MANLEY
LABORATORIES, INC.

THE ELOP®

OWNERS MANUAL

TUBES RULE

MANLEY LABORATORIES, INC.
13880 MAGNOLIA AVE.
CHINO, CA 91710 USA
TEL: +1 (909) 627-4256
FAX: +1 (909) 628-2482
emanley@manleylabs.com
www.manley.com

3.31.11cd

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INTRODUCTION

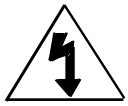
THANK YOU!...
for choosing the Manley ELOP®. This Limiter follows in the tradition of the vintage LA-2A Leveling Amplifier using a passive electro-optical device to control gain. The advantage of a passive device is that it eliminates the need to push the music through many transistors and/or ICs as would be the case in a VCA based Limiter.

Also like the LA-2A, the Manley utilizes a tube line amplifier for make-up gain. This is one of our favorite clean and powerful line drivers. We achieve true tube "warmth" with fidelity rather than with distortion. Other owners of this unit love the way they can drastically (10 dB) limit without introducing unmusical harshness. We find it extremely quick and easy to use, mostly because it does exactly what one would expect of a good limiter when patched in. For critical vocal tracks, this is the one to demand.

Unlike the LA-2A, we illuminate the photo-resistor with an LED rather than electro-luminescent elements which are often slow and unreliable. We also use a solid state side-chain to drive the LEDs. The Limiter also features a BYPASS switch that retains the tube section at unity gain. 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.

GENERAL NOTES

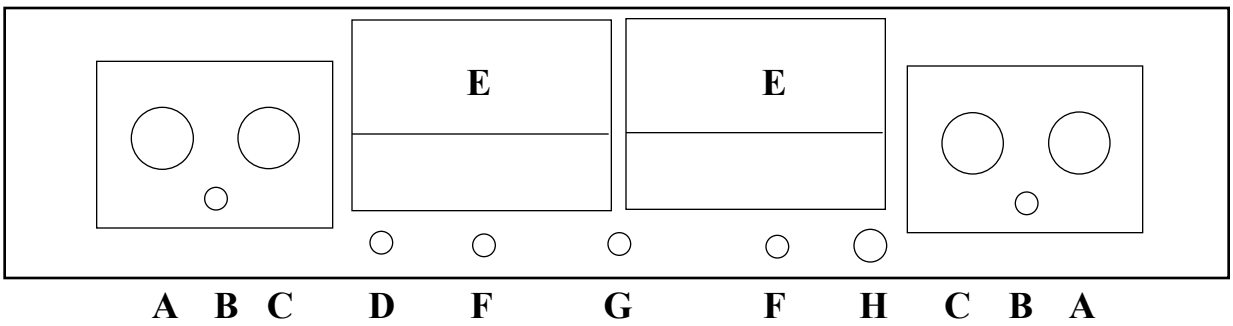
LOCATION & VENTILATION
The Manley ELOP® must be installed in a stable location with ample ventilation. It is recommended, if this unit is rack mounted, that you allow enough clearance on the top and bottom of the unit such that a constant flow of air can move through the ventilation holes.
WATER & MOISTURE
As with any electrical equipment, this equipment should not be used near water or moisture.
SERVICING
The user should not attempt to service this unit beyond that described in the owner's manual. Refer all servicing to Manley Laboratories.



WARNING!

TO PREVENT THE RISK OF ELECTRIC SHOCK
DO NOT OPEN THE CABINET
REFER SERVICING TO QUALIFIED PERSONEL

FRONT PANEL



A GAIN Adjusts the gain of that audio channel. Unity gain is about the seventh marking, or 1 o'clock. Limiting usually requires some additional "make-up" gain to compare IN / BYPASS. The Gain control can also be used as the level to tape.

B IN / BYPASS. Audio still flows through the tubes in BYPASS but at Unity Gain. Switching to IN provides the Limiting controls and functions. Use this switch to verify that the limiting is not messing up the original sound but enhancing it or at least leveling the volume.

C REDUCTION Adjusts the amount of limiting in that channel. This could also be called "threshold". Turning this clockwise introduces limiting.

D STEREO LINK / NORMAL Switching the toggle UP provides the STEREO LINK. It is used on stereo tracks so that when either channel is called to limit, both channels reduce the same amount at the same time. This prevents image shifts and an instrument should stay where you panned them. Limiting individual sounds is usually done with the switch down where each side is independent of the other.

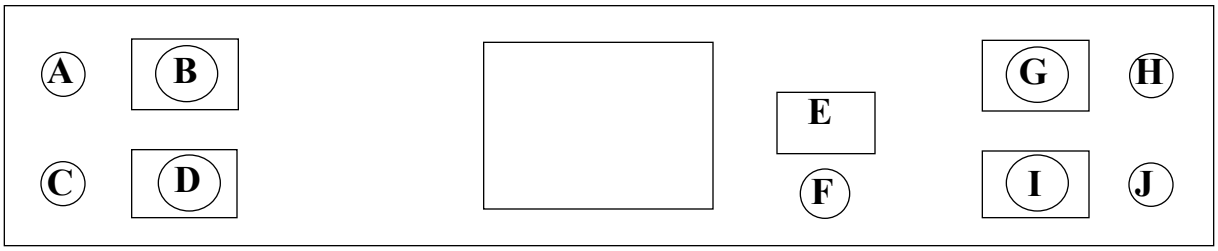
E METER Shows the amound of gain reduction in dB from the 0 dB mark. Functions as a high quality VU meter when the switch is set to METER OUTPUT. Note that VU meters and PEAK meters rarely agree and that digital recorders use peak meters - Rely on those for clean recording. VU meters are standard with analog machines and big consoles because they correspond well with perceived loudness.

F METER SELECT Switch to REDUCTION to see the amount of limiting in dB. The wider and quicker the reduction meter swings the more likely the limiting will be audible. Switch to OUTPUT to show the output level as a conventional VU meter.

G POWER SWITCH Switch up to turn the unit ON. Both meters will illuminate when the power is on.

H SIDECHAIN FILTER Allows you to limit only the frequencies above the one selected. Useful if you want to let the bass come through full-force, but limit everything else.

REAR PANEL



A	**1/4" INPUT (UNBALANCED) (RIGHT)**	TIP: HOT SLEEVE: GROUND
B	**XLR INPUT (BALANCED) (RIGHT)**	PIN 1: GROUND PIN 2: (+) PIN 3: (-)
C	**1/4" OUTPUT (UNBALANCED) (RIGHT)**	TIP: HOT SLEEVE: GROUND
D	**XLR OUTPUT (BALANCED) (RIGHT)**	PIN 1: GROUND PIN 2: (+) PIN 3: (-)
E	**IEC MAINS CONNECTOR** Standard IEC mains connector for 50 /60 Hz AC.	
F	**MAINS FUSE** Replace only with 1A SLO-BLO (120V) or 0.5A SLO BLO (230V).	
G	**XLR INPUT (BALANCED) (LEFT)**	PIN 1: GROUND PIN 2: (+) PIN 3: (-)
H	**1/4"INPUT (UNBALANCED) (LEFT)**	TIP: HOT SLEEVE: GROUND
J	**XLR OUTPUT (BALANCED) (RIGHT)**	PIN 1: GROUND PIN 2: (+) PIN 3: (-)
K	**1/4" INPUT (UNBALANCED) (RIGHT)**	TIP: HOT SLEEVE: GROUND

Old versions of the ELOP® were unbalanced only. This version has both transformer (floating !) balanced and unbalanced (transformerless) inputs. The outputs are similar, offering transformer (floating) balanced XLR and unbalanced 1/4 jacks. The output transformers are "driven" either way so even using unbalanced outputs there may be a part of the "character" caused by the iron. Recording engineers tend to prefer the sound of good transformers. If done right, they saturate a little in the deep lows and this effect "warmth" is usually attributed to "tubes". Its the tubes that give it that clean, immediate, musical quality. Transformers give that rich, fat bottom end - its not a "boost" like EQ but more like a low frequency "exciter". Analog tape also saturates this way, as does the better vintage gear - tube or discrete.

OPERATION NOTES

The Manley ELOP® follows certain traits and traditions established by the UREI LA-2 and similar leveling amplifiers. These traits can be divided into two aspects - electronic and operation. The electronic concept is simple and rather clean. Use the audio to light up LEDs or lamps which shine onto photo-resistors. These photo-resistors, in combination with a fixed resistor, simply act as a voltage divider to attenuate the signal. The tube line amplifier only functions to provide extra gain to make up for attenuation losses and then acts as a fine cable driver. Simple, elegant and minimal. Operation of this type of design is also simple, elegant and minimal. There are usually only "threshold" and "gain" controls. Most have no user adjustment of "attack", "release", "ratio" or functions for de-essing or external sidechains. To put it one way, the user is "stuck" with fixed time constants and a feature list that seems utterly anemic compared to dynamic processors costing far less...

...so why are "LA" style opto-based limiters so popular? Several reasons. To paraphrase Letterman, "The number one reason why "LA" style limiters are favorites is because.... they work right on vocals". This "rightness" has a few aspects. The first is that "LA" style limiters don't leave much trace of limiting as they work. This is partly due to tubes, partly to the simplicity of the opto circuit and partly because the user can't alter the attack and release. Almost every VCA based design seems to leave electronic personality on that critical vocal track. This is usually undesirable. Our Opto circuit has no active limiting in the signal path. Tube circuits have the potential to be musically more transparent than transistors because tubes are generally more linear devices. However, there are many poor examples of tube circuits in use, and many ways to butcher the quality. We chose to use our favorite simple tube line amplifier circuit which we also use in our Mono and Dual Mono Micpres and Enhanced Pultec Equalizers (rather than copy UREI designs) because frankly our circuit sounds better and cleaner.

Back to this matter with fixed time constants. We get requests to modify our ELOP® for more controls, but we get even more people raving about how great and useful the ELOP® is now. The attack, release, knee and ratio (curve) are a function of the Vactrol Cell we chose to use. The choice was based on the attack and release characteristics. Changing the time values in this circuit involves different choices of Vactrols. In the VOXBOX® we spend a lot of effort to get attack and release controls and it required a radical departure from conventional approaches. There is a major advantage to fewer controls and a reason for the coolness of LA type limiters. You simply adjust the Threshold for the desired limiting amount and adjust the Gain for the desired level to tape - then record. The limiter does what its supposed to do - nothing more, nothing less. Kinda like automatically right, strangely quick and easy, and pretty much non-distracting. We use the phrase "Set it and forget it". This is a very important feature that would be lost with a variety of controls. A good engineer wants to be ready to record "now" and does not want to be fussing with controls while a lead vocal is going to tape. Unfortunately most compressors drag the engineer's attention away (and often the singer's and producer's attention away as well).

The time and slope characteristics of Opto elements are not easy to describe and probably even more difficult to simulate. The attack is fast; not super-fast "brick wall", but fast enough to "catch" consonants. It is also a function of level. At lower reduction levels and lower peaks the Vactrol is slower. It becomes faster with sharp peaks and heavier levels of reduction. Release is similar but 10 to 20 times slower. Quick peaks are handled with quick release and as gain reduction nears zero the Vactrol gets slower like gentle braking to a stop. While normal cheapo VCA limiters are much simpler the best approximation is 10 ms attack and 500ms release. We spec 2.5 sec for release which accounts for that slow down near zero. The attack spec number is similarly an approximation. Who cares - it works.

The slope or ratio is also difficult to simulate. The initial ratio is low and becomes higher with more gain reduction until the LEDs light up fully and further reduction is not easy. This upper limit of reduction is in the area of 20 dB or at the bottom of the GR meter where the ratio becomes low again but this would be a severe setting that few engineers could use. Distortion becomes audible at very deep limiting. In a tech shop, it is easy to drive the limiter to 20 dB of reduction and beyond where the GR meter shows a flaw in that it “folds back”. We put a higher priority on having the meter show what the Opto was doing accurately with “normal settings” than extreme test bench observations. Test benches don’t make hit records.

So the Opto Limiters seem to be great for vocals, but what else are they used for - and what about sounds where the time constants are less than optimum ? Historically, “LA” style limiters were often used for bass and guitar tracks. They can be ideal for brass, saxes, synths and similar sounds with superb results. There are other compressors that work well for these instruments but few that are as transparent. Usually, when you hear of an engineer using a non-Opto compressor for these instruments it is usually framed with “for the crunch” or because they add some desired color. There are only a very small number of “clean” general purpose variable time compressors which seem to give Opto units competition - our Variable MU® is at the top of that list. Where the “LA” style limiters are not always appropriate is for percussion and for mixes where the percussion is just right. The Opto typically reacts fast to peaks - fast enough to remove drums from a mix but not quite fast enough to be called “brick wall”. Individual drums tend to have a little of the initial transient let through but the desirable tone of the drum is diminished. If used gently, this can be applied to brighten up the attack of the drum, but it is difficult to apply in practice because drums can be very dynamic. One great use is on the room mics. The initial drum sound is pulled down, then the natural reverb is increased. Shades of early Led Zep. While we mentioned that “LA” style limiters are not what we suggest for mixes, there are times when the drums are too loud or when the engineer can mix “into” the limiter. Both techniques are possible but not necessarily easy. One trick is very little movement on the GR meter. Some of our clients use the Opto on mixes as an effect. This application is valid as long as the effect given and the effect desired are the same. There is not many options for adjustment and fine tuning. The good news is that at least the Manley is clean enough to pass a good mix. In a live sound setting the Opto will perform as a fine speaker protection device. Once again the Threshold is set for minimal limiting with music and is just adjusted to encourage the pyrotechnician to try harder tomorow to kill a few woofers.

Advanced Tricks

Here are a few tricks that are not really for rookies. They come from guys doing major records for years and won't work unless you've mastered the basics. In other words if we gave you a Strat and Marshall it won't make you another Jimi. Also we don't suggest that you try these out while paying big-time studio rates - they may not be easy to get right at first. OK, you have been warned.

Trick#1. Each compressor or device in the chain has certain flavours and characteristics and with experience we grab the ones we like because of the sound - not because "it is a compressor". The idea is to use several cool compressors in a chain getting flavours from each depending on how much GR (gain reduction) is used in each and how hard they are driven. It's this second concept that can be tricky. How far to turn up each Make-up Gain to overdrive or not overdrive the next unit - and still not get flooded with noise when the music stops. You can chain the two channels of the ELOP® and turn up the make-up of the first channel. This works best with classic discrete and tube units and usually IC units are to be avoided. The finesse comes from which order they are patched. See how long it might take to get best results .....

Trick#2. This one is easier but also requires serious listening. Rather than just "inserting" a limiter, try driving the limiter from the tape patch (pre EQ), returning it to a spare fader and mixing it with the original. So what is so tricky ? How you EQ and automate and add effects to these channels. You can also have fun phase reversing one of the channels. You get cancellation but only at a certain level. It is sort of like gating but different - it is a way of controlling the "ambiance".

Trick#3. Using one track to "duck" another. This may work better with compressors with attack and release and ratio controls if you are thinking drums. Bass and vocal is very cool with the ELOP®. Set it up like trick#2 with bass in one channel and vocal in the other (in LINK mode) and experiment with each threshold. Two guitar tracks also work here sometimes. Obviously we pull out this trick when two tracks are stepping on each other and EQ isn't making enough room for clarity.

Trick#4. Drive the compressor from an AUX send and return it to a channel. Once you have some limiting, carefully turn up that aux send on the return channel to "feed back" into the limiter. Watch out for real howling feedback and over the top limiting. If you are lucky it won't scream during the quiet parts. The key is balancing the faders, track auxes, the return auxes, the thresholds and make-up gains. The technique can get pretty crunchy and wild. Works best with not-so-clean compressors but is interesting with the ELOP®.

Trick#5. This one is a way to get a very good single channel De-esser from the ELOP® or other compressor good enough for lead vocals. Mult the Insert send of the vocal to the ELOP® and to a spare channel. EQ the snot out of that second channel -boosting the 5 or 6KHz band and chopping everything below that. Use the insert from this channel to drive the other channel of the ELOP® but it is unlikely that you want this fader up. Set the ELOP® to Link. The threshold of the first channel sets compression and the second channel sets de-essing. Unlike some de-essers it will not chop highs but reduce wide-band which is less obvious. The only drag is that the release is a little slow. Remember good de-essing is not to remove esses - the idea is to reduce esses and make them natural sounding. BTW if you need to de-ess, you might want to re-think your choice of gear. There are 3 main reasons we get horrible esses: 1) a gap in the singer's teeth or just a strange voice, 2) too much or wrongly choosen EQ, or, 3) gear that distorts the highs. If the cause is "1", try sticking some dental wax in the gap. No joke. If the cause is "2" then we can tell you some EQs allow one to boost highs with less problems with the esses or you might try boosting a higher freq, or less during tracking. If it is "3" you may want a better mic or sell off some of that cheap IC gear that seems to be distorting the top in a way that you don't like. Actually we have heard some pretty expensive gear - both tube and solid state - that has this particularly ugly distortion. If in doubt, try some tough percussion through it like shakers or tamborines, and see how they sound...

MAINS CONNECTIONS

Your ELOP 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
BLUE	NEUTRAL
BROWN	LIVE

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.

DO NOT CONNECT/SWITCH ON THE MAINS SUPPLY UNTIL ALL OTHER CONNECTIONS HAVE BEEN MADE.

Note: Units are purpose-built for original destination country's mains voltage: 100V, 120V, or 220-240VAC as indicated on the serial number badge. Power transformer mst be replaced in order to change mains operating voltage. 120VAC units may NOT be rewired to put the primaries of the power transformer in series for 220-240VAC operation or a large radiated field of hum will develop. If changing locations/voltages, the power transformer must be replaced with the dedicated one for the voltage at which it will operate.

100-120V Operation: Uses a 1A MDL SLO-BLO fuse.
220-240V Operation: Uses a 0.5A MDL SLO-BLO fuse.

Waste Electrical and Electronic Equipment (WEEE)

Information for customers:
The European Parliament and the Council of the European Union have issued the Waste Electrical and Electronic Equipment Directive. The purpose of the Directive is the prevention of waste of electrical and electronic equipment, and to promote the reuse and recycling and other forms of recovery of such waste. As such the Directive concerns producers, distributors and consumers.

The WEEE directive requires that both manufacturers and end-consumers dispose of electrical and electronic equipment and parts in an environmentally safe manner, and that equipment and waste are reused or recovered for their materials or energy. Electrical and electronic equipment and parts must not be disposed of with normal household wastage; all electrical and electronic equipment and parts must be collected and disposed of separately.

Products and equipment which must be collected for reuse, recycling and other forms of recovery are marked with the following pictogram:

Small products may not always be marked with this pictogram in which case this is present in the instructions for use, on the guarantee certificate and printed on the packaging.

When disposing of electrical and electronic equipment by use of the collection systems available in your country, you protect the environment, human health and contribute to the prudent and rational use of natural resources. Collecting electrical and electronic equipment and waste prevents the potential contamination of nature with the hazardous substances which may be present in electrical and electronic products and equipment.

Your MANLEY or LANGEVIN retailer will assist with and advise you of the correct way of disposal in your country.

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. No need to panic. We have sold hundreds of these units and barely any have ever had a problem with hum or interfacing to other gear. However, if you suspect a problem the following paragraphs should help.

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 blows too 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. Next check the front panel, try BYPASS. If you have sound now it might be a good idea to turn up the output levels to about 1 o'clock (rather than fully counterclockwise which is "minus infinity". The XLR inputs and outputs are transformer balanced and floating. "Floating" refers to a very useful feature of transformers where they can be used without a ground reference - this prevents ground loops before they happen rather than electronically cancel them. It does require that both PIN 2 and PIN 3 be connected (but not to each other). To interface to unbalanced units you should connect PIN 3 to Ground or PIN 1. Brainless solution - use the 1/4" unbalanced inputs and outputs to interface to unbalanced gear.

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 only one side of the Limiter exhibits this problem, it may be a problem in the Limiter. See the next item.

ONE SIDE WORKS FINE BUT THE OTHER SIDE IS DEAD - Let's assume this is not wiring. We are pretty sure it is the Limiter. 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 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'. Most Manley gear is two channel, meaning you can swap tubes to determine the bad boy. Do two at a time just watching that they are the same number. 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 "the vacuum leaked out". Either way, replace the tube. Call us, or look for a tube supplier on the internet. Manley can ship you a tested one. Back to swapping - before you pull a tube, pull the power out, let the unit sit and cool and discharge for a minute or two, 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.

HUM - Let's assume it knows the words. Once again - several possibilities - several cures. Most likely it is a ground 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 (PIN 1). This is done by some studios 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 ELOP® 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 is more likely with the unbalanced inputs and outputs because these signals are ground referenced. A common situation is using the limiter in a way that significantly boosts the low level signals and what may have started out as a little hum becomes nasty. Check out the gear feeding the Manley or use less limiting and make-up gain.

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. It will have to be on , connected and speakers up but not too loud for the sake of your 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 (12AU7). You may find that you need to choose the quietest tube out of several of that type.

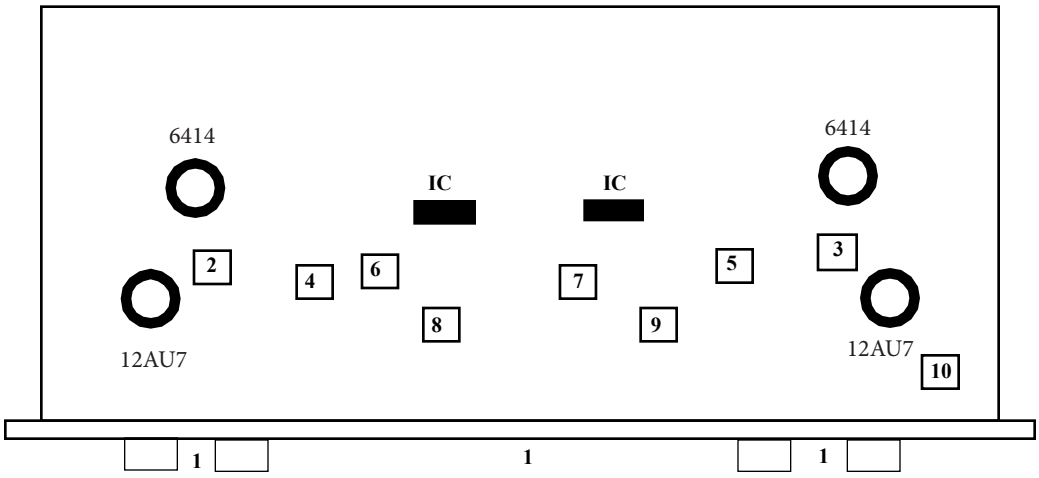
DISTORTION - This might be a tube. Swapping is a good way to find out. It may be a wiring thing or mismatch as well. Wiring problems usually accompany the distortion with a major loss of signal. Mismatches are a bit tougher. The ELOP® has a high input impedance (HI Z) but some of our gear has a reasonably low input impedance. 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.

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 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 invest more in these two output caps than most limiters spend on the entire parts list. A little very low frequency noise might be seen at the output if you use a scope. This is generally very low level and caused by AC power fluxuations.

THE METERS ARE OUT OF CALIBRATION - If the problem only seems to be when the unit is just turned on it's normal. It should warm up. It might be a half dB out for 15 minutes - relax. If they drift a tenth of a dB over the course of a day it is because of bad AC power fluxuations - chances are other gear is doing worse, you just haven't found out yet. Your unit will have been factory calibrated and tested twice before you received it. Sometimes parts drift a bit in value over the years, or you have repaced tubes and want the unit calibrated at the same time, or you just want it as perfect as it can be. These are good reasons to turn the page and go through the calibration procedure or sent it to a technician or the factory for a tweak. If you send the unit to a tech, you should include this manual because they will need it. If you do it yourself, you will need an Oscillator and a few screwdrivers and it would be nice to have a VOM meter and Scope but not necessary.

Once in a while we get a call from a client with a "digital studio" with confusion about levels. They usually start out by using the digital oscillator from their workstation and finding pegged VU meters the first place they look and they know it can't be the workstation. Even a -6 level from their system pegs the meters. Some of you know already what 's going on. That -6 level is referenced to "digital full scale" and the computer might have 18 or 18.5 or 20 dB of headroom built in. That -6 level on the oscillator is actually a real world analog +12 or +14 and those VU meters don't really go much further than +3. There are a few standards and plenty of exceptions. One standard is that pro music (non-broadcast) VU meters are calibrated for 0VU = +4 dBm =1.228 volts into 600 ohms. Another standard is that CDs have a zero analog reference that is -14 dB from digital full scale or maximum. This allows sufficient peak headroom for mixed material but would be a bad standard for individual tracks because they would likely distort frequently. This is why digital workstations use higher references like 18 and 20 -to allow for peaks on individual sounds. It may be too much in some cases and too little in others. Add two other sources of confusion. Peak meters and VU meters will almost never agree - they are not supposed to. A peak meter is intended to show the maximum level that can be recorded to a given medium. VU meters were designed to show how loud we will likely hear a sound and help set record levels to analog tape. By help, I mean that they can be only used as a guide combined with experience. They are kinda slow. Bright percussion may want to be recorded at - 10 on a VU for analog tape to be clean but a digital recording using a good peak meter should make the meter read as high as possible without an "over". Here is the second confusion: There aren't many good peak meters. Almost all DATs have poor peak meters that do not agree with each other. One cannot trust them to truly indicate peaks or overs. Outboard digital peak meters (with switchable peak hold) that indicate overs as 3 (or 4) consecutive samples at either Full Scale Digital (FSD) are the best. They won't agree with VU meters or Average meters or BBC Peak meters either. Each is a different animal for different uses. The Limiter should help digital and analog achieve consistent levels but use each meter for it's own strength. The Reduction mode is useful with everything.

INTERNAL ADJUSTMENTS



1) You will have to start out by setting front panel controls to these settings. BYPASS mode, SEP (LINK OFF), REDUCTION controls counter clockwise (MIN), GAIN to 1:00 or unity, S.C. at "Flat". The top will need to be open. There are two screws on the top that hold the top perforated-panel to the back. Remove these and the perforated top will slide back. Be careful! THERE ARE HIGH VOLTAGES INSIDE THE LIMITER. DO NOT HOLD THE METAL PART OF THE SCREWDRIVER. DO NOT PROBE AROUND WITH THE SCREWDRIVER OR FINGERS. The unit should be on for about 15 minutes to allow for "warming up".

2 & 3) This adjusts the tube amplifier gain in all modes. 1 KHz sine at 1.23 volts RMS (+4 dBm, 0 VU) to both inputs. BYPASS mode. Adjust 2 & 3 for unity gain at outputs.

4 & 5) This adjusts VU meter calibration for OUTPUT. Same input, Meter switches to OUTPUT. Adjust for 0 VU on the Meters.

6 & 7) This adjusts the meter zero for Reduction mode. Meter switches to REDUCTION. Adjust for 0 VU on the Meters.

8 & 9) This adjusts the meter in Reduction mode to reflect the actual gain reduction accurately. You will probably need to increase the oscillator 10 dB to get Limiting. Switch from BYPASS to IN. Meter switches to OUTPUT. Adjust GAIN controls to get 0 VU on the METERS again, then adjust REDUCTION controls to reduce the signal to -4dB. Switch METERS to REDUCTION. Adjust 8 & 9 to get -4 dB on the METERS.

10) This adjusts the gain of the right side chain and adjusts the side chain balance in Link. Switch the LINK ON. There should be 1 to 2 dB change in the Meters. Adjust 10 so that the meter is the same for both sides. You may have to re-adjust 8 and 9. Check that both in LINK and SEPARATE that both channels show the same reduction.

This is a final check to verify that all adjustments are OK and the unit is ready for use. Confirm that 0 VU on the meters is +4 dBm with an external VU meter or VOM that reads between 1.22 and 1.23 volts AC and that gain reduction reads the same on OUTPUT and REDUCTION and that LINK or UN-LINK does not reduce the gain unevenly on the two sides. Remove the power and slide the top in all the way where it will fit into a groove in the front panel and put those two top screws back in. Done !

SPECIFICATIONS

ALL-TUBE audio path 12AU7WA + 6414 per ch.

Unbalanced 1/4” Inputs And Outputs and...

Balanced Transformer Coupled XLR Inputs And Outputs

Hi-current drive <50 ohm 1/4” & XLR outputs

Silent conductive plastic INPUT attenuators

Max. GAIN REDUCTION 22dB

ATTACK time: 10mS for 6dB GR

RELEASE: 2.5 Seconds for 6dB GR

Maximum Input (Bypass through Line Amplifier) +30 dBv (with Limit “IN” the maximum is entirely variable)

Maximum Output +30 dBv

Headroom (referenced to +4 dBv) 26 dB

Frequency Response: 10 Hz to 70 kHz +/- 0.5 dB

BYPASS switches and AUTOMUTE w/warmup delay

Large ILLUMINATED Sifam VU METERS (older units before serial number MELOP®B716 shipped before 6/2003 use: 26V 1.2W FESTOON LAMPS; Manley’s Part Number: VAR016B) Order spare bulbs using our parts order form. (newest units after serial number MELOP®B716 shipped after 6/2003 use yellow LED lighting)

Meters switch to read OUTPUT or REDUCTION

STEREO LINK

Side-Chain High-Pass Filter 100Hz or 200Hz

THD & Noise (1kHz @ +4 dBm): .015%

Noise Floor (Gain set to minimum): -80 dB Wideband

Signal to Noise Ratio: 126 dB typical

Maximum gain: 15 dB

Power consumption: 40 watts

Operating mains voltage: Units are purpose built for original destination country’s mains voltage: 100V, 120V, or 220-240VAC as indicated on the serial number badge. Power transformer must be replaced in order to change mains operating voltage. 120VAC units may NOT be rewired to put the primaries of the power transformer in series for 220-240V operation or a large radiated field of hum will develop. If changing locations/voltages, the power transformer must be replaced with the dedicated one for the voltage at which it will operate.

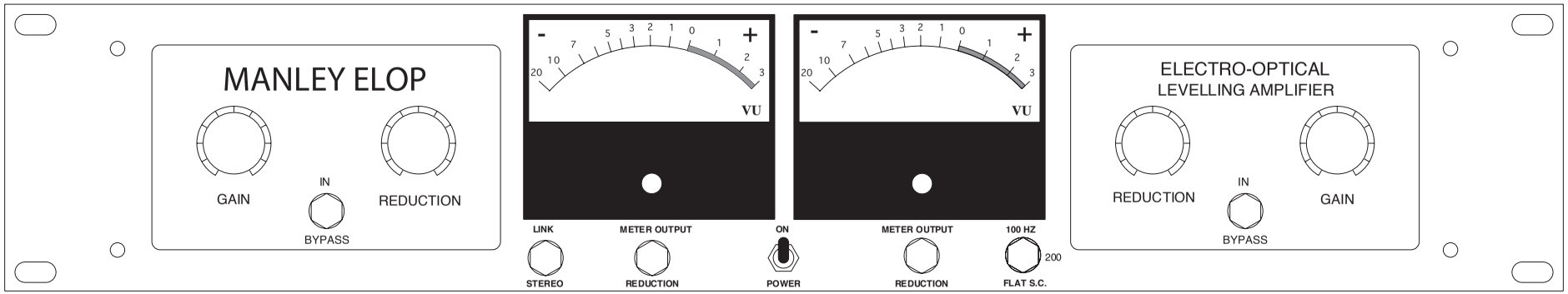
Mains Voltage Frequency: 50~ 60Hz

Dimensions: 19” x 3 1/2” x 10” (occupies 2u)

Shipping weight: 16 lbs.

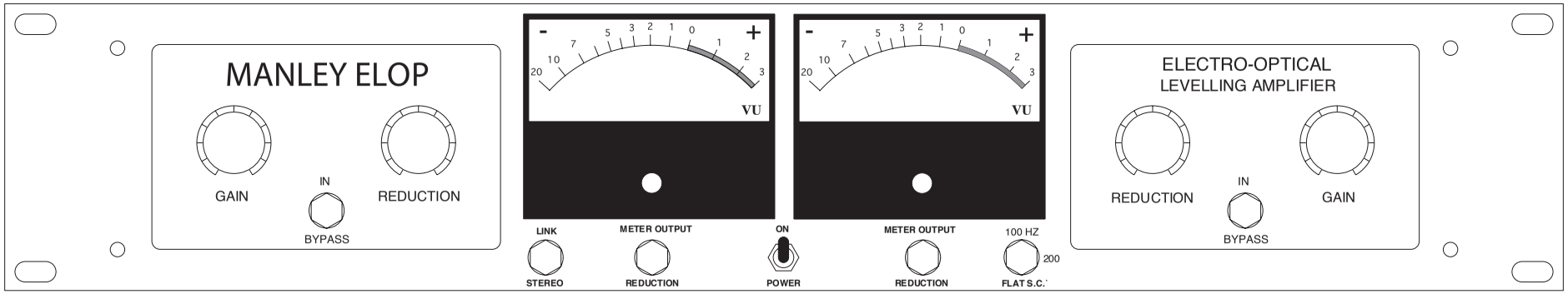
TEMPLATE FOR MANLEY ELECTRO-OPTICAL LEVELLING AMPLIFIER
PHOTO-COPY THIS PAGE AND STORE YOUR SETTINGS WITH THE TAPES OR OTHER SESSION NOTES

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



ARTIST . . . . . MIC NOTES . . . . . DATE . . . . .

SONG . . . . . INSTRUMENT / TRACK . . . . . ENGINEER . . . . .



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