NO	VERSION: 1	REVISION: A
DRAWN BY: C. SCHMIDT	DATE: 30.6.14	PAGE: 1
CHECKED BY	DATE:	2 PAGES
FILENAME: HU0212-LP-R02_SPAREPARTSLIST		

Spare Parts List for: HU0212-LP-R02
Project: Grandmeister 36 Head
Project Number HU0212
Assembly: Rearboard PCB

pos.	part. no.	describtion	Bezeichnung	reference designators
1	9320084	varistor SIOV-S20K50 50V	Varistor SIOV-S20K50 50V	R89
2	9520360	jack 6.3mm mono prn, switch	Klinkenbuchse 6,3mm mono, print, schalt	J6 **(Speaker-Out)**
2	9520360	jack 6.3mm mono prn, switch	Klinkenbuchse 6,3mm mono, print, schalt	J5 **(Line-Out)**
2	9520360	jack 6.3mm mono prn, switch	Klinkenbuchse 6,3mm mono, print, schalt	J3, J4 **(FX-Loop)**
3	9500110	push botton switch CIC WPML-2YL-NL	Drucktaster CIC WPML-2YL-NL	SW2 - SW5 **(Powersoak)**
4	9520317	XLR-connector 3pol male Wprin	XLR-Buchse 3pol male Wprint	JP2 **(Red Box Out)**
5	9500111	push button switch CIC WPML-4Y-SL	Druckschalter CIC WPML-4Y-SL	SW1 **(Speaker Cabinet Type)**
6	9140032	pot A10K log mono RK16	Poti A10K log mono RK16	P1 **(Noise Gate)**
7	9520012	DIN jack MAB5 SH Wprint 5pol	Diodenbuchse MAB 5 SH Wprint 5pol	J2 **(MIDI Out)**
8	9520138	DIN jack MAB7 SH-L Wprint 7pol	Diodenbuchse MAB 7 SH-L Wprint 7pol	J1 **(MIDI IN)**

Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 REARBOARD PCB	
DRAWING-NO	VERSION I	REVISION A
DRAWN BY C. SCHMIDT	DATE 30.6.14	PAGE 2
CHECKED BY	DATE	2 PAGES
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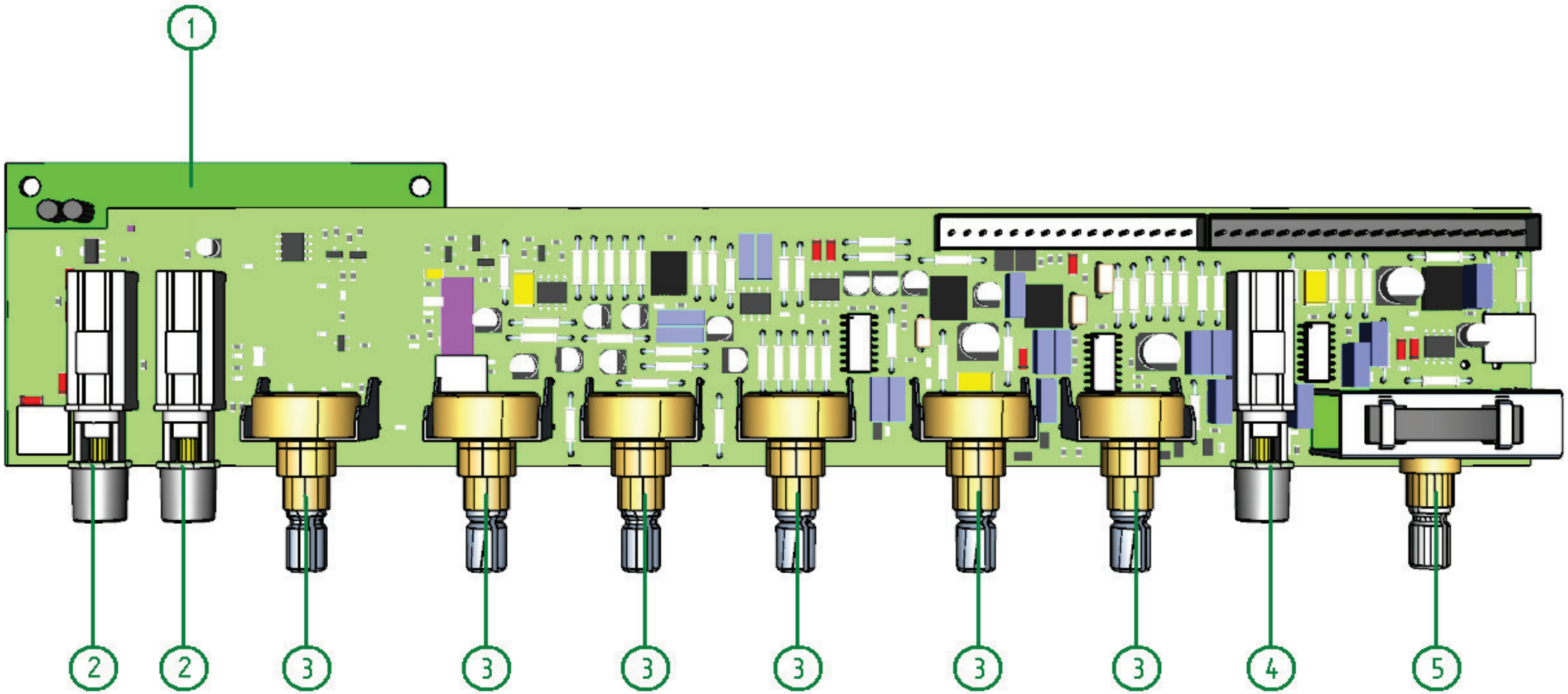


Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 CONTROLLER BOARD PCB	
DRAWING-NO	VERSION 1	REVISION A
DRAWN BY C. SCHMIDT	DATE 1.7.14	PAGE 1
CHECKED BY	DATE	2 PAGES
FILENAME HU0212-LP-R03_SPAREPARTSLIST		

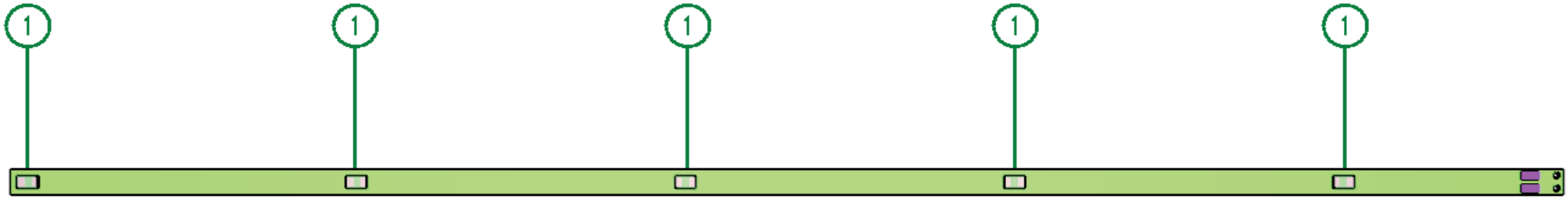
Spare Parts List for:	HU0212-LP-R03
Project:	Grandmeister 36 Head
Project Number	HU0212
Assembly:	Controller Board PCB

pos.	part. no.	describtion	Bezeichnung	reference designators
1	9590161	Effect Board	Effect Board	
2	9500109	push button switch CIC WPML-2BL-NL	Drucktaster CIC WPML-2BL-NL	SW3 **(FX-Loop)**
2	9500109	push button switch CIC WPML-2BL-NL	Drucktaster CIC WPML-2BL-NL	SW4 **(Noise Gate)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P1 **(Gain)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P2 **(Volume)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P3 **(Bass)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P4 **(Mid)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P5 **(Treble)**
3	9140033	pot B10K lin mono RK 16	Poti B10K lin mono RK 16	P6 **(Reverb)**
4	9500114	push button switch CIC WPML-2R-SL	Drucktaster CIC WPML-2R-SL	SW2 **(Boost)**
5	9500115	rotary switch 4pol 4pos	Drehschalter 4pol 4pos	SW1 **(Channel)**

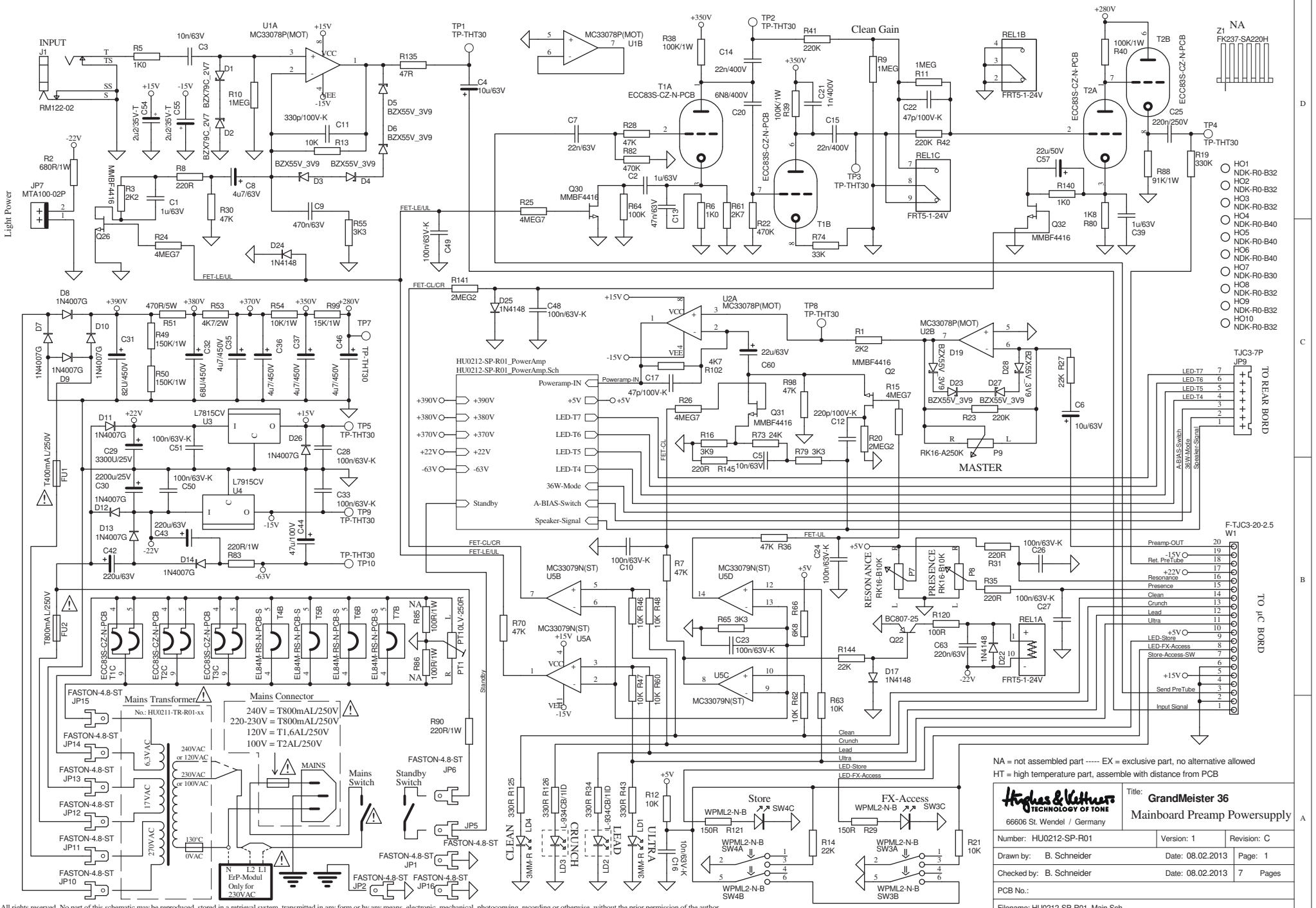
Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 CONTROLLER BOARD PCB	
DRAWING-NO	VERSION 1	REVISION A
DRAWN BY C. SCHMIDT	DATE 1.7.14	PAGE 2
CHECKED BY	DATE	2 PAGES
FILENAME HU0212-LP-R03_SPAREPARTSLIST		

Spare Parts List for:	HU0211-LP-R03
Project:	GrandMeister 36 Head
Project Number	HU0212
Assembly:	LED-Board

pos.	part. no.	describtion	Bezeichnung	reference designators	quantity
1	8360005	LED blue, 3,5x2,8mm PLCC2	LED blau, 3,5x2,8mm, PLCC2	D1, D2, D3, D4, D5	5



Hughes & Kettner TECHNOLOGY OF TONE	TITLE: SPARE PART LIST GRANDMEISTER 36 HEAD HU0212 LEDBOARD	
DRAWING-NO	VERSION 1	REVISION A
DRAWN BY C. SCHMIDT	DATE 1.7.14	PAGE 1
CHECKED BY	DATE	1 PAGES
FILENAME HU0211-LP-R03_SPAREPARTLIST		


INPUT
Light Power
Clean Gain
MASTER
Mains Transformer
Mains Connector
240V = T800mAL/250V
220-230V = T800mAL/250V
120V = T1,6AL/250V
100V = T2AL/250V
MAINS
Mains Switch
Standby Switch
Standby
CLEAN
CRUNCH
LEAD
ULTRA
Store
FX-Access
TO REAR BORD
TO µC BORD
NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB
Hughes & Kettner
TECHNOLOGY OF TONE
66606 St. Wendel / Germany
Title: GrandMeister 36
Mainboard Preamp Powersupply
Number: HU0212-SP-R01
Version: 1
Revision: C
Drawn by: B. Schneider
Date: 08.02.2013
Page: 1
Checked by: B. Schneider
Date: 08.02.2013
7 Pages
PCB No.:
Filename: HU0212-SP-R01_Main.Sch
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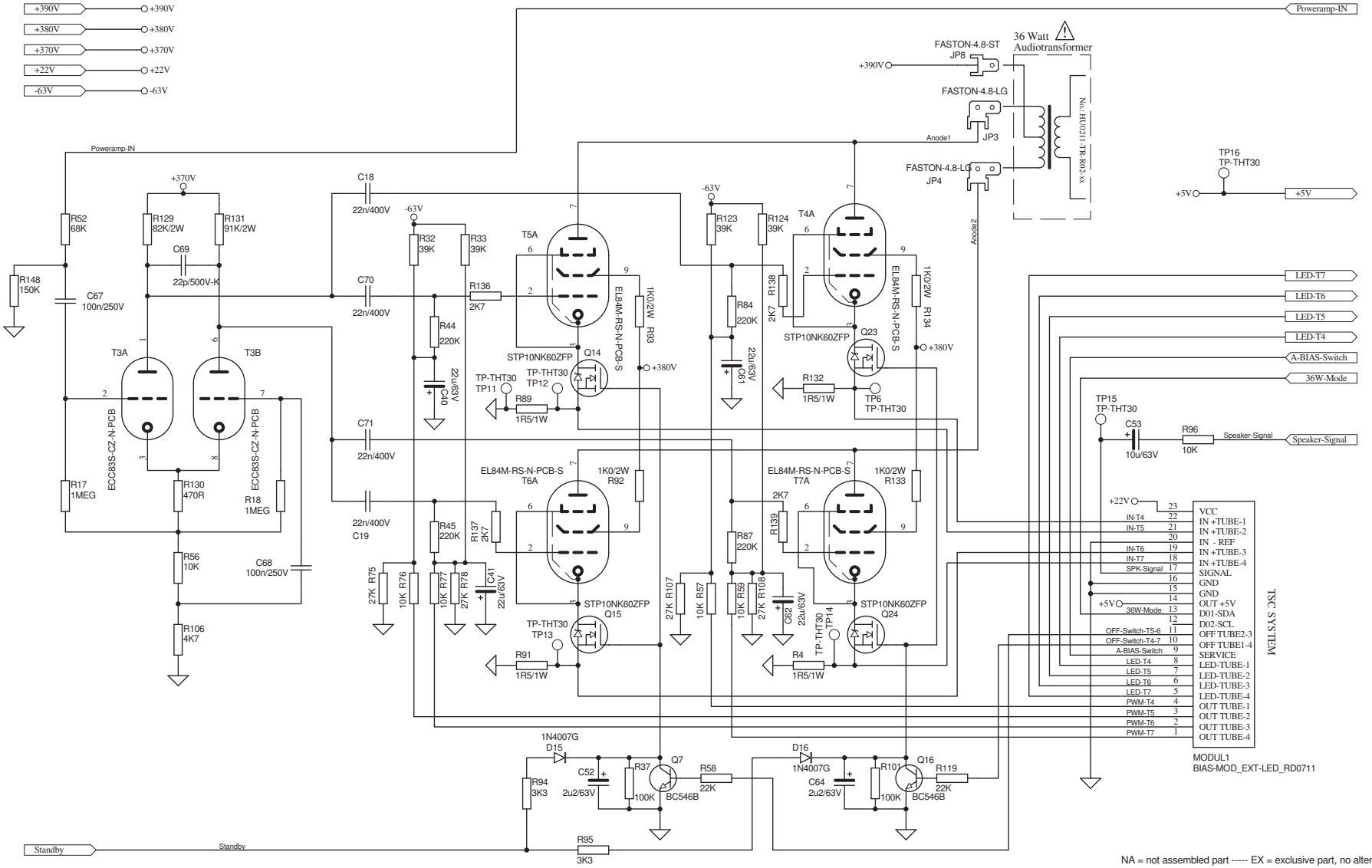
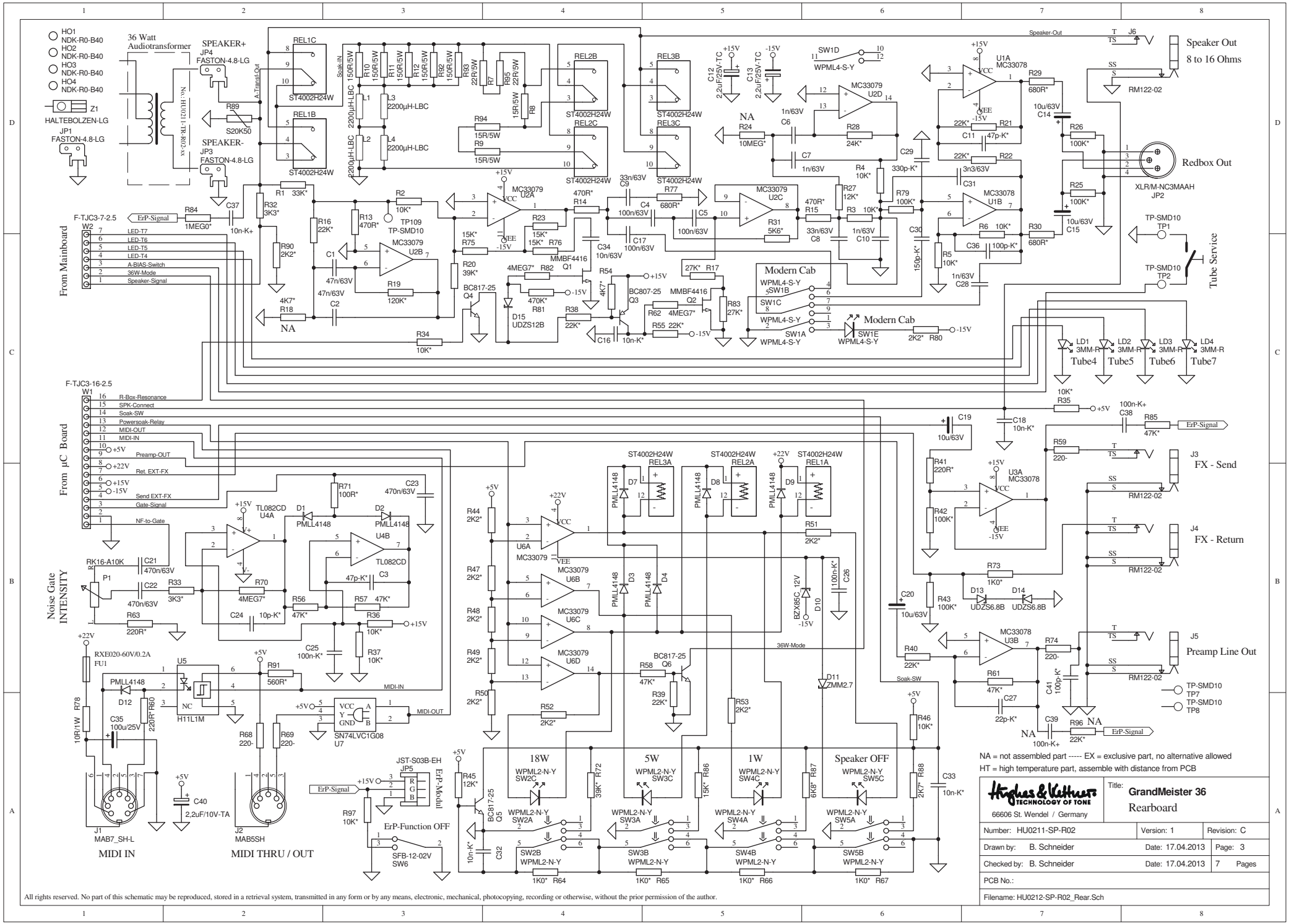
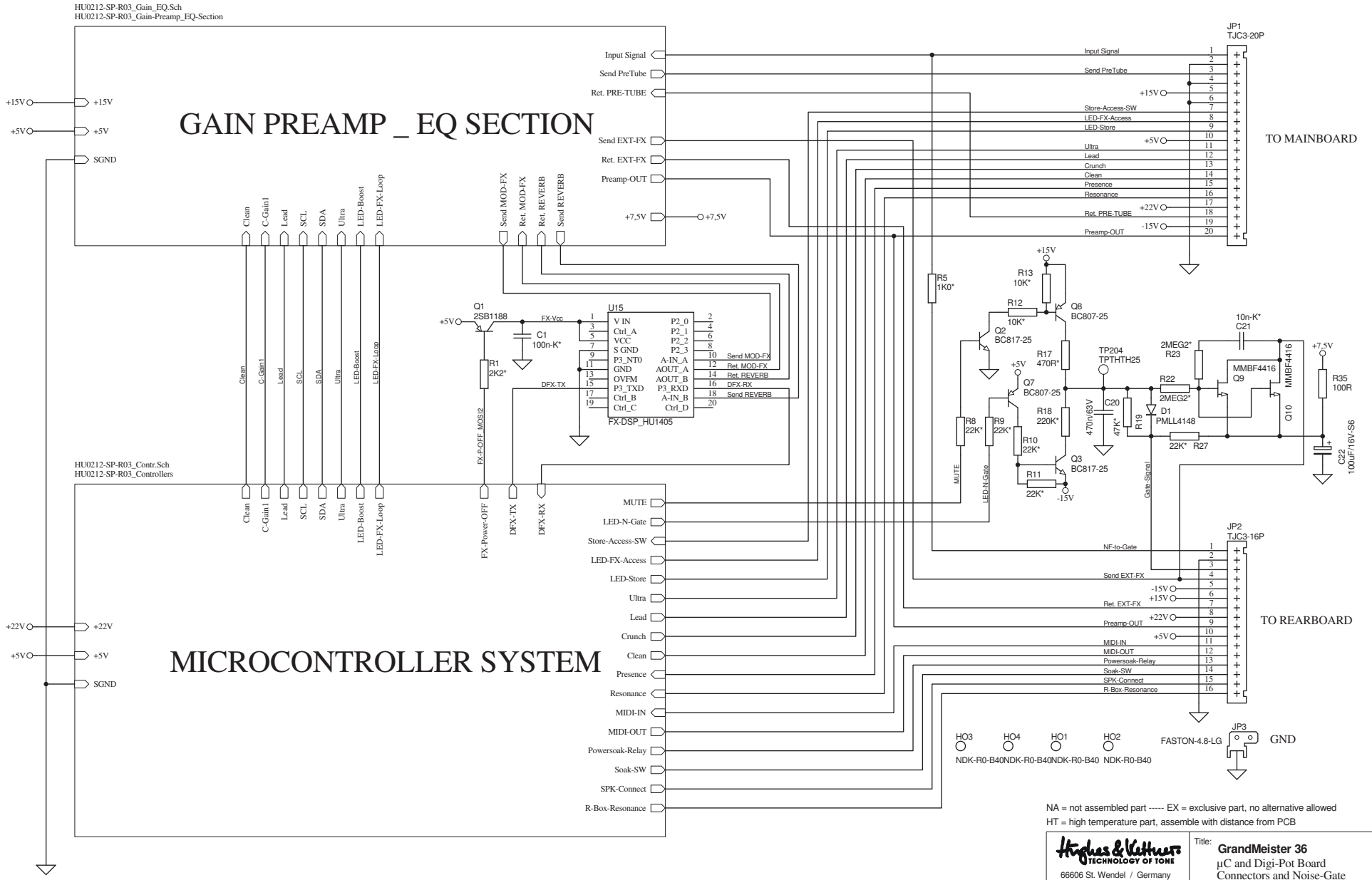
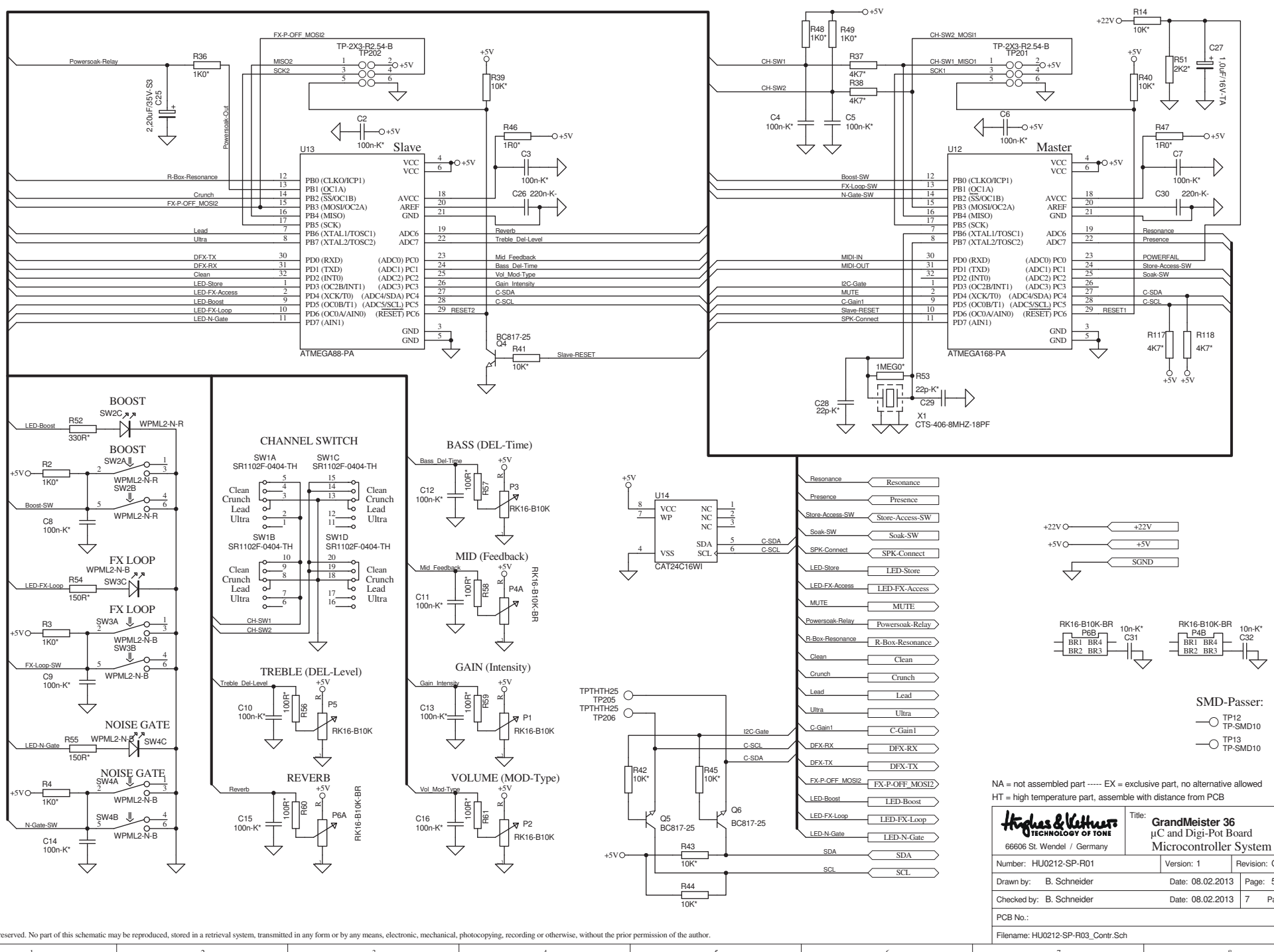


NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB

Hughes & Kettner TECHNOLOGY OF TONE 66606 St. Wendel / Germany	Title: **GrandMeister 36** Mainboard Poweramp
Number: HU0212-SP-R01	Version: 1 / Revision: C
Drawn by: B. Schneider	Date: 08.02.2013 / Page: 2
Checked by: B. Schneider	Date: 08.02.2013 / 7 Pages
PCB No.:	
Filename: HU0212-SP-R01_PowerAmp.Sch	

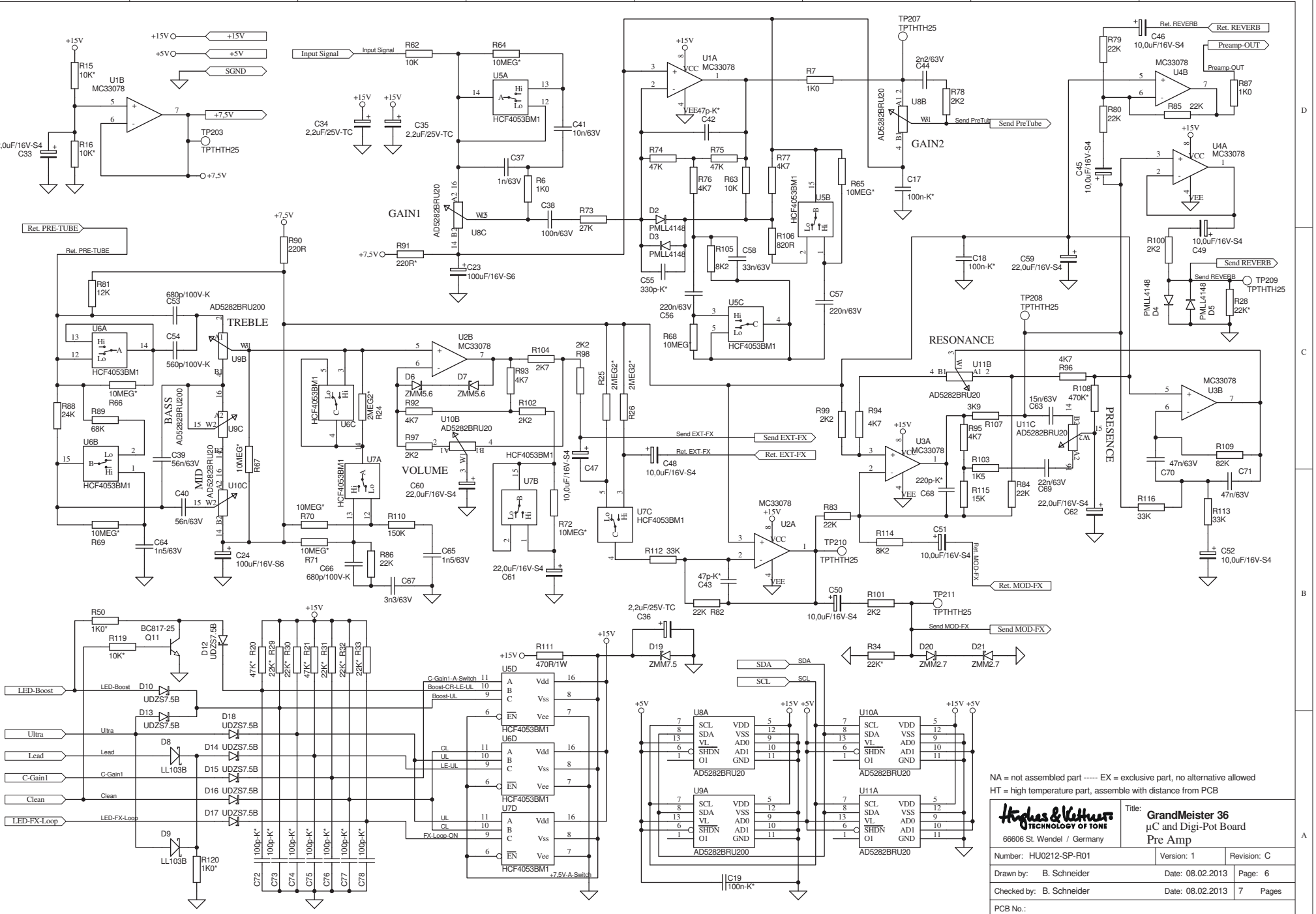






NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB

Hughes & Kettner TECHNOLOGY OF TONE 66606 St. Wendel / Germany	Title: **GrandMeister 36** µC and Digi-Pot Board Microcontroller System	
Number: HU0212-SP-R01	Version: 1	Revision: C
Drawn by: B. Schneider	Date: 08.02.2013	Page: 5
Checked by: B. Schneider	Date: 08.02.2013	7 Pages
PCB No.:		
Filename: HU0212-SP-R03_Contr.Sch		

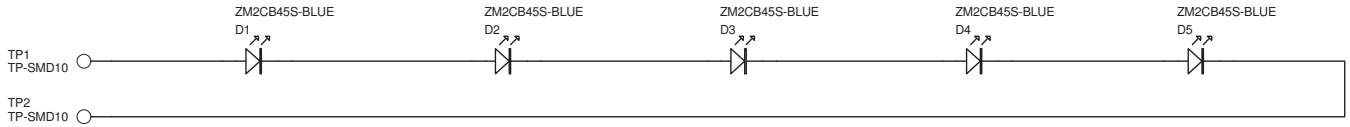


NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB

Hughes & Kettner TECHNOLOGY OF TONE
66606 St. Wendel / Germany

Title: **GrandMeister 36**
µC and Digi-Pot Board
Pre Amp

Number: HU0212-SP-R01	Version: 1	Revision: C
Drawn by: B. Schneider	Date: 08.02.2013	Page: 6
Checked by: B. Schneider	Date: 08.02.2013	7 Pages
PCB No.:		
Filename: HU0212-SP-R03_Gain_EQ.Sch		

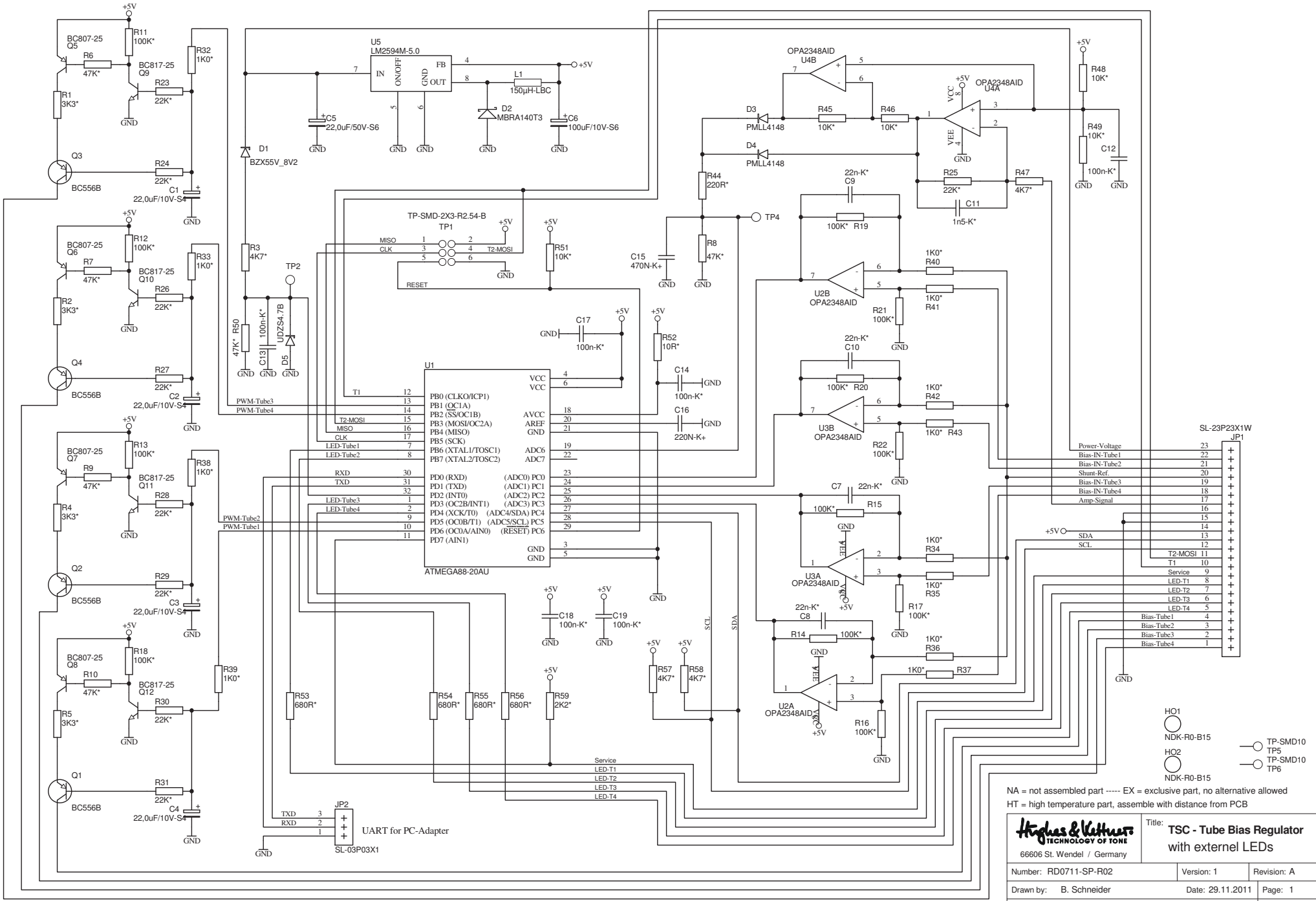


HO1
NDK-R0-B15

HO2
NDK-R0-B15

NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB

Hughes & Kettner TECHNOLOGY OF TONE 66606 St. Wendel / Germany	Title: **TubeMeister 36** LED Board	
Number: HU0211-SP-R03	Version: 1	Revision: A
Drawn by: B. Schneider	Date: 22.09.2011	Page: 4
Checked by: B. Schneider	Date: 22.06.2011	5 Pages
PCB No.:		
Filename: HU0211-SP-R03_LED-Board.Sch		



NA = not assembled part ----- EX = exclusive part, no alternative allowed
HT = high temperature part, assemble with distance from PCB

Hughes & Kettner TECHNOLOGY OF TONE 66606 St. Wendel / Germany	Title: **TSC - Tube Bias Regulator** with externel LEDs	
Number: RD0711-SP-R02	Version: 1	Revision: A
Drawn by: B. Schneider	Date: 29.11.2011	Page: 1
Checked by: B. Schneider	Date: 29.11.2011	1 Pages
PCB No.:		
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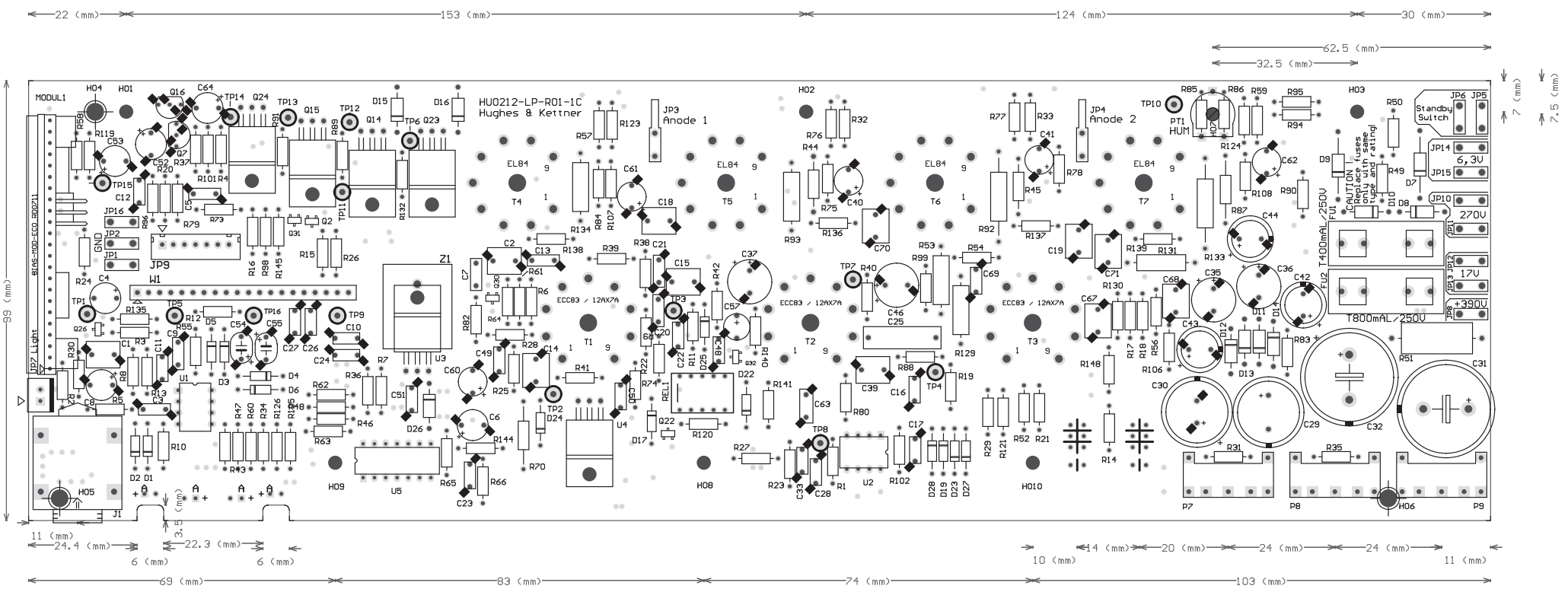

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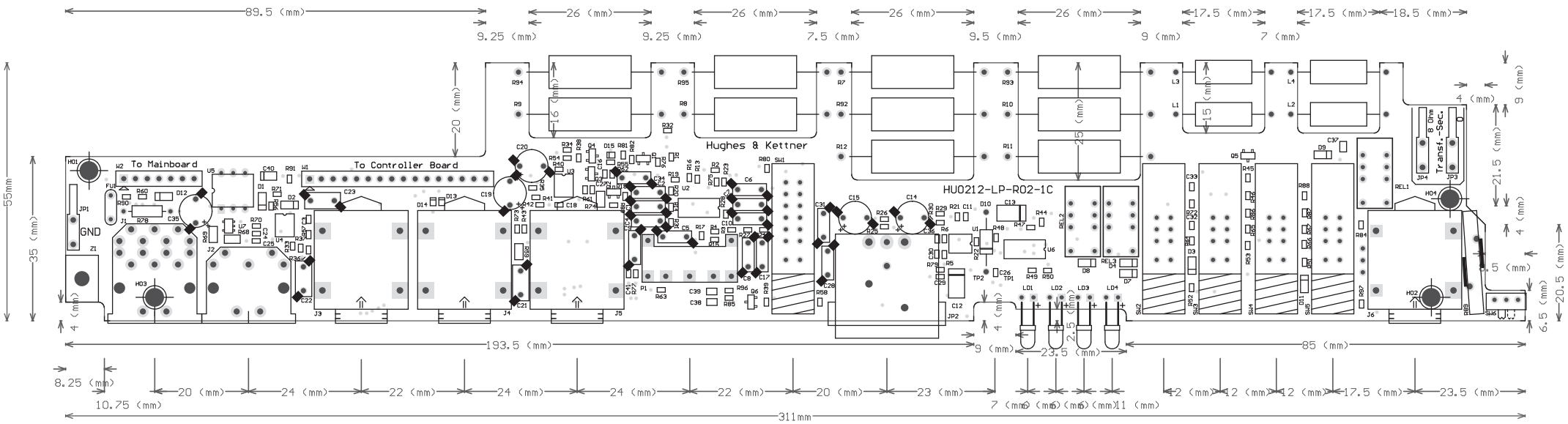
ENGINEER: PHONE:	PART NO.: HU0212-LP-R01-1C	REV: 01	DATE: 8-Feb-2013
FILE NAME: HU0212-LP-R01-1C.PCB	LAYER:		GERBER:



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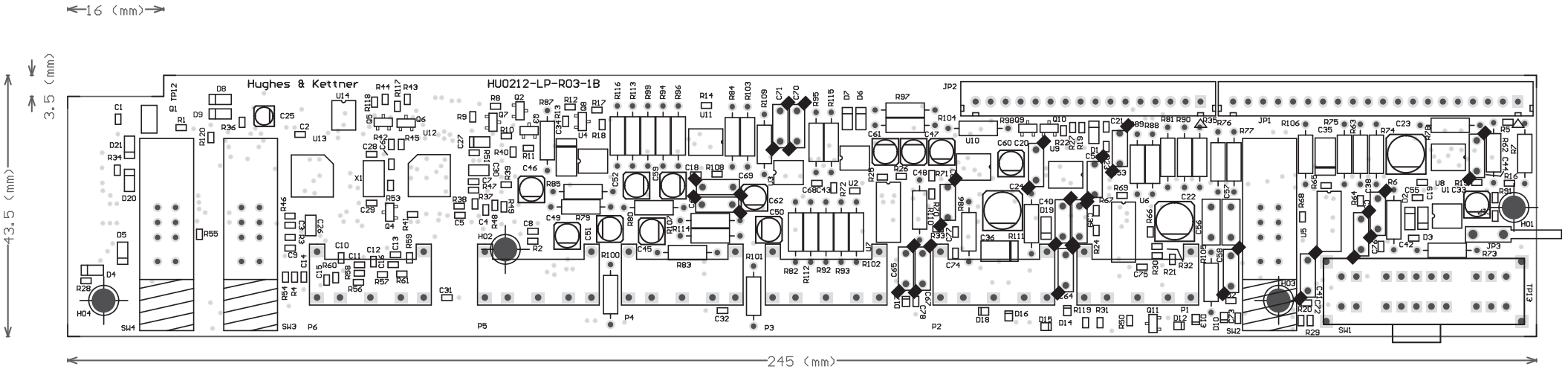
ENGINEER: PHONE:	TITLE: GrandMeister 36 Rear Board		
ENGINEER: PHONE:	PART NO.: HU0212-LP-R02-1C	REV: 01	DATE: 25-Apr-2013
FILE NAME: HU0212-LP-R02-1C.PCB	LAYER:		GERBER:



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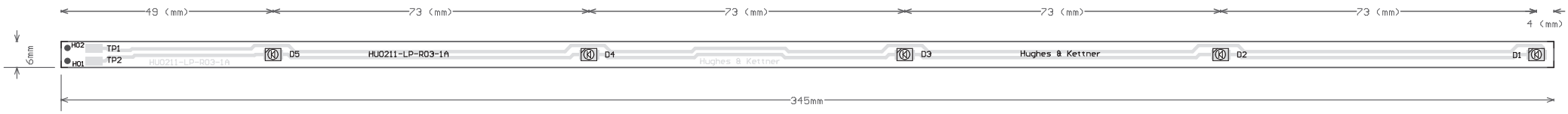
ENGINEER: PHONE:	TITLE: TubeMeister Access uC-Board		
ENGINEER: PHONE:	PART NO.: HU0212-LP-R03-1B	REV: 01	DATE: 26-Nov-2012
FILE NAME: HU0212-LP-R03-1B.PCB	LAYER:		GERBER:



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ENGINEER: PHONE:	TITLE: TubeMeister 36 LED Board			
ENGINEER: PHONE:	PART NO.: HU0211-LP-R03-1A	REV: 01	DATE: 22-Sep-2011	
FILE NAME: HU0211-LP-R03-1A.PCB	LAYER: Mechanical Layer 4		GERBER:	