MANLEY

LABORATORIES, INC.

OWNER'S MANUAL

ENHANCED
MID FREQUENCY
PULTEC EQUALIZER

MANLEY LABORATORIES, INC.
13880 MAGNOLIA AVE.
CHINO, CA. 91710 USA

TEL: (909) 627-4256
FAX: (909) 628-2482

email: emanley@netcom.com
http://www.manleylabs.com

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INTRODUCTION

THANK YOU!...

for purchasing the Manley Laboratories Enhanced Pultec Mid Frequency Equalizer. The all-tube Mid Equalizer utilizes the original WESTERN ELECTRIC passive-equalization circuit found in the long-out-of-production and justifiably famous PULTECS. According to experts, Western Electric developed the passive EQ in the 30's to improve speech quality in a typical telephone system. This may help to explain the choice of curves and frequencies. Western Electric also seem to have brought us the balanced audio & the 600 ohm standard. Eugene Shenk of Pulse Technologies re-discovered the EQ and added his vacuum tube gain make up amplifier. While Pultec sold a healthy number of units to broadcast, when transistors came in, many jumped to the new technology and Pultec fell on hard times. It was not until the mid 70's and early 80's with the big new recording studios, that engineers and producers found that nothing had the same magic that old Pultec tube EQs could give. Twenty years later, and they are still favorites (along with old British console EQs) and today few understand why they sound so good. Its not "just" the tubes.

We can offer a few good reasons. First - the EQ is passive. That means that the components involved have no gain. A typical modern parametric EQ can use 10 to 20 op-amps, each with many, many transistors. Music generally prefers a simple path with the fewest parts to pass a signal through. This also is one of the big advantages to tube circuits - simplicity. The EQ uses a few capacitors, inductors and resistors (or pots). No headroom problems, no crossover distortions, no slew induced distortions.

Second- Transformers can add a nice fat low end. That euphonic bottom was partially due to transformer saturation. In other words the lower and louder a signal got, the more it saturated (added some extra harmonics to the ultra lows where most speakers are deficient). It helps us percieve that there was some energy down there without hearing the distortion as such. The older transformers suffered from wide band distortion and losses in the highs. This is rarely wanted. Modern high quality transformers are much better in the highs and generally much lower distortion, due to improvements in materials, but they can still saturate - the way we like.

Third - Op-amp circuits have limitations. They use negative feedback to control gain. Often enough, this can cause a loss of transient accuracy and/or instability. Most op-amp EQ circuits rely on some very small signal levels that are prone to cross-over distortions in the push-pull outputs. Older op-amps have slow PNP transistors that began rolling off at a few hundred hertz causing crossover distortions. Headroom can be a hard ceiling (+20 dBu) that gets nasty when significant amounts of boost are called for. All of this worsens when driving capacitive wire or low impedances. The better solid state EQs are discrete with high voltage power supplies for headroom. Our Langevin Pultec is that style. The Manley tube version beats it.

Manley uses an all-tube gain block with a +31 dBu capability and less than 10 dB of feedback. Four triodes are used for "flat" class A gain stages and demonstrate the beauty of simplicity. We use a similar line amp in our 40 dB Mic Preamps and Electro-Optical Limiters and some of our audiophile hi-fi preamps.

Our version of this classic EQ incorporates modern audiophile grade components with our proven line-amp for absolute sonic beauty... Conductive plastic potentiometers and sealed gold-contact switches, polystyrene and rolled film and foil capacitors, and a our own transformers combine with a regulated stiff power supply and state-of-the-art tube circuitry to bring another classic PULTEC that is optimized for voice - but not only voice. They get used daily in mastering and seems to be the right tool for a huge numer of applications. Beyond the improvements in pure fidelity, we added extra frequencies and better interfacing, and it's only 1U !

Please take a few moments to read through this manual carefully as it contains information essential to proper operation of this unit. Thank you again, and please enjoy!

EQ HINTS

We usually give a few hints about tricks commonly used with our products. With an EQ of this type it is not so likely you need much help.

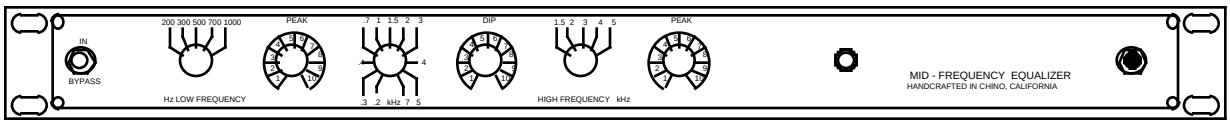
The most common question we get asked about our Pultecs is "Why not a boost/cut knob in each band?". We don't know why it was designed that way for sure. It was designed in the 1930's by Western Electric to improve voice through telephone lines. We believe it was done this way because it was the most practical in a simple passive design. This was before op-amps and Baxandall type cut / boost circuits were common. We do know how to design & build that style but it wouldn't be a Pultec, it would need twice as many parts or not be passive. Standard EQs are easy - Our customers requested Pultecs when they could have anything except a new well built Pultec. David and EveAnna flew to New Jersey to request permission from Eugene Shenk of Pulse Technologies to use the circuits and name. Mr Shenk was gracious enough to give it to them. Permission was also obtained from Western Electric because they originated this passive EQ. We just improved it for a different era.

The obvious application is voice. Many acoustic and electric instruments benefit from the choice of frequencies and bandwidths. We know it has been the magic touch on harmonicas, acoustic guitars, and violins. Because almost all instruments have a reasonable amount of mids, it can be handy very often. We suggest it in combination with another EQ like the Manley Pultec EQP1-A which focuses on lows and highs. The frequencies complement each other. This combination has proved powerful and flexible for mastering.

Many of the most recognised engineers suggest cutting rather than boosting. According to them, it sounds like less phase shift and resonance. They would start by dipping a little in the 150 to 1.5K area and not by boosting lows, then highs, then.... One obvious advantage to this is maximised headroom. The Mid Dip section is great for this approach.

Another advanced technique of EQ is to approach it "in the mix" rather than "soloed' and more as an arrangement tool than making every single sound huge. It is based on finding optimum areas in the spectrum of the mix to emphasize each sound. The denser the arrangement, the more this may be needed. It is most difficult when the band participates in the mix. Each player wants to hear thier instrument oversized, up-front and dramatic. Producers and engineers who can hear, in their head, what the mix should be with one or two passes of the tape have the method. The Mid Eq has proven to be a great tool for that approach. The opposite approach is every sound is big, and most of the tracks are muted. However when one gets great arrangements & great musicians playing together these "tricks" are not really needed much. A hit song will probably be a hit regardless of your efforts or the mix but the best memories is when it all clicked.

The Mid Pultec has pretty narrow bandwidths, appropriate for fine-tuning or creating some unusual character. Approach it like a fine tip paint brush. If what you need is a roller brush, save the Mid EQ for something else like the final touch-ups. Try it on percussion, snare or sax. These instruments often challenge the transient accuracy of solid state Eqs. They might take on a smeared, edgy or pink noise quality. The better the monitor system the more obvious this can be heard. Manley's circuits may sound quicker, cleaner & warmer.



A IN / BYPASS - Bypass, of course, disables the EQ function. The signal always passes through the tubes.

B Hz LOW FREQUENCY - Determines frequency at which maximum low frequency PEAK occurs. Choices are 200, 300, 500, 800 and 1 kHz.

C PEAK (LOW FREQUENCY) - Provides continuously variable BOOST from 0 to 11-12 dB to the selected low frequency. See the curves on page 11.

D MID FREQUENCY SELECT - Dermines frequency at which maximum DIP in the mids occurs. 11 frequencies from 200 Hz to 7K. The 200 to 800 frequencies are great for clearing up some of the mud in sounds, 1 kHz to 4 khz to tame the nasal tones and painful hard sounds while the 5 or 7 kHz are often used to compensate for microphone diaphragm resonances.

E MID FREQUENCY DIP - (peak) Provides continuously variable CUT from 0 to -10 or -12 dB to the selected mids. As with most LC passive EQs, as one selects higher frequencies, the bandwidth narrows slightly and a little more range of cut (or boost) is possible.

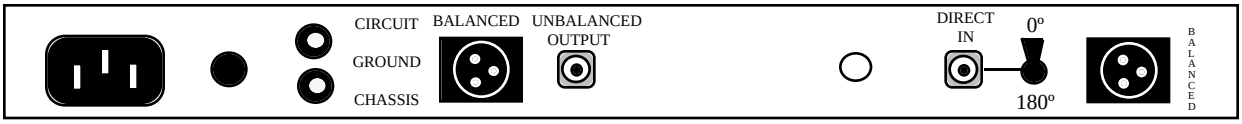
F HIGH FREQUENCY SELECT - Determines frequency at which maximum high frequency PEAK occurs. Choices are: 1.5 kHz, 2, 3, 4, & 5 kHz.

G HIGH FREQUENCY PEAK - Provides continuously variable BOOST from 0 to 10 dB of the selected high frequency.

H LED POWER INDICATOR - When power is first turned on, the LED should turn on RED. About 20 seconds later it will change to GREEN indicating the signal can pass through. This is a power-on, power-off mute circuit to prevent thumps and noises as the tubes are warming up (or cooling). It is smart enough to ignore quick black-outs.

I POWER SWITCH - Powers the unit ON when switched UP. We suggest turning the unit off when the session is over. The tubes will last longer.

REAR PANEL



A B C D E F G H I

A **IEC MAINS SOCKET** - Accepts standard 50/60 Hz AC mains voltage. Check that the voltage indicated on the back is the same mains voltage as your country.

B **FUSE HOLDER** - To remove the fuse, push and turn the fuse holder cap. Use a 1 Amp SLO-BLO fuse. Always replace fuse with same value and type.

C **GROUND TERMINALS** - Use these to minimise hum. See troubleshooting section. Normally these two terminals are joined by a "ground" strap. Moving this strap is similar to disconnecting the AC mains 3rd pin ground but includes the chassis/rack ground. You can also connect a wire from the "circuit ground" to your console in some situations. Experiment.

D **XLR BALANCED OUTPUT** - This is a transformer balanced output which will drive any impedance down to 600 ohms, but an impedance of 2000 ohms or greater is preferred. Pin out is as follows: PIN1 = Ground, PIN2 = high (+), PIN3 = low (-).

E **1/4" UNBALANCED OUTPUT** - The 1/4" output is a transformerless output and disconnects the transformer & XLR output when a plug is inserted. Tip = Signal, Sleeve = Ground, Ring = unused. Use either output but not both

F **GAIN SET PRESET** - This control adjusts the feedback over the line amplifier. It is preset for unity gain, however, additional gain is available through this screwdriver adjust control.

G **1/4" UNBALANCED INPUT** - 3000 ohm input impedance, unbalanced. It is meant as an input that bypasses the transformer. This is too low as a "direct" for guitars but can be great with an effects pedal or preamp between the guitar and EQ. You may need the gain these pedals often provide. Most synths can drive this input but also may be low level.

H **PHASE REVERSE** - Switched in the UP position will retain the floating input signal in phase. Switched in the DOWN position will reverse the phase of the floating input signal. Switched in the MIDDLE position switches off the transformer and the high impedance unbalanced 1/4" input is optimised. The 1/4" input is always on but not highest impedance (3K) until the switch is in the middle position. The middle position kills the XLR in.

I **XLR BALANCED INPUT** - Fully floating / balanced input. Input impedance is 5000 ohms. Pin out is as follows: PIN1 = ground, PIN2 = positive going phase (+), PIN3 = negative going phase (-). The PHASE switch must be on the "0" or "180" position.

MAINS CONNECTIONS

Your Pultec has been factory set to the correct mains voltage for your country. The voltage setting is marked on the serial badge, located on the rear panel. Check that this complies with your local supply.

Export units for certain markets have a moulded mains plug fitted to comply with local requirements. If your unit does not have a plug fitted the coloured wires should be connected to the appropriate plug terminals in accordance with the following code.

GREEN/YELLOW	EARTH	terminal
BLUE	NEUTRAL	terminal
BROWN	LIVE	terminal

As the colours of the wires in the mains lead may not correspond with the coloured marking identifying the terminals in your plug proceed as follows;

The wire which is coloured GREEN/YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol or coloured GREEN or GREEN and YELLOW.

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked by the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal in the plug which is marked by the letter L or coloured RED.

This unit (like most pro gear) is designed for third pin AC mains ground. See the troubleshooting section if you usually use ground lift adapters (2 pin to 3 pin or "cheaters". You can use the ground posts on the back of this unit rather than that method. Using these posts are safer and gets better results in most situations.

Ventilation. Two tubes only, so not bad. Worst - Small flight cases, packed & insulated. Best - 1 space above and below. Good - 1 space above. Good - shallow unit above, not blocking vent slots. OK - cool gear above and below, with air flow.

Power - Turn it off after the session. The tubes last longer.

Older units had a switch for 220/240 or 110/120 volt operation. While a nice feature, it compromised the noise floor slightly. We now hardwire for each country we send units to. So the few who move thier racks internationally have to use typical step-up step-down transformers that they are probably using anyways. The vast majority who don't fly gear globally have got quieter units. It is also a bit safer. We mark each unit on the back panel for the voltage it is wired for - if in doubt, please check.

TECH NOTES

SWITCHING ON

The power switch is located on the right hand corner of the front panel. When one first turns on the power the LED next to the switch is red, indicating "mute"- after about twenty seconds it turns green and audio can pass. This prevents thumps or pops during warm-up and shut-down. The circuit is smart enough to ignore short black-outs. The audio does not normally pass through the relay involved - the relay, when muted, simply shorts the output. Do not switch on and off rapidly in succession as this is not good for the power supply. A recent update added high voltage shunt regulators so that AC power variations were not reflected to the output. We also added output transformers.

TUBE LIFE

As with all tubes, their quality degrades with age. This is due to cathode emission, a natural process found in all tubes. Excessive increase in noise (hiss) can indicate the need to replace a tube. Usually, the 5814/12AU7A will be the one to try first as this is the tube in the gain stage. The 6414 is the output tube. Microphonics are a natural occurrence found to some extent in all tubes. We try our best to select the least microphonic tubes possible.

TUBE SUBSTITUTION

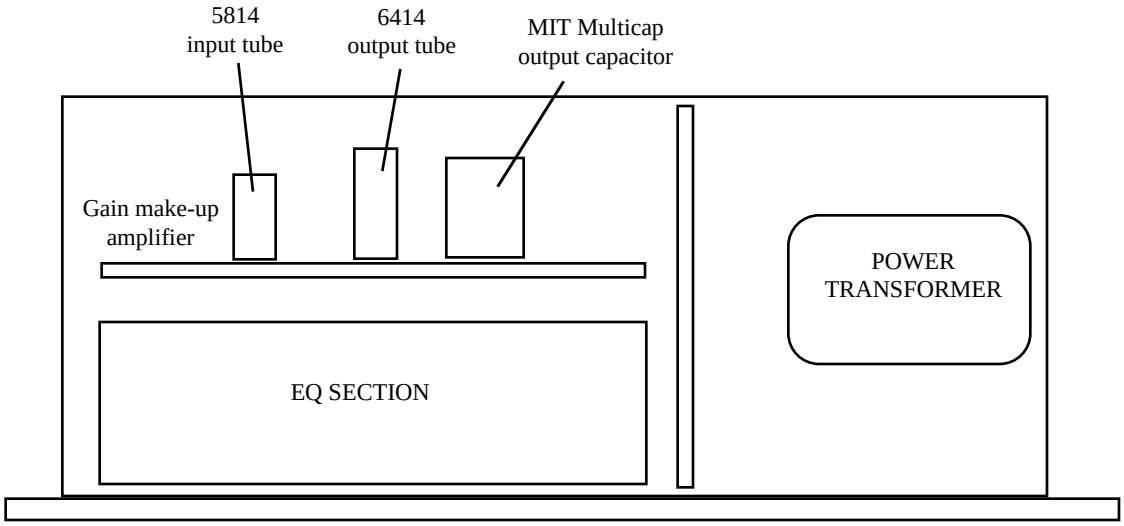
This circuit has been optimised around the 5814 and the military 6414 tube types. We also believe these are the best tubes for your unit. Replacement tubes can be obtained from Manley Laboratories. However, if you're stuck in a pinch, the following tubes are approved substitutes for this unit:
For the 5814: 12AU7WA, ECC82 (exact substitutes)
For the 6414: 12AT7, ECC81, 12BH7A (not exact substitutes, but they will work fine with a little less current output)

CUSTOM VERSIONS

For mastering use, we also build a custom version of the Manley MID Frequency Pultec EQ which has 1/2dB switching BOOST and CUT controls replacing the continuously variable controls found in your unit. We also build a Mastering Version of our Pultec EQP1-A.

SERVICING and TUBE REPLACEMENT

High voltages are present in this unit when powered and for 10 minutes after power is removed due to the slow discharge of the high voltage capacitors. Before opening the top, remove the mains cable and let the unit "sit" for about 10 minutes. Even then it is good practice to only use one hand in any high voltage gear and/or use rubber gloves. Do not touch the circuit board or and resistors and capacitors as there may be some charge still remaining. Wiggling the tubes slightly back and forth helps when removing or inserting them. Given these precautions, replacing tubes is as easy as changing a light bulb. There is a metal tube shield over the 5814, Twist it slightly counter-clockwise to remove it. It is used to reduce hum and light pick-up. Replace it after changing the tube.



TROUBLE-SHOOTING

There are a number of possible symptoms of something not quite right, some may be interfacing, others we will touch on as well. On the back panel are balanced and unbalanced inputs and outputs. Usually we connect balanced outputs to balanced inputs (same with unbalanced) but usually we can also patch an unbalanced to balanced or balanced to unbalanced with no problem (especially true with transformers) but some gear you can't. Check the manuals if you find a problem.

NO POWER, NO INDICATORS, NADA - Probably something to do with AC power. Is it plugged in? Check the fuse on the back panel. A blown fuse often looks blackened inside or the little wire inside looks broken. A very blackened fuse is a big hint that a short occured. Try replacing the fuse with a good one of the same value and size. If it too blows then prepare to send the unit back to the dealer or factory for repair. The fuse is a protection device and it should blow if there is a problem. If the unit works with a new fuse, fine. Check the MAINS VOLTAGE SELECTOR if one is fitted. Some of our models are able to have them and some don't. It should be set correctly for your mains voltage.

LIGHTS BUT NO SOUND - First try plugging the in and out cables into some other piece of gear to verify that your wires are OK. Assuming that it was OK into the other unit it probably is still a wiring thing. The XLRs are transformer balanced (isolated / floating) that require the LOW or negative part of the signal on PIN 3 to be connected to something, even when driving unbalanced inputs. With unbalanced sends or returns are used with the EQ balanced inputs/outputs then PIN 3 and GROUND should be connected together. The EQ's unbalanced outputs kill the balanced XLR signals to provide a transformerless audio path. Once again, when using a balanced to unbalanced (or vice versa) don't forget to have PIN 3 connected to the SLEEVE of the 1/4" plug.

LEVELS SEEM TO BE WRONG, NO BOTTOM - Several possible scenarios. Manley uses the professional standard of +4 dBm = Zero VU = 1.23 volts AC RMS. A lot of semi-pro gear uses the hi-fi reference of -10 dBm = Zero VU. This is a 14 dB difference that will certainly look goofy and may tend to distort. Often there are switches on the semi-pro gear to choose the pro reference level. We do not provide that kind of switch because of inevitable compromises in the signal path. If the loss looks close to 6 dB and it sounds thin then one half of the signal is lost. The cause is probably wiring again. One of the two signal carrying wires (the third is ground / shield on pin 1) is not happening. Check the cables carefully because occasionally a cable gets modified to work with a certain unit and it seems to work but its wrong in other situations. If you have two and only one EQ exhibits this problem, it may be a problem in that unit. See the next item.

SIGNAL GONE EVEN IN BYPASS - The signal goes through the tube stage in "Bypass". Let's assume the wiring has been checked twice. There is about a 98% chance it is a tube. If it were solid state you would generally send it back for repair. Being a tube unit, you can probably find the problem and fix it in a few minutes. Not too many years ago, people (your parents) could "fix" their own stuff by taking a bag of tubes down to the corner and checking said tubes on a tube tester. These are practically extinct but no prob'. Be careful - there are some high voltages inside the chassis and tubes can get pretty warm but if you can replace a light bulb you should be able to cruise through this. Before you remove a tube, just take a look at them powered up. They should glow a bit and they should be warm. If one is not, you have already found the problem. The tube's filament (heater) is burnt out or broken (like a dead light bulb). The other big visual symptom is a tube that has turned milky white - that indicates air has gotten into the tube or we joke "the vacuum leaked out". Either way replace the tube. They are not hard to find - even Radio Shack carries a fair tube stock and Manley can ship you a tested one. You can even pull a tube or two from a guitar amp to verify "it was that one not glowing" but then get an exact replacement (substitution list on previous page). Before you pull a tube, pull the power out, let the unit sit and cool and discharge for 10 minutes, then swap, then power, then check. Gentle with those tubes, don't bend the pins by trying to insert them not quite right. A little rocking of them as you pull them out or put them in helps. When the problem follows the tube you found the problem - a bad tube. No soldering, no meters, one screwdriver - easy. The good news is "easy" the bad news is "tubes have an very unpredictable lifespan.

HUM - Once again - several possibilities - several cures. Most likely it is a ground loop. If you are using the 1/4" unbalanced inputs, try the transformer XLRs. Balanced inputs can reject hum from ground loops, but it would be good to break the loop. The two most common procedures are: try a 3 pin to 2 pin AC adapter (about a dollar at the hardware store) which is better than messing up the power cable by bending the ground pin until it breaks off. Method two - cutting the shield on one side of the cable. This is usually done at every female XLR to "break" all loops. You may get a loop simply from the rack. All the other gear in the rack is "dumping" ground noise onto the rack rails. Try removing the EQ from the rack so that it is not touching any metal. You may have cured a non-loop hum. Some gear radiates a magnetic field and some gear (especially if it has transformers) might receive that hum. A little distance was all it took. A cool method of reducing all sorts of hum and noise is to use the new 60-0-60 balanced AC power transformers available from Equi=Tech and Furman. It costs more but works best. Hum might be because of the unbalanced input but this hints at ground loops and questionable wiring.

IT MAKES NOISES WHEN THE FRONT PANEL IS TAPPED - An easy one. Some tubes become microphonic over time. That means they start acting like a bad microphone. Vibration has caused the supports for the little parts in the tube to loosen and now the tube is sensitive to vibration. Easy - Replace the tube. Which one? The one that makes the most noise when you tap it (usually the 5814). It will have to be on , connected and speakers up but not too loud (save the speakers).

IT GOT HISSY - Also easy. This is again a common tube symptom. You could swap tubes to find the culprit but an educated guess is OK too. Generally the first tube in the path is the one with the most gain and dealing with the softest signals. The usual suspect is the tube that is usually located closest to the front panel volume pot or the 5814. You may find that you need to choose the quietest tube out of several of that type. We do this at the factory.

DISTORTION - This might be a tube. Swapping is a good way to find out. It may be a wiring thing or mismatch as well. Wiring problems usually accompany the distortion with a major loss of signal. Mismatches are a bit tougher. Without even explaining the term "impedance" it is enough to say that a lot of gear is simply not capable of driving pro levels and low impedances. It will sound like lost headroom, early clipping, distortion on peaks. Often changing the order of processors will do the trick. Another not so rare place to look is the patchbay, your settings, the meter levels - it happens. This unit has high input impedances, low ouput impedances and more headroom than most gear but will lose some of that headroom into 600 ohm inputs found in vintage gear. You can usually remove that 600 ohm (termination) and be better off.

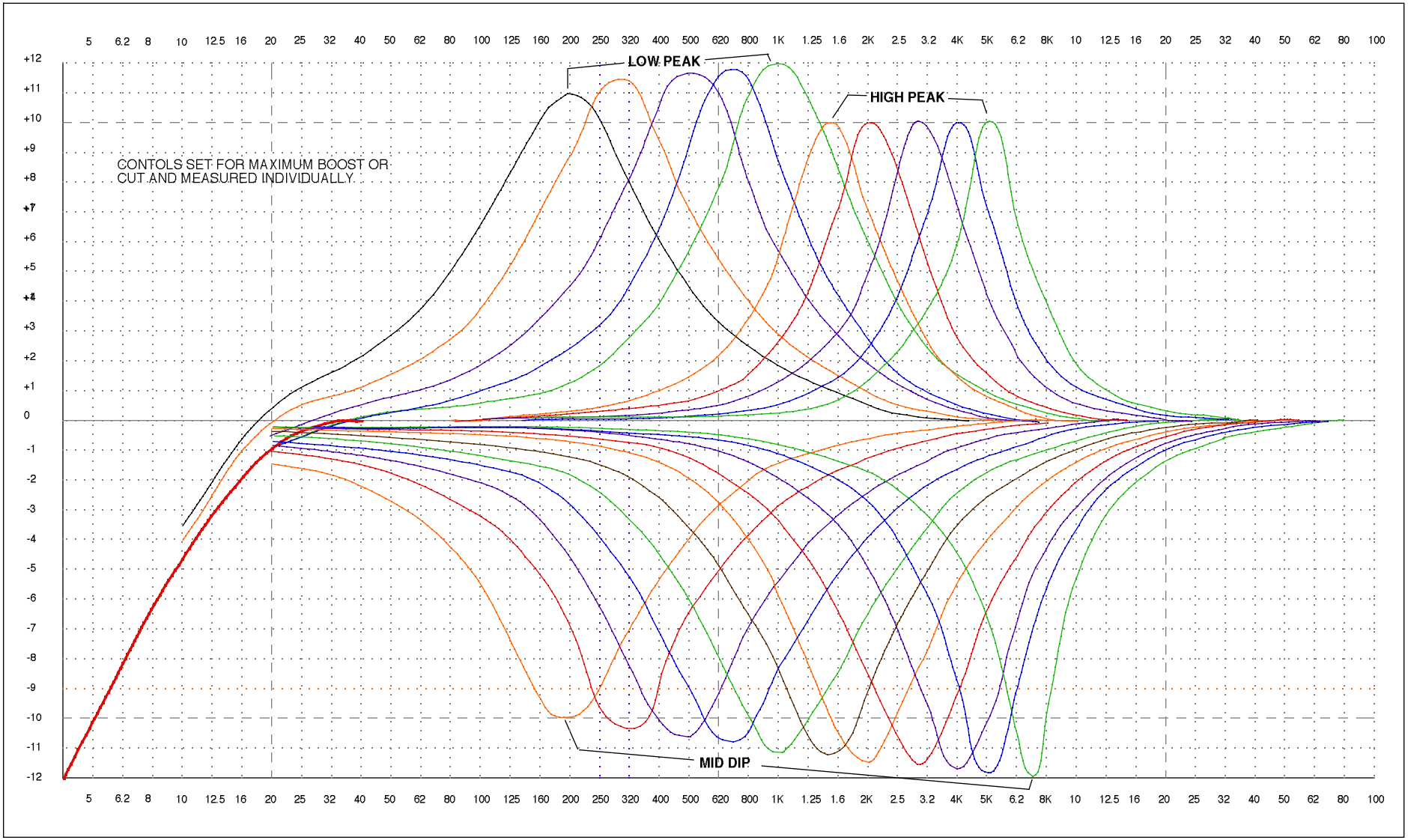
DC OR SOMETHING AT THE OUTPUT THAT IS INAUDIBLE - This might happen and it might be accompanied with a strange hum or little whistles as it warms up. It only seems to occur with long cables. It happens on an older unit but not on the newer one. Years ago we found a problem with our line driver section when it fed very long or cheap wire. The output would tend to oscillate in the inaudible ultrasonic frequencies (200 kHz to 500 kHz) into high capacitance like a long cable. We cured it by adding a simple 47 to 100 ohm resistor at the XLR. Newer units should not have a problem but if you have an old one, we can FAX you a 25¢ fix. Real DC at the output would be such a rare find that we would be pretty surprised. We use a $30 output cap to block DC. Most manufactures use a 30¢ electrolytic cap but we don't like the sound or reliability of these. We also had some low level, low frequency output caused by AC mains fluxuations. We cured that with a unique high voltage shunt regulator. Older units may can get this fitted if needed.

THE KNOBS "FEEL" LOOSE - This is a complaint that we get. We use Bourns conductive plastic pots. They are the best sounding, most reliable pot that we know of. David showed us that they have less coloration than Penny & Giles faders on big consoles. Unfortunately they "feel" loose. We could use cheap unsealed pots like most other companies but then we would not "feel" so good about putting the Manley name on the panel. The only better solution we can offer is the detented Grayhill 11 position gold contact rotary switches that we use for the mastering versions. This will cost you. You may notice that we are proud to share the name of the makers of the parts we use. A lot of research and listening goes into our choices. The name on the front panel is also the name on the desk of the parts buyer.

WHAT CAN BE DONE TO MAKE A TUBE PROCESSOR LESS FRAGILE - There is a strange and false rumor about tube gear being unreliable and fragile. They seem to forget about all those original Pultecs and LA-2As still in daily operation after 30 or 40 years. Many of them have been abused beyond belief. At least 95% of the ones made are in full daily operation. What about all those old tube guitar amplifiers still working hard after the all the miles in the back of a truck. Tube mics, like all condensor mics, are a bit fragile but it has usually been the mic capsule or cables and not the tubes. Now how much solid state gear from the 70's and 80's still works (or is worth using)? It would seem that 40 year old tube gear is more reliable than 20 year old solid state and more useful. On the other hand, we expect much of the the new cheap gear to have a short life whether it uses tubes or solid state. "Fragility" is a question of "build quality" far more than the technology used.
The only tried and true way to increase the reliabilty factor in tube or solid state gear is to buy the well made stuff and then carry back-up units like every touring company. If you can't have a "spare" unit at least have a few spare tubes. Do manufacturers of solid state say "carry a few transistors or IC's or do they say "send the unit back with an approved RMA"?

We respect and use the some of the "old" techniques of manufacturing - using solid, thick metal chassis, hand soldering, fewest possible connectors and "over-engineered" designs. We also get to use better parts than were available back then. We can use conductive plastic sealed pots, gold contact jacks and switches, high temperature capacitors and more stable 1% tolerance parts. We can also use solid state where it is best used - in the power supply. Silicon diodes have some advantages in some of our designs and we often use HexFets for regulators, with zeners.

We do all we can to make this unit not only reliable but also a unit you will enjoy for decades. We rarely get gear back for repair and very, very rarely charge for anything except tubes. We used to give a "lifetime" free repair guarantee (except tubes) which was expained as your lifetime and/or the person you may have sold the gear to. Pretty gutsy but it shows how we feel the gear is gonna last. We officially modified our policy when more gear was becoming rentals and used live, and almost industrially however we do believe in supporting our customers to every practical extent.


LOW PEAK
HIGH PEAK
CONTOLS SET FOR MAXIMUM BOOST OR
CUT AND MEASURED INDIVIDUALLY
MID DIP
5 6.2 8 10 12.5 16 20 25 32 40 50 62 80 100 125 160 200 250 320 400 500 620 800 1K 1.25 1.6 2K 2.5 3.2 4K 5K 6.2 8K 10 12.5 16 20 25 32 40 50 62 80 100
+12 +11 +10 +9 +8 +7 +6 +5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12

SPECIFICATIONS

Manley Enhanced Pultec Mid Frequency Equalizer

Maximum Input (Bypass through Line Amplifier)	+30 dBv
Maximum Output	+30 dBv
Headroom (referenced to +4 dBv)	26 dB
Frequency Response:	10 Hz to 70 kHz +/- 0.5 dB
THD & Noise (1kHz @ +4 dBm)	.015%
Noise Floor (Gain set to minimum)	-80 dB Wideband
Signal to Noise	126 dB typical
Maximum Gain (via trim on back)	5 dB to -5 dB
Maximum EQ Boost	12 dB low mids, 10 dB high mids
Maximum EQ Cut	12 dB (10 db some freqs) (see curves)
Power Consumption	.35 Amps @ 115 VAC
Fuse	1 Amp Slo-Blo
Size (2U)	19" x 1.75" x 10"
Actual Weight	10 Lbs
Shipping Weight	13 Lbs

WARRANTY

All Manley Laboratories equipment is covered by a limited warranty against defects in materials and workmanship for a period of 90 days from date of purchase to the original purchaser only. A further optional limited 5 year warranty is available to the original purchaser upon proper registration of ownership within 30 days of date of first purchase.

Proper registration is made by filling out and returning to the factory the warranty card attached to this general warranty statement, along with a copy of the original sales receipt as proof of the original date of purchase. Only 1 card is issued with each unit, and the serial number is already recorded on it.

If the warranty registration card has already been removed then this is not a new unit, and is therefore not warranted by the factory. If you believe this to be a new unit then please contact the factory with the details of purchase.

This warranty is provided by the dealer where the unit was purchased, and by Manley Laboratories, Inc. Under the terms of the warranty defective parts will be repaired or replaced without charge, excepting the cost of tubes. No warranty is offered on tubes, unless:
1. a Manley Laboratories preamplifier is used with a Manley Laboratories amplifier, and
2. the warranty registration card is filled out.

In such a case a 6 month warranty on tubes is available with the correct recording of the serial number of the preamplifier on your warranty registration card.

If a Manley Laboratories product fails to meet the above warranty, then the purchaser's sole remedy shall be to return the product to Manley Laboratories, where the defect will be repaired without charge for parts and labour. The product will then be returned via prepaid, insured freight, method and carrier to be determined solely by Manley Laboratories. All returns to the factory must be in the original packing, (new packing will be supplied for no charge if needed), accompanied by a written description of the defect, and must be shipped to Manley Laboratories via insured freight at the customer's own expense. Charges for unauthorized service and transportation costs are not reimbursable under this warranty, and all warrantees, express or implied, become null and void where the product has been damaged by misuse, accident, neglect, modification, tampering or unauthorized alteration by anyone other than Manley Laboratories.

The warrantor assumes no liability for property damage or any other incidental or consequental damage whatsoever which may result from failure of this product. Any and all warrantees of merchantability and fitness implied by law are limited to the duration of the expressed warranty. All warrantees apply only to Manley Laboratories products purchased and used in the USA.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damges, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

WARRANTY REGISTRATION

We ask that you please fill out this registration form and send the bottom half to:

MANLEY LABORATORIES
REGISTRATION DEPARTMENT
13880 MAGNOLIA AVE.
CHINO CA, 91710

Or you may **fax** this page to: (909) 628-2482

Registration entitles you to product support, full warranty benefits, and notice of product enhancements and upgrades. You MUST complete and return the following to validate your warranty and registration. Thank you again for choosing Manley.

MODEL MANLEY MID FREQUENCY PULTEC EQ SERIAL No. _____

PURCHASE DATE _____ SUPPLIER _____

PLEASE DETACH THIS PORTION AND SEND IT TO MANLEY LABORATORIES

MODEL MANLEY MID FREQUENCY PULTEC EQ SERIAL No. _____

PURCHASE DATE _____ SUPPLIER _____

NAME OF STUDIO & OWNER _____

ADDRESS _____

CITY, STATE, ZIP _____

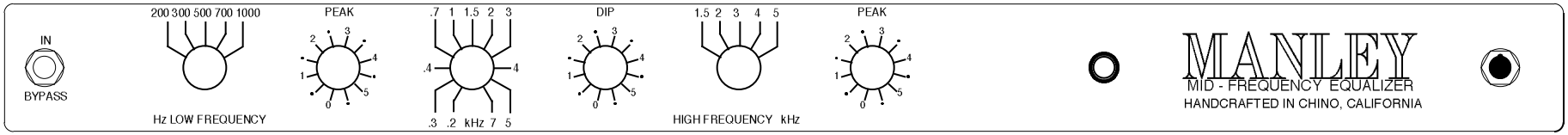
TEL: _____FAX:_____email:_____

COMMENTS?? We welcome your feedback!_____

_____

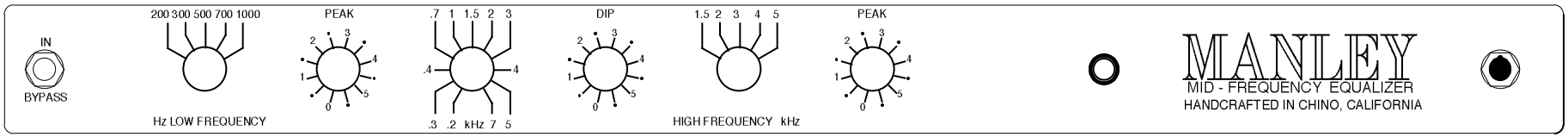
TEMPLATE FOR MANLEY MASTERING MID - FREQUENCY EQUALIZER
PHOTO-COPY THIS PAGE AND STORE YOUR SETTINGS WITH THE TAPES OR OTHER SESSION NOTES

STUDIO . . . . . NOTES . . . . .



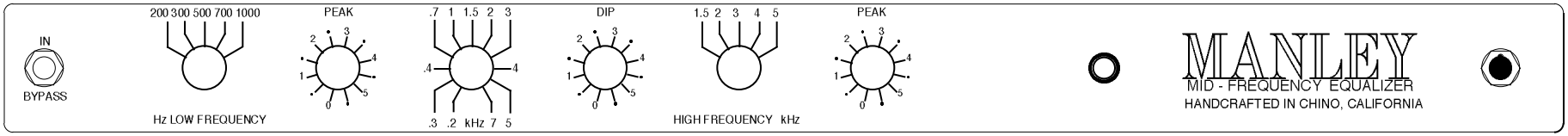
ARTIST . . . . . LEFT - BOTH - RIGHT . . . . . DATE . . . . .

SONG . . . . . VERSION . . . . . ENGINEER . . . . .



ARTIST . . . . . LEFT - BOTH - RIGHT . . . . . DATE . . . . .

SONG . . . . . VERSION . . . . . ENGINEER . . . . .



ARTIST . . . . . LEFT - BOTH - RIGHT . . . . . DATE . . . . .

SONG . . . . . VERSION . . . . . ENGINEER . . . . .