



®

Instrument Amplifier

V 2.0

Operations Manual

For the TRAIN FORTY-FIVE™
(head/combo) Amplifier



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T45m 5/2005



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A Note From Andy,

First of all, *Thank You* for purchasing a Fuchs Audio Train Forty-Five™ amplifier!

We created the Train 45™ amp to fill the need for an “affordable” amplifier for those seeking the performance & “attitude” of the venerable Trainwreck™ style amps. Based on the basic “Trainwreck Express™” circuit topology (with our own upgrades and enhancements) Your Train45 is built to the very high standards all Fuchs products are built to. Each Train 45™ is precision handmade by myself and the staff at Fuchs Audio, built to extremely high standards of excellence using the highest quality components available today. Our original prototypes were tested and evaluated by many “real” Trainwreck™ owners. Compared against originals and other “inspired” products, our Train45 was refined to meet or exceed the prime characteristics that Trainwrecks™ are known for. The addition of a Fan, separate power tube bias circuits, DC filaments for low level tubes, a 3-position bright switch, and a presence control, give added flexibility to the basic Trainwreck™ circuit.

With over two decades experience in the service, manufacturing, and design of tube audio/music equipment, we at Fuchs Audio are extremely proud of the quality and tremendous musicality of our Train 45™. This amp seriously rocks!

Please read this manual carefully. Although the Train 45™ was created to be a simple amplifier to operate, it will perform to its fullest glory with your full understanding of the contents of this manual.

Feel free to call or e-mail us (we prefer emails!) with comments & questions about your Train 45™, or just to find out what’s new here at Fuchs Audio.

Lastly, I recommend checking out our new web site: www.fuchsaudiotechnology.com, for product/user updates, cool links and other info benefiting our customers.

Sincerely,

Andy

Andy Fuchs
President
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1 Introduction to the Fuchs Audio Train 45™ Amplifier



The Train-45™ ... your new tone just pulled into the station!

Perhaps some of the most famous amps from New Jersey (besides ours!) were the Linden Ampegs and the legendary Trainwreck amps made by Ken Fischer in Colonia, New Jersey. Ken Fischer was actually laughed at when he suggested a channel switching amp to owner Everett Hull at Ampeg! Ken eventually became legendary, building a series of single channel non master volume amps under the Trainwreck name. Being from the N.Y, New Jersey area, I couldn't help but see, hear and service my share of Trainwreck amps over the years. Although I've built a great reputation for channel switching amplifiers, I've never lost my love for a good grinding rock and roll amp. Give me a Les Paul, a couple of hot naked humbuckers, an AC/DC riff or 2 thru a nice 412 cabinet and I can be a happy camper!

Well, when I started the development of the Lucky 7™, Blackjack 21™ amps, I wanted to make a series of single channel non master style amps with a more rock and roll attitude than our ODS and TDS amps. These new series of amps offer that rock-n-roll tone & attitude in varying power levels. All these models share a similar "in your face" attitude, at different power levels. I felt a fitting "top-model" in the series would be a traditional "wreck-style" amp that had both the EL-34 power & attitude to drag off to a gig and shake some people up. An amp that was "clean to mean" using both the guitar volume control and your hands, a simple, short signal path for maximum speedy response and hand-to-speaker transfer, and just plain simple to "grab and go." I took the basic 3-gain stage circuit topology of the original Express, had the correct power and output transformers designed, and added a few circuit twists of our own to the mixture.

I've always believed in audiophile style circuit techniques to bring out the best in any tube circuit. Guitar amps are no different. I started with an audiophile style high voltage storage system. Instead of using single large capacitors, I used a group of smaller capacitors in a bank. By using a bank of smaller capacitors ganged together to produce one large capacitance, you end up with a power supply that is both forceful yet agile. One that holds lots of energy for transients, yet can respond quickly to each and every note.

I then laid the amp out on a heavy fiberglass two-sided circuit board. The power and preamp tubes are off the board, chassis mounted on premium grade sockets. I used extremely wide and heavy traces to emulate a hard wired amp. I made constant comparisons to both real Wrecks, many of the so-called "Wreck-clones", and my hard wired prototypes. I even used ground plane technology on the circuit board, which adds capacitance to select circuit traces like a wire would get from resting on a chassis. This warms up the tone, lowers noise, and keeps the circuits stable. I used single point star-type grounding to keep it ultra-quiet, and DC preamp tube filaments to wring the last ounce's of noise out of it, (no matter who's preamp tubes you use). Other than logically selecting the first preamp tube for lowest noise and crosstalk, the remaining preamp and driver tubes are non-critical. Like the high-end ODS and TDS Fuchs™ amps it shares much of the same premium metal work including an aircraft grade aluminum chassis, and a cooling fan.

By using many of the same components of our other products, we've kept this great tone affordable. The Train-45™ features a unique train logo with an LED "headlight", which is super-bright and will never need replacement!

Specifications:

Cabinet: 10.5 deep, 8" tall, 18" wide.

Weight: 35 lbs

Cabinet Material: Pine

Covering: Tolex

Power tubes: 2 X EL-34/6CA7. (6V6's may be used for reduced power)

Preamp tubes: 3 X 12AX7

Controls: 3-position brite switch brite/flat/dark. Gain, high, mid, low, presence.

Rear panel: IEC Detachable power cord, fuse holder, AC and Standby switches. 4, 8, 16-ohm outputs (one each), Hard/Soft switch.

Rated power: 35 watts clean 45 watts peak with EL-34/6CA7's.

6v6's provide approximately 22 watts of power.

"Trainwreck" and "Trainwreck Express" are registered trademarks of Ken Fischer.

2 Please read before powering up your Train 45™.

Please see Panel Diagrams in next section **3** for assistance.

- 1) Inspect to make sure power & pre-amp tubes are intact & snugly seated in their sockets.
- 2) Make certain a speaker (load) is plugged into speaker output jack on the back of the amplifier. Failure to have a speaker connected to the amp will result in damage to the output tubes! Your amp is supplied with 4, 8 and 16 ohm impedance speaker output jacks, select the one closest to your speaker(s) impedance. USE ONLY ONE SPEAKER OUTPUT JACK.
- 3) Reduce Front panel GAIN control to moderate level.
- 4) Install instrument cable from guitar into front panel INPUT
- 5) Be sure both POWER and STANDBY switches (rear panel) are in DOWN position.
- 6) Install power cord to amplifier (AC POWER IN) and to AC power source.
- 7) POWER UP amplifier by: 1) flipping POWER switch UP. Allow at least 30 seconds to minute for tubes to fully heat up.
- 8) The Amplifier is now fully on and ready to use. Feel free to adjust all toneshaping controls as you see fit.

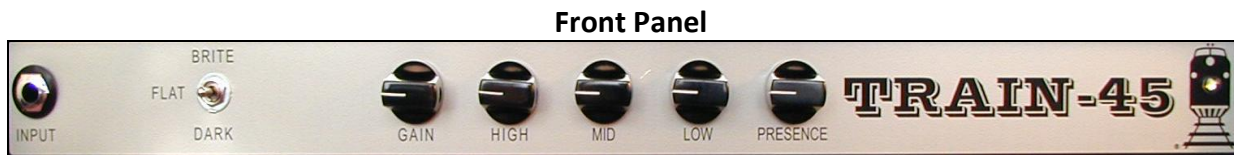
NOTE:

Your Train 45 CAN be safely used with an attenuator* device (see below). These will allow you to obtain higher gain settings while reducing the overall volume of the amplifier.

(* Watch for the new Fuchs "Conductor"™ Amplifier-Attenuator (coming out summer 2005). The "Conductor"™ is a low-coloration power reduction device, designed for use most tube amps including this series of Fuchs™ amps. (Not recommended with ODS or TDS amplifiers).

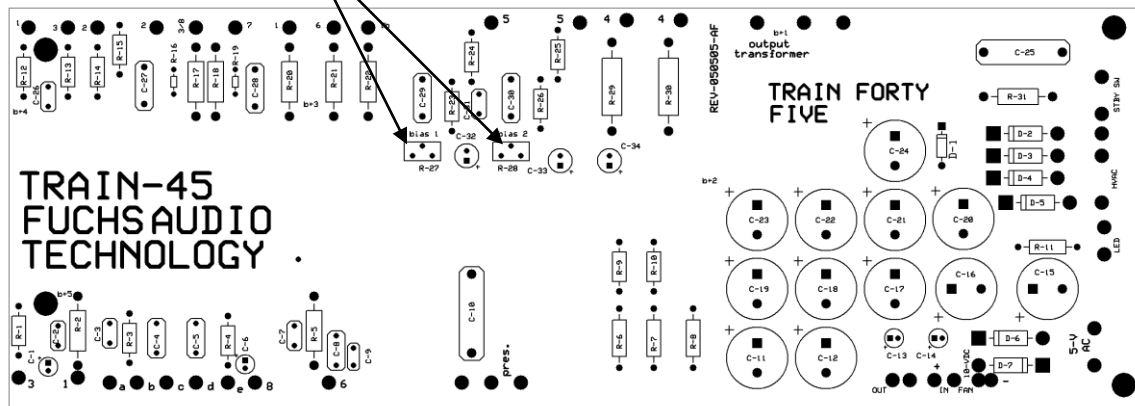
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3 Diagrams of FRONT & REAR Panels, Tube Bias Diagram



Tube Bias diagram-Train 45

Power Tube Bias Pots



4 Front Panel Controls, inputs & Their Functions



Input Jack:

Input jack is a 1/4" phone plug, designed for 1-Meg impedance, guitar-level signal. This input will readily accept pedals/effects without any loss in performance. Pedals/effects input is also inserted to this input in series with your guitar.

Brite/Flat/Dark Control:

This control provides 3 positions of equalization to the amplifier's overall sound and are considered a toneshaping control. Adjust to your preference.

Gain Control:

The gain control sets the overall gain/volume for the amplifier. Adjust to your volume/tone tastes. (NOTE: Your Train 45 can be safely used with attenuator devices. These will allow you to obtain higher gain settings while reducing the overall volume of the amplifier)

NOTE: There are no "correct" Gain settings. Finding the desired tone setting depends on the guitars/pickups used, as well as your own personal tastes. This amplifier works in unison with your guitar volume to control the nature of the clean/overdrive tones.

High Control:

Adjust the high control to taste, it controls adjusts the high frequency spectrum of your Train 45.

Mid Control:

Adjust the Mid control to taste, it controls adjusts the mid frequency spectrum of your Train 45.

Low Control:

Adjust the Low control to taste, it adjusts the low frequency spectrum of your Train 45.

Presence Control:

This control adds an edge to the overall amplifier tone. It's excellent for cutting through in a band or a recording mix. It also allows greater ability to selectively make notes feed back and "sing". It operates like a traditional presence control, reducing negative feedback at high frequencies within the feedback loop of the power amp. Not all Trainwreck™ amps had this feature, however we thought (as did our evaluation team) that it added an additional level of flexibility to the amplifier, much like the 3-position bright switch.

Power indicator light:

Located to the right side, this LED light indicates if the amplifier is seeing AC power.

5 REAR Panel Controls, inputs/outputs



AC power cord input:

Using the supplied IEC 120vac power cord. Connect to AC POWER IN on the amplifier and to AC power source.

AC power fuse:

This fuse protects the amplifier if any malfunction occurs. Use ONLY stock fuse rating as supplied by factory. Using any other fuse value can damage amplifier and void factory warranty.

ON/OFF switch:

In the DOWN position amplifier is completely OFF. In the UP position the amplifier is seeing AC current and is considered ON.

Standby switch:

In the UP position the amplifier is fully ON and will produce sound. In the DOWN position the amplifier is in STANDBY mode and will not produce sound, yet amplifier is seeing AC current.

HARD/SOFT switch:

This setting controls “sag” of the amplifier power supply allowing for a harder or softer overall “bite” to the amplifier’s sound and can be considered a tone shaping control. UP is HARD, DOWN is SOFT. This switch can be used when the amplifier is on.

Speaker outputs (4, 8 & 16 ohm):

(You must have a speaker load inputted to the amplifier before powering on!) Each (1-4 ohm, 1-8 ohm, 1-16 ohm) output optimizes the amplifier for 4, 8 or 16-ohm speaker impedances. Connect using a ¼” phone plug to an outboard speaker cabinet. If you have a Combo amplifier, connect to the combo speaker with supplied wire/¼” jack.

6 Biasing Train 45™ power tubes & other technical info

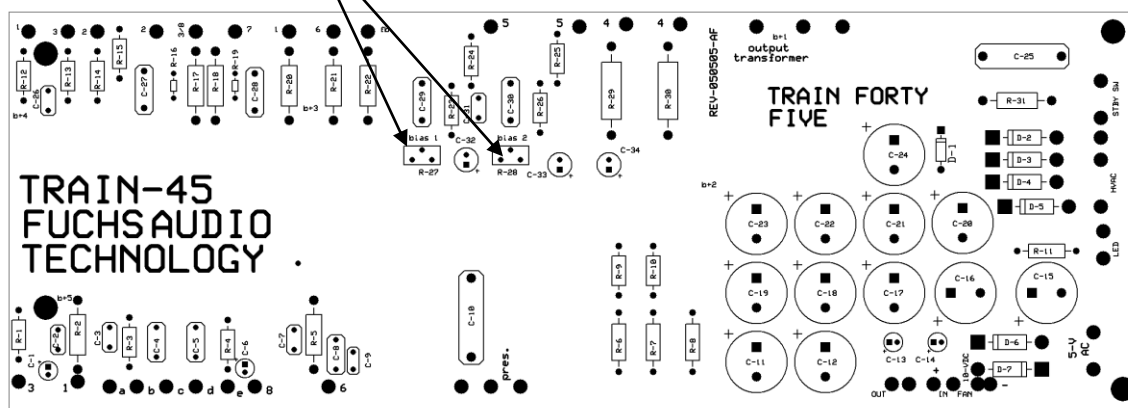
WARNING: High Internal voltages inside this amplifier can cause harm or Death!

The Train 45 (PCB) circuit board is shown below with the chassis sitting on its transformers, and front panel facing you. There are exposed high-voltages in this chassis, even with the amplifier shut-off! If you are not familiar with tube amplifiers and/or high voltages, do not attempt to remove the chassis from its cabinet or attempt to service this amplifier. Refer servicing to the factory or to someone with experience servicing these types of amplifiers.

Output tube Bias Setting:

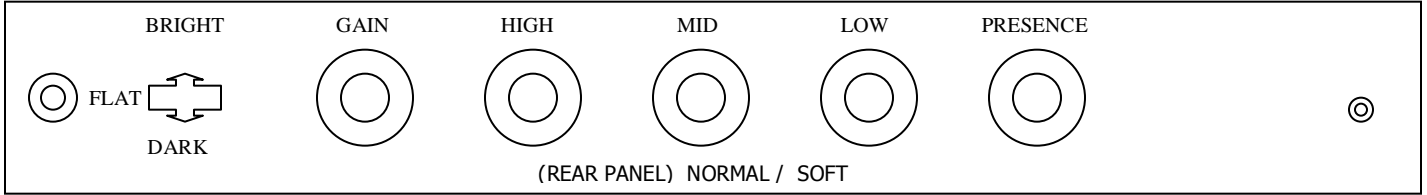
“Each” OUTPUT tube (EL-34/6CA7) is factory set for .040 Volts (40 millivolts), which is equal to 40 ma per tube (for EL-34/6CA7), which is measured at pin 8 of each power tube. Optional “6V6” output tubes should be set for 30 ma each (30 mv .030 volts). There are two trimmers on the pc board, and one is for each output tube bias. Bias is measured at the pin 1/8 connection of each output tube, measured to ground and set to the above voltage setting. This should be set with the amp cold, then reset after the amp has run for about an hour. Use a reliable digital voltmeter for these settings. It is normal for one tube to affect the other initially. It’s wise to check each tube after they have warmed up and stabilized.

Power Tube Bias Pots

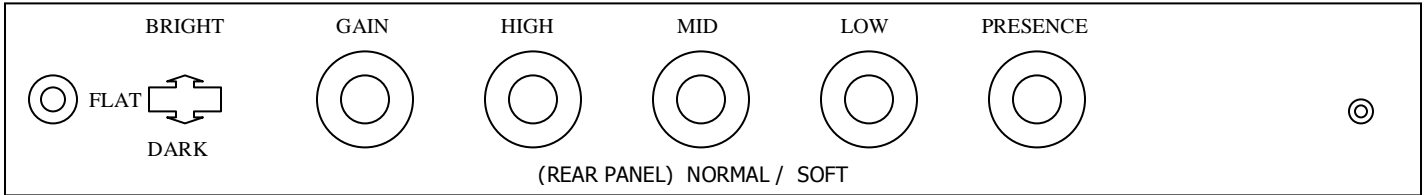


DISCLAIMER: There are exposed Internal high-voltages in this amplifier. Do not attempt to service, repair or conduct tube biasing unless you are qualified to do so. Please contact Fuchs Audio beforehand with questions in this regard. Fuchs Audio takes no responsibility or shall be held liable for any personal harm caused or damage to this amplifier as a result of unauthorized service, repair or internal adjustments made to this amplifier.

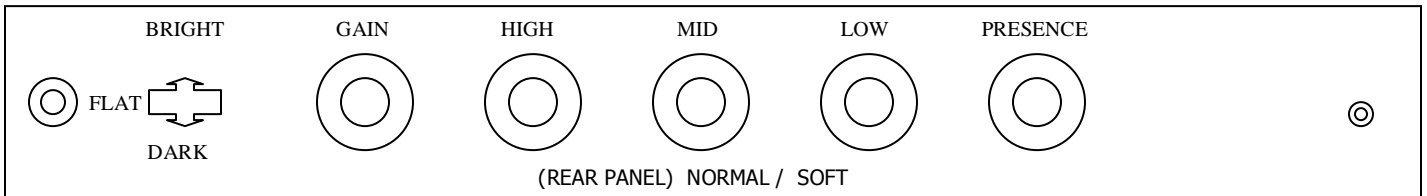
7 Sample Setting diagrams & notes



Notes: _____



Notes: _____



Notes: _____



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8 Warranty Information

The Fuchs Audio Technology-Train Forty-Five™ Warranty

Fuchs Audio Technology® guarantees our products to be free from defective workmanship or material failure for a period of FIVE years (tubes excluded) from date of new purchase to the original purchaser. This does not apply to Fuchs amplifiers that have been tampered with, damaged by shipping carriers, reverse engineered, or modified. Your warranty form/information must be returned to Fuchs Audio Technology® within 30 days of purchase, or your warranty will not be in effect. Fuchs Audio Technology® reserves the right to suspend or terminate the above warranty at our sole discretion, should damage from any of the above limitations and or exclusions be detected upon examination.

Keep the information on this page for your records.
Please mail-in warranty form on next page

FUCHS MODEL _____ **(Train Forty-Five)**

SERIAL NUMBER _____

OPTIONS INCLUDED _____

PRODUCTION DATE ____/____/____

TESTED BY _____ Fuchs Audio Technology®

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WARRANTY REGISTRATION FORM

This completed form must be returned to Fuchs Audio Technology within 30 days of purchase along with a copy of your receipt from your authorized dealer.

Please fill in all requested information on this form so we may register you for future warranty repairs or future upgrades, should they become available.

Purchasers Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Country: _____

Phone Number: _____ E-Mail address: _____

Model: _____ Serial Number: _____

Date of Purchase: _____

Dealer Name: _____

Comments:

Please return this form to:

Fuchs Audio Technology

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