

MIG-T Tube Preamp for Hammond T-Series Organs

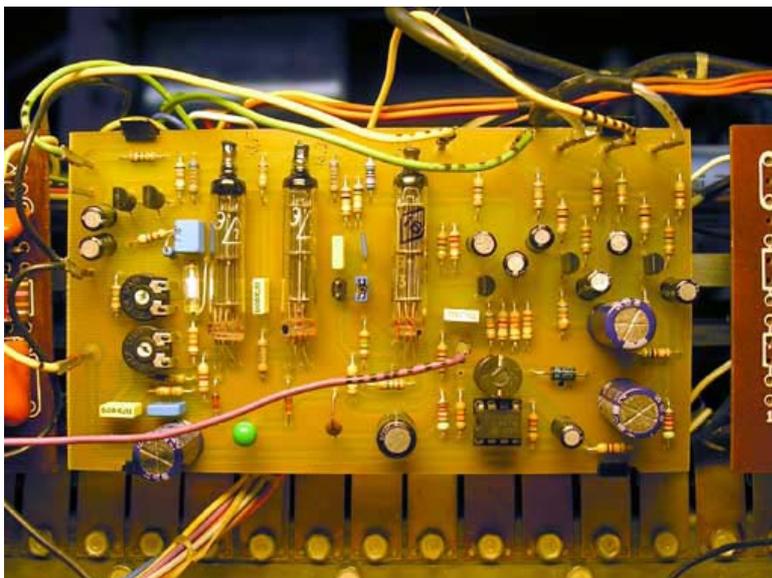
By Carsten Meyer, info@keyboardpartner.de

Want that sweet tube sound for your transistorized organ? Build a real tube amplifier for your T-series spinet organ!

But wait... don't those tubes require a lethal high anode voltage and a big transformer for heating? True for most, but not for mine. I found some miniature tubes that work perfectly with the organ's 24V power supply, they need only a few milliamps for heating. How that?

Let the Russians do the work!

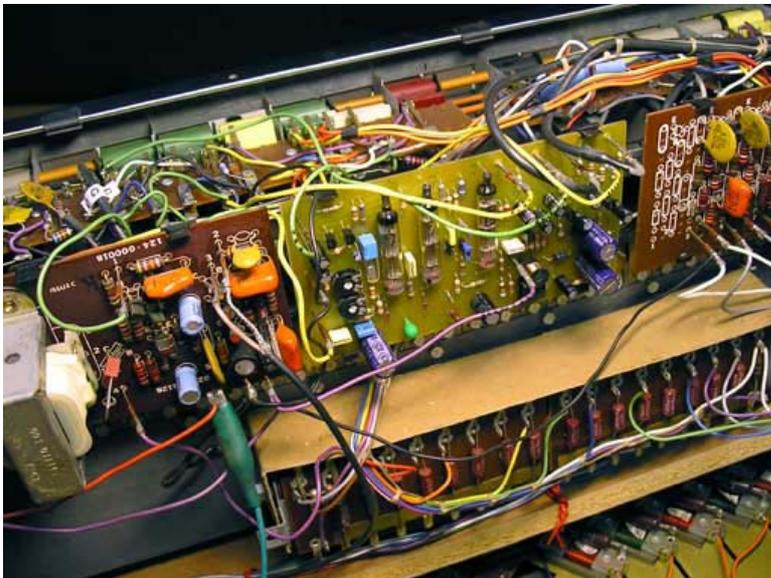
Remember russian pilot Victor Belenko who defected to Japan in his **MIG-25 Foxbat fighter** back in 1976? U.S. military officials were stunned when they examined what they thought was the most advanced fighter jet in the world. The Russians, it turned out, were still using **old-fashioned vacuum tubes** instead of state-of-the-art transistors and computer chips. For all their vaunted military reputation, the Soviets seemed incredibly backward. Eventually though, it dawned on the Americans that the Soviets had figured out the old tubes would be less vulnerable to the electro-magnetic pulse of a nuclear blast than some newer components. The MIG-25 fighter was equipped with thousands of miniature vacuum tubes, and most of them are still available at very low cost, since the russians literally made millions of them for military stock. Data of these tubes is pretty hard to find on the web, because the cyrillic transcription of their numbering is not consistent. Kindly people here in Europe have collected them, and some can be found at <http://www.elektronikinfo.de/strom/russischdatenblaetter.htm> or at <http://www.ginko.de/user/franz.hamberger/roehren/inhalt.html>.



Upper picture above shows the pre-productional prototype of my **MIG-T** preamp. The tube in the middle of the PCB (type 1SH29b or 1J29b) is the **preamp output stage**, the two tubes to the left (type 1SH24b or 1J24b) work as the **additional overdrive stage**. The IC to the right is a LM2574ADJ "Simple Switcher", a high-efficiency switching power supply circuit which produces the 1,2V DC for heating. The transistorized preamp stages (upper right side) are

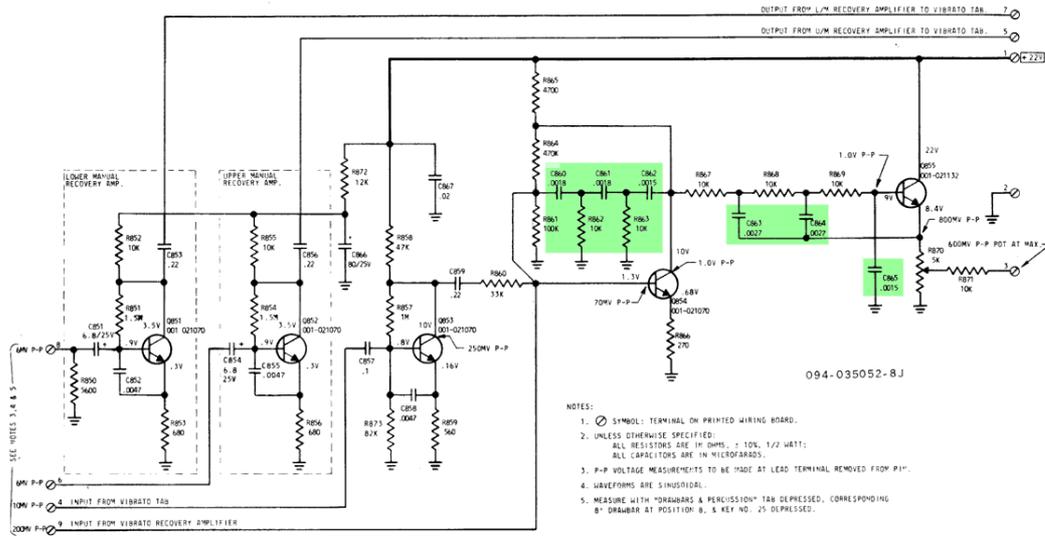
fitted with **low-noise transistors** and straight frequency response. The two transistors to the left work as emitter-follower to adapt the tubes' high output impedance to the output. Bias is chosen to drive the preamp output tube **slightly in distortion**, which is of very "sweet" type and adds a nice warm tone. The **additional overdrive stage** adds a compression and a soft symmetrical clipping which resembles the sound of an overdriven Leslie 122 amp, all with that vintage "thump". **Overdrive gain** and output volume is settable by the trimpots on the left. Two jumpers between the tube stages define the amount of key click by different high frequency responses. You may use either the clean output or the overdriven output (choose by an obsolete tab switch, by example).

The MIG-T preamp **simply rocks** - download the MIG-T tube preamp MP3 sound example at <http://www.keyboardpartner.de/hammond/t-mod-skill4.htm> (clean and overdriven, played on a plain T-500 with all my published modifications, solely through internal Leslie unit and internal speakers). I apologize for the quality of the performance - I'm a technician, not a skilled player!

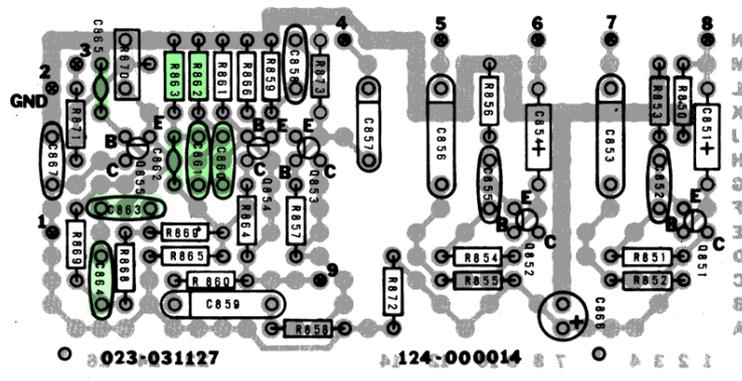


Installation instructions

The **MIG-T** comes ready built and is pretty easy to install. Please read Skill 1 to 3 to disassemble the organ and to remove the original transistor preamp board 124-000014. Write down the wire numbers and tag the wires. The MIG-T pinning (see MIG-T circuit schematics - actual circuit might be changed without notice) has the same order and numbering scheme as the Hammond board, with two exemptions: First, power supply is routed from the red +24V wire of the adjacent **vibrato preamp board** (left board on pictures, see green alligator clip on right picture). The filtered +21V supply (former yellow or orange wire to pin P1) is not capable of the heater current required for the tubes. Cut the yellow wire or tug it away. Second, it has two outputs (upper overdrive, lower clean) which may be routed to a switch for choosing the clean or overdriven sound on the fly. The trimpots adjust overdrive output level (upper pot), clean output level (mid) and drive gain (lower pot). Adjust to personal taste and a warm, not too harsh sound. The two jumpers set the frequency response. For a non-recalibrated tone generator, you have to install both, leaving one or both open yields more treble and more key click.



- NOTES:
1. SYMBOL: TERMINAL ON PRINTED WIRING BOARD.
 2. UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS. 1.0W, 1/2 WATT;
ALL CAPACITORS ARE IN MICROFARADS.
 3. P-P VOLTAGE MEASUREMENTS TO BE MADE AT LEAD TERMINAL REMOVED FROM P.W.
 4. WAVEFORMS ARE SINUSOIDAL.
 5. MEASURE WITH "PUSHBAR" & "PERCUSSION" TAB DEPRESSED, CORRESPONDING BY DRAWING AT POSITION 8, & KEY NO. 25 DEPRESSED.

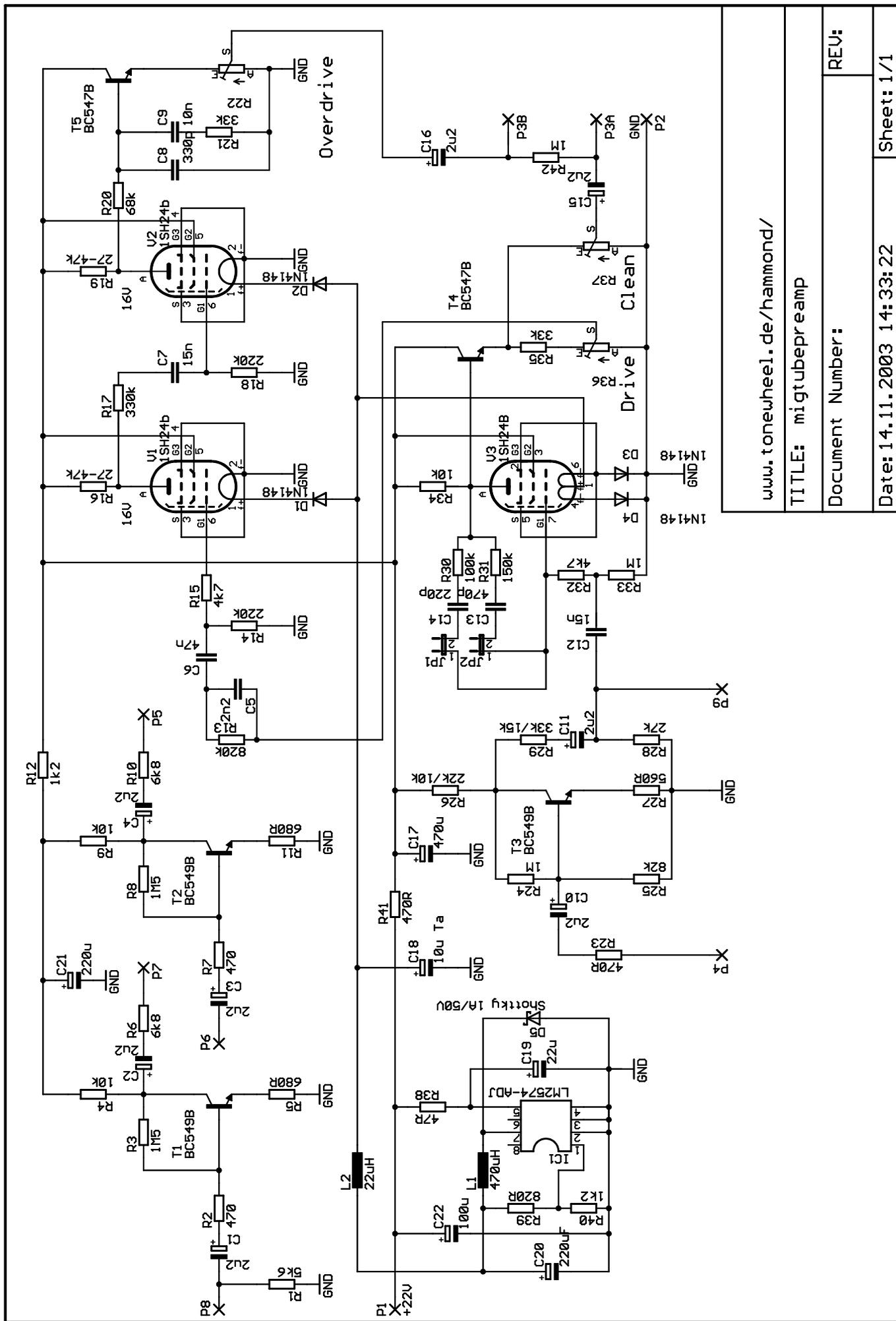


RECOVERY & NON-VIBRATO BOARD (124-000014)

PIN #	WIRE COLOR	TERMINATION
1	Yellow	Pin #6 Percussion Board
2	Black	Vibrato Chorus Switch
3	Black	Pin #6 Vibrato Board
4	Green	Switch Panel & Components Board #6
5	Yellow	Vibrato on Lower Switch (Back Terminal)
6	Green	Vibrato on Upper Switch
7	Clear	Upper Manual Tonebars Switch
8	Yellow	Vibrato on Lower Switch (Front Terminal)
	Clear	Junction with Cable B behind Lower Manual Tonebars Switch

This is the original Hammond recovery transistor preamp board 124-000014, which is completely replaced by the MIG-T Preamp.

For complete manuals and support, visit our webpage www.keyboardpartner.de/hammond/



www.tonewheel.de/hammond/
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REV:

MIG-T Tube PreAmp for HAMMOND T-Series Organs

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Compatible with Hammond Recovery Board 124-000014. Use +24V supply from vibrato amplifier board as described on <http://www.keyboardpartner.de/hammond/t-mod-skill4.htm>

