

Little Labs

Little Labs *pcp* *instrument distro*

Operators Manual



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Dear Audio Professional,

Congratulations on your purchase of the PCP instrument distro Rev2.5. This specialized audio tool was initially developed by me to address problems encountered when in the overdub stage of recording guitars. As the product developed it became clear it was a very useful tool in all aspects of production from live shows to tracking to overdubbing to mixing.

The PCP is hand made. All the parts, passive and active, were selected by ear to perform in its application to the highest sonic and musically satisfying standards. The quality of parts, mechanical and electronic, are on the par with an audiophile high end product rather than a commercial electronic musical product. I am confident you will find the PCP Musical Instrument Distro to be one of your wisest pro audio purchases.

I would like to give credit for help in developing this product to the following: The staff and clients of Conway Recording Studios (my present real world lab), Joe Barresi, engineer and friend, who nagged me for almost two years to get this product out, and my Physics Professor Pop, William Little, for explaining how the passive summing (used in the original purple version of the pcg) follows the theory of reciprocity .

Cheers,

Jonathan Little

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Contents

Before using the PCP

Balanced inputs warning	3
AC, audio ground & ground lifts	3
Instrument out earth lift warning	3
PCP definition	3

What is in PCP

The Direct Box	4
The Guitar Splitter	4
The Line Driver and Running Long Cables	5
The Balanced Hi Level Inputs & Reamping	5
Using it All	5
Other Possibilities	5

Other Useful information

Front & Rear Panel Descriptions	6
JUST SAY KNOWTO GAIN	7
Power Supply Information	7
Disassembly	8
Assembly	8
PCP Revision Information	9
General Information	10

READ THIS BEFORE USING THE PCP INSTRUMENT DISTRO

The PCP uses shorting jacks which ,simply put, short the instrument input when not in use. However it is important to note, when plugging in your instrument, you must plug in the top front instrument in jack or rear instrument in jack first. Now to confuse you more, whatever is plugged in the rear instrument in will be overridden but what is plugged in the upper front instrument in. This was done so if you have a standard set up placed in a rack of gear, you could plug in the front when needed without having to reach in the back and disconnect what is feeding the rear.

The balanced inputs on the rear of the unit are for feeding from professional level +4db balanced sources this will insure proper output levels on the PCP.

Furthermore the DI output XLR must feed a balanced input. The expansion in & outs must use a tip-ring-sleeve balanced (stereo type) 1/4" plug cable to link with another PCP. A mono guitar 1/4" shorty will not work!

The Third prong AC ground is attached to the chassis and audio ground. Ideally chassis is attached to third prong AC ground only. This shields the PCP and will eliminate a possible source of ground loops. Unfortunately third prong AC ground quality will vary greatly from studio to studio,venue to venue. Therefore, I chose to attach audio and chassis ground. This enables you to ground lift the third prong AC ground if necessary, while still keeping the unit properly shielded. I usually use a ground lift to start and remove it if necessary.

On the subject of grounding, be careful when selecting earth lift on the PCP outputs. Even though an un-grounded amplifier makes one hell of a hum, always keep a voltmeter around to check for voltage potentials between guitar and amp, mic stands, fog machines or lava lamps. Tube amps with groovy modifications are possible sources for electrocution. Electrocution means death & you don't want that. Little Labs cannot be held responsible for any injury or death caused by the direct or indirect use or misuse of its products.

There you have it, but please read on for more information and tips that should help the inexperienced and experienced engineer or guitar player alike in obtaining the highest performance and creative genius out of the Little Labs PCP instrument Distro.....Oh yeah, PCP stands for PROFESSIONAL TO CHEESY PEDAL, and has absolutely no relationship to that elephant tranquilizer drug popular amongst our youth.

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WHAT IS IN

PCP

1) The Direct Box

Not an after thought, the Direct Box in the PCP utilizes a similar circuit topology as the HI Z input on the Little Labs Multi Z Direct Box (another fine Little Labs Product). The Direct box is active and has 16db of gain, you will not experience the level loss associated with passive directs. In almost all cases you will be able to use it at line level, rather than mic level, eliminating the need to run through a microphone preamplifier. The PCP is powered by a regulated low impedance 48 volt dc@250ma power supply with a large reservoir capacitance to give it BALLS. Compare it to that phantom or battery powered active direct and see why power supply matters.

2) The Guitar Splitter

Guitar splitters have a bad rap in the guitarist community due to the changing of the guitars sound which can occur when using them. Solving this is a difficult task because when dealing with the high impedance pickups in guitars different cable capacitance, input impedances, length of cable, etc. can make a huge difference in the sound of the guitar. I chose to get a pleasing sound with high impedance transformer isolated outputs. Will your guitar sound different when splitting to different amps using the PCP rather than plugging directly into the amp? Probably yes, but it will be close and pleasing. Do me a favor if comparing, use a female to female quarter inch barrel connector, and rather than plugging directly

into the amp from the guitar, use both cables as would be used when using the splitter.

The PCP instrument input impedance is high: 10,000,000Ω. By design, this will not load down your instrument pickups. This works well for the direct box portion of the PCP and has the added advantage of being able to mult off your instrument to another device and only the external device will load the pickup. The high impedance instrument input is sent out to the three output sections which, when instrument is selected, are directed to the phase reverse switch, the ground lift switch, and the level trim for each of the three outputs. The three, labeled to amp or pedal, outputs are high impedance and are not meant to drive any more cable then a normal guitar to amplifier length. If long cable lengths are necessary, see Line Driver info. The natural pickup loading of an average length cable feeding an amp effects not only the high frequency of the guitar but the envelope of the attack when plucking the strings. The specially selected output transformers in the PCP emulate a guitar pickup's impedance. These special transformers maintain the natural roll off and attack which occurs when feeding one amp when splitting off to 3 (1 pc) or 6 (2 pcps utilizing expansion) amps, without the ground loops and phasing problems of other splitter boxes.

The sound of a guitar amp when the guitar feeding it is converted to a low impedance, as in some other cheaper non-transformer-isolated splitter boxes, I found to be a bit bright and have a hard attack. This might be the sound you are looking for sometimes, and you can achieve this by splitting the line driver out (mind you, you will not have level trim or phase reverse). I personally prefer the creamy tone and natural attack of the transformer isolated high impedance outputs. But HEY, whatever floats you at the moment is ok with me.

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3) The Line Driver & Running Long Cables

When using combo type guitar amplifiers in the studio (head & cabinet attached, such as in a fender twin), if the player needs to sit in the control room, it becomes necessary to run a long cable from the Control Room to the Studio. The problem with running long cables is, due to the high output impedance of the guitar, the cable capacitance causes a severe high frequency roll off in the tone of the guitar. The DI out unbalanced line driver will eliminate this, by converting the high impedance guitar output to a low impedance output which will drive long distances without high frequency loss. Low impedance outputs as we mentioned in The Guitar Splitter section are not my personal preference, but when using really long cables it is the only solution...with one exception. That is to use two PCP instrument distros, utilizing the expansion output to expansion input. This will allow, in my opinion, the optimum tone and attack to be maintained with a very long cable between PCPs.

4) The Balanced Hi Level Inputs & Reamping

For each instrument output, labeled output A, B, or C to amp or pedal, you may select instrument in, but you also may select up to three +4db balanced inputs which are thus converted to guitar level/impedance outputs. This makes it possible to feed previously recorded tracks to a guitar amp or any pedal/effect designed to work with a guitar. These inputs must be fed by professional level +4db balanced sources (If fed by unbalanced -10db "consumer" sources the guitar level outs will be low in level). Selecting more than one balanced input will sum them together. Interestingly, how they sum is dependent on whether the balanced +4db level input is transformer or actively balanced. Utilizing the balanced +4db level inputs and the instrument inputs together makes it possible to double guitar tracks through an amp. Also with the advent of so many

samples being used live today, more difficult guitar parts can be fed to the players amp. Who needs to know you got the part once, after 200 takes, and were never able to get it right again! Revel in the glory of hearing, "This guy is so frickin good it sounds like two guys playing!"

5) Using it All

The individual tools in the PCP instrument distro can be independently used, but can effectively be used in a symbiotic relationship between all of its tools. When recording the guitar use the direct out signal clean to tape. Feed PCP balanced inputs A, B, and C from buss outputs of the console. Feed three heads from the guitar level/impedance outputs. With this set up, tracks can be laid down, fed back to different amps and doubled. It can be used as a very powerful flexible tool. Experimenting with different amps and other effects devices can be done later, after the performance itself is nailed.

6) Other Possibilities

Pultec equalizers, Neve modules, Fairchild compressors, and any Balanced +4db outboard gear can be used on guitar before your amp with the proper impedance/level when using the PCP. This is achieved by plugging the guitar into the PCP, taking the Direct out feeding the equalizer, compressor, etc. Then bring the equalizer, compressor, etc. back in one of the the balanced ins and assign that to the to amp or pedal output which feeds your guitar amp.

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FRONT AND REAR PCP INSTRUMENT DISTRO PANEL DESCRIPTIONS

Pushing in these buttons selects which pro level balanced inputs A, B and C (plugged in the rear female XLRs) will feed the instrument impedance / level output (located to the right of each row of buttons on the front panel).

These can be combined with each other, and the instrument input for doubling of guitar parts or other special effects.

Pushing this button in selects the instrument plugged into the instrument input, to feed the instrument impedance / level output (located to the right of each row of buttons on the front panel). This can be combined with the pro level inputs for doubling of guitar parts or other special effects. If using two PCPs in the expansion mode, when the button is out, it will select the other PCP instrument input to feed the instrument impedance / level output.

Pushing in this button lifts the pin 1 ground of the Di out XLR.

Your instrument should be plugged into the top front jack, or rear jack. The lower front jack only works when an instrument is plugged into the jack above it, or rear jack.

Female XLR inputs to be driven from preferably pro level balanced sources such as a console send or tape machine outputs.

Your expansion in & outs are for when using a second PCP which will enable you to have six instrument level/impedance outputs. You must use balanced (stereo trs type) 1/4" plugs in & out between the units.

This is your unbalanced line driver low impedance output for driving long cables (e.g. utilizing a combo or twin amp and you need to play in the control room).

Pushing this button reverses the phase of the instrument impedance / level output (located to the right of each row of buttons on the front panel). Use it to eliminate phase (polarity) differences between different head or cabinets.

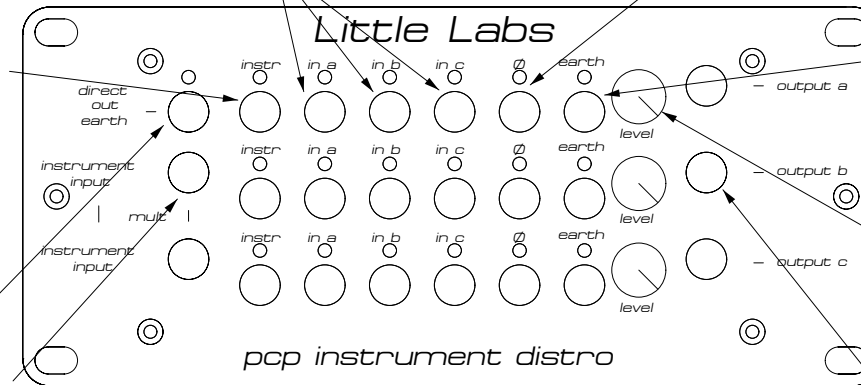
Pushing this button lifts the ground of the instrument impedance / level output (located to the right of each row of buttons on the front panel), use with caution as this might eliminate bad hum problems, but can create nasty hums as well. Always check for possible lethal voltages between instrument and heads with a voltmeter.

This trims your instrument impedance / level output volume (on the adjacent jack). When used as a guitar splitter, if the trim is set all the way clockwise, the level will vary from from about +3db to unity over the level of the instrument selected to feed it. (This is dependent on the impedance of the amp or pedal that the output is feeding).

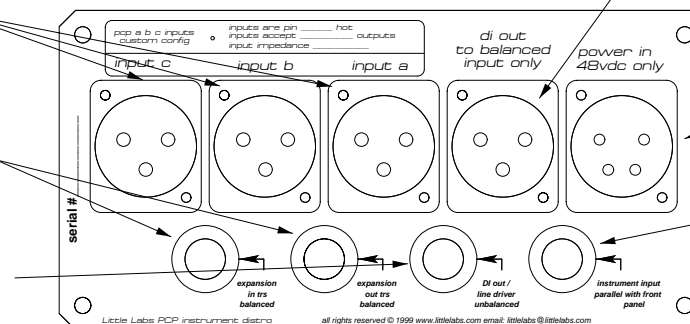
These are the instrument impedance / level outputs, they have the same level and impedance as a passive electric guitar pick up. These outputs are designed to happily feed guitar amps and / or guitar pedals. Use the buttons to the left of each output to select what feeds it.

Use only the 48vdc 250ma power supply supplied with the PCP and plug in its 4 pin XLR here.

Your instrument should be plugged into this jack or the top front jack. If you have an instrument plugged in this rear jack, when you plug in the front top jack it will cut off this input. If you need to mult between the front and rear jack you can plug in here and the bottom front jack.



Direct Box output designed to drive balanced line inputs pin 2 hot.



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JUST SAY KNOW... TO GAIN

Proper gain between stages in an audio system is critical for low noise and low distortion. A passive type Direct Box using a transformer has to lose voltage in order to have its input (primary) impedance high and its output (secondary) impedance low. Typical voltage loss for this type passive device is 20dB. That is the only reason Direct Box outputs have always been run into the microphone inputs of a console.

With an active Direct Box, voltage loss is not a problem. In fact, the active stages typically sound better with gain (something more than unity). Most passive instruments need very little or no gain to run into a microphone preamplifier. Most active instruments have more than enough gain to bypass the microphone preamplifier stage altogether and run directly into a line input. It is important to note this because if you find yourself heavily padding an instrument in order to run it through the high gain input section of your console (the microphone preamplifier) you will get a dramatic increase of NOISE. The proper way to run a Direct Box in this situation is to feed the Direct Box output into your console line inputs rather than the console microphone inputs (use the balanced XLR out for balanced console line inputs, and the unbalanced 1/4" jack for unbalanced console line inputs). This way no gain is unnecessarily added or padded, and a happy gain structure (low noise and low distortion) is the result.

The Little Labs PCP Instrument distro direct box output is capable of putting out +26dB. Obviously, this is more level than you will probably ever need. This is solely done for headroom. The actual gain of the Direct Box is +16db from instrument input to direct box output.

The front guitar output (with the trim full up) is designed for approximately unity gain with the instrument input, when using a typical guitar amp or pedal. With higher input impedances you will notice slightly more output (about 2 db above unity). Input impedance of guitar amplifiers and pedals will vary from manufacture to manufacture but will typically be about 1,000,000 Ω on the high side to 100k Ω on the low side .

POWER SUPPLY INFORMATION

The PCP Instrument Distro uses an external 48volt DC 250ma linear regulated low impedance power supply. Internal to the PCP a 4700uf capacitor is used for cable decoupling, further filtering, and storage capacitance. THE FIRST FIFTY LITTLE LABS PCP INSTRUMENT DISTROS' POWER INS WERE LABELED 48VAC, PLEASE NOTE, THIS LABELING IS INCORRECT AND ONLY THE 48 VDC 250 MA SUPPLY WHICH CAME WITH THE PCP SHOULD BE USED.

As stated in the Read This Before using The PCP section, third prong AC ground is attached to the chassis and audio ground. If you are in Hum Hell, you may ground lift the PCP. In fact I usually start with a ground lift, but be careful (especially on the older tube amplifiers that someone has done some really groovy modifications to). Always check with a voltmeter for any voltage potentials between your instrument, your amplifier, and the PCP.

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DISASSEMBLY

When opening the guts of a product, you always run the risk of doing something so as the product never quite works right again. Please refer to qualified service personnel, no user serviceable parts inside. I can always tell if someone opened up one of my products. But I myself usually won't even buy something until I open it. So here is how to do it without screwing it up, Fortunately this is my easiest product to open up to date.

1. On the rear panel the four screws located in the corners should be removed. Please note the screw in the bottom right is not black it is silver and is used for shielding purposes.
2. The rear panel is attached to the whole circuit board assembly and the entire insides will slide out the rear of the aluminum extrusion.
3. This will expose the insides to your leering eyes. Nicely made, eh?
4. You should not need to separate the rear panel unless possibly you have a broken XLR or phone plug. If you must separate the rear panel, it is being held to the circuit board by each XLR's internal body half screw. Use a very small screwdriver and twist the screw inside the center of each XLR counterclockwise. They should each click loose and the rear panel with the XLR outside shell will slide off.
5. Lastly remove the two qwik connect power connectors , or on newer units desolder the red and black wires. The entire rear panel will then be separated.

ASSEMBLY

1. If you removed the rear panel, slide it back on the pcb mounted XLRs and phone plugs. With the same small screwdriver used before to remove the inner XLR from the shell, twist the inner screw of the XLR innards clockwise until they click into place on the shell.
2. Attach the wire mounted qwik connects to the pc board male qwik connects making sure pin 1 of the 4 pin xlr attaches to the right (closer to the edge) qwik connect and pin 4 attaches to the other qwik connect parallel to it. If you reverse these, you will blow up the PCP and it won't be covered by any warranty. BE VEYVY VEYVY CAREFUL!
3. Very carefully slide the whole PCB assembly into the main chassis. If all is well it will slide right in, the leds will slip right into place. If all isn't well don't force anything and visually check that the leds line up and the trim pots as well. Fudge what you need to until it slides easily into place.
4. Reinstall the four 4-40 screws in the rear and remember the bottom right screw should be silver (for shielding purposes). ... And thats it!

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PCP **REVISIONS**

Revision 1 The Purple PCP

The original rev 1 Purple PCP had all the same buttons and inputs and outputs as the most recent version. The circuit topology however is completely different. The rev 1 Purple PCP used an elaborate purist passive lattice summing philosophy . It required the xlr inputs to be fed from a balanced source which could comfortably feed a low impedance (600Ω). This requirement, with time, proved to be too much for the real world of recording, where wiring and gear is unpredictable. Side effects on the rev 1 Purple PCP from using unbalanced sources and or sources unable to drive 600Ω included crosstalk, low levels and or ground feedback. The circuitry to drive the Direct box and guitar splitter were shared on the rev 1 Purple PCP . All instrument inputs were muted on the rev 1, no shorting jacks were used. This could result in a noisy output if instrument was selected on the selector, and no instrument was plugged in. The original Purple PCP was happiest in studios with a lot of transformers interfacing gear, old NEVE or API rooms. Overall the rev 1 Purple PCP was a great box and there are a lot still out there with happy owners, but if you are looking to upgrade to the latest rev 2.5 all aspects of performance have been improved, besides aren't you sick of the purple yet???

Revision 1.5 The Unseen PCP

Rev 1.5 was supposed to fix the passive problems by using an even more elaborate purist passive lattice summing philosophy. It still had though a problem in that if two inputs were summed on one output. For example:

selecting in a, and in b, on output a then selecting in b, on output b crosstalk would result in that you could hear some, in a, on output b, even though it wasn't selected. Sorry that is a little confusing.

Revision 2 The Black PCP

The Rev 2 Black PCP uses active balanced summing. This type of summing is extremely quiet and is usually only used in very large mixing desks. It allows a much higher input impedance so you won't be loading any gear down. Its overall sonic effect on the PCP is a more effortless solid punchy sound. The rev 2 Black PCP can be used, if you must, with unbalanced sources with the only draw back of a loss in level of 6db. The Direct Box and guitar splitter sections no longer share the same circuitry. The Direct Box output on the Black PCP is truly outstanding. The rev 2 Black PCP still uses on its guitar level/impedance outputs the proprietary transformers of the original rev1 Purple model. The rev 2 Black PCP uses a shorting jack on the upper front instrument in jack (some units slipped out without this). This keeps the PCP quiet if you have instrument selected for an output but do not have an instrument plugged in.

Revision 2.5 The Black PCP

The rev 2.5 Black PCP is essentially the same as the rev 2 with minor updates. The rear jack will now be interrupted if you plug in the front upper jack. This was a request by a customer and seemed to make sense. The circuit board itself is now black in color (if you ever peek). Any minor boo boos on the PCB layout on the rev 2 were remedied on 2.5 and that is it. If you have an older unit, of course I recommend you update, I will work something out with you. Performance of the Black PCP is truly exceptional in every aspect.

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GENERAL INFORMATION

To be kept informed of new Little Labs products and Little Labs product updates, please drop us a postcard or E-mail. Please include your name, address, which product you bought and where you purchased. Also, any comments or suggestions are always welcome.

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