

Trimming Avolites Dimmers

INTRODUCTION

This note was written with the intention of restating the correct method of trimming the Avolites LD 12-10, & LD 12-20 series Dimmer modules. It also has the more common pin outs of control connectors, and details the control voltages that are used in normal operation. Probably the best way to find out if you understand what follows is to get a dimmer in the shop & trim it there under fairly sane conditions, so when faced with a sick dimmer on the road you will have a fair idea of how a normal one behaves.

What Happens When A Dimmer is Trimmed?

Refer to the Dimmer Law Curve at the back of this note to get an idea of what a dimmer curve looks like. This curve relates the fader position to the voltage output from the thyristor for any fader position. When you adjust, the ramp you adjust the shape of the curve. In the LD series dimmers there is only one correct curve. It so happens that when the curve is correctly set the voltage measured at the RAMP test point is 5 V DC. There is no other valid voltage that it should be set to.

The DOWN trim sets the position on the curve where the 0 V position of the fader relates to the curve. The further up the curve you move the down trim position the more conductive the thyristor becomes & the more the lamps bleed. If its off the bottom of the curve, then the lights won't begin to turn on until the fader has been moved a long way from the bottom of its travel. The ideal place for the DOWN trim to be set is right at the origin of the curve.

The UP trim sets the point on the curve where the MAXIMUM DC VOLTS from the desk is set on the curve. Note that this need not necessarily be 10 V but in practice you should aim for that voltage to be the maximum. The further down the curve you go the less bright the lamps will be for the maximum fader position. If the trim is set off the curve then the sensitivity of the fader is lost as the lights will turn on to full brightness BEFORE the fader reaches TOP of it's travel. The ideal position for the top trim is just at the top of the curve.

Why a Dimmer Needs To Be Trimmed

The Avo LD Series Dimmers use an analogue control board to generate the pulses required by the Thyristors to turn them on. When the dimmer is supplied from Avo's it will (nominally) be trimmed so that an input control voltage of 0 Volts DC to an input channel has the associated output channel, FULL OFF, & an input control voltage of 10 Volts DC has the associated output channel FULL ON.

As with any other piece of analogue electronics the value of components may drift with time & the original settings of trim pots no longer have the same affect as when first set. It may be that the Lighting Desk you are using is not (by the time the control signal reaches the dimmer) producing exactly a 10 V control signal but say 9 or 11 V & you are not in a position to adjust the Desk output. It may be that the dimmers you are using are unfamiliar to you, in which case it is a very good idea to retrim them to save grief later. '

What You Will Need

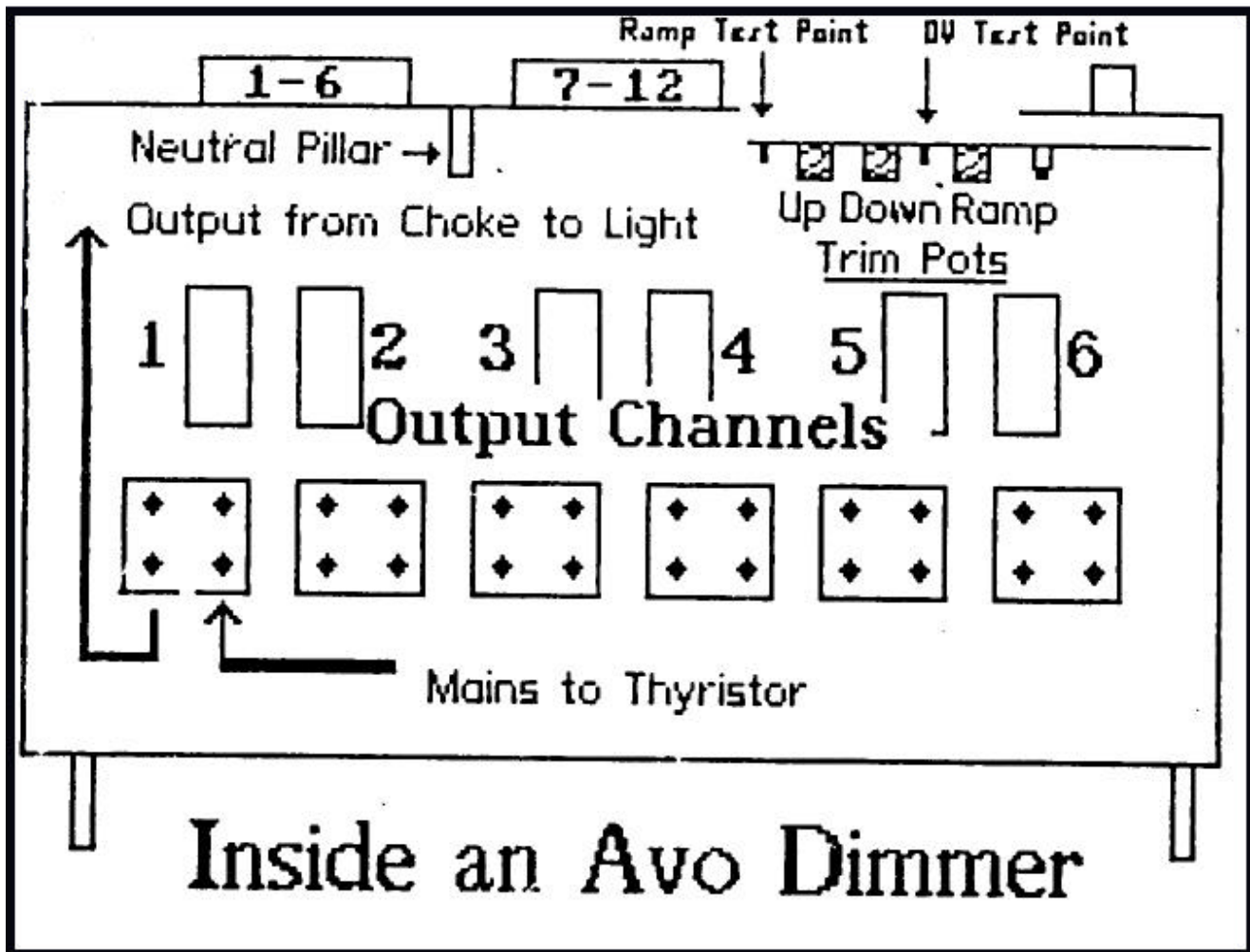
To successfully trim a rack you will need an accurate DC & AC voltmeter (Digital or Analogue, it doesn't matter) a small flat bladed screwdriver to adjust the trim pots with. You do NOT need an Oscilloscope, NOR do you need silence to listen to the dimmer buzz. It is quite possible to trim a rack without being able to hear yourself talk, as is found in a normal Dimmer City.

What You DO

Firstly slide the dimmer out of the rack on its rails. To do this undo the four screws that hold the dimmer in the rack & pull it gently towards you. It is also worthwhile looking in the back of the rack to free the cables that go to & from the dimmer from the rest of the stuff in the back of the rack. Pull the dimmer out far enough to be able to remove its top cover. Remove the cover by undoing the five screws & remove it by easing it out from underneath the front of the dimmer. (Note: It is not possible to trim the rack successfully without removing the lid.) Watch Out!! At this point there are exposed mains voltages present. This is nothing to worry about, but be aware that an electrical hazard exists.

Whilst working on the dimmer in this condition it is worth noting how to electrically isolate the dimmer. Pulling the control fuse out only isolates the control circuitry from the line voltage, it DOES NOT remove the line voltage from the thyristors. To do this you must switch the breaker for that dimmer OFF. The lack of line voltage can be ascertained by checking that NO neon's are lit on the front panel.

Locate the control card & check (with no mains connected) that it is seated properly in the card holder.



Step by Step

0) Connect a load to the channel you are using to test the trim. PAR lamps make a very good load... '

1) Set the RAMP

Set your Voltmeter to DC VOLTS, with the range set to measure 5-V DC. Referring to the control card diagram clip the COMMON (BLACK) meter probe to the 0V test point & clip the VOLTS (RED) probe to the RAMP test point. The value you should read here is +5.0 V If the value is off adjust SLOWLY the RAMP trim pot until the value is correct. Unclip the meter probes.

2) Set the DOWN TRIM

Set the Voltmeter to AC VOLTS, with the range set for about 30 V A.C Clip the COMMON (BLACK) probe to the NEUTRAL pillar, located of the back of the dimmer. Connect the VOLTS (RED) probe to the wire from the choke that connects to the lighting circuit you are testing. It is conventional to check channel NO.1. See the diagrams to locate the choke for channel 1. Set the fader for the channel you are checking to OFF. Adjust the DOWN trim pot until you find the point where the thyristor just starts conducting. Note: Adjust the trim pot anti-clockwise to make the thyristor conduct more, adjust it clockwise to make it conduct less. There is leakage thru the thyristor of about 1 Volt A. C. this is normal, meaning that the lowest value you'll be able to set the output voltage at is about 1 V & not 0 v !! This is normal.

3) Set the UP Trim

Set the Voltmeter range to measure the line voltage. Set the fader for the test channel to FULL ON. Adjust the UP trim pot to the point where it is conducting most. (Note Adjust the pot anti-clockwise to make the thyristor conduct more & clock-wise to make it conduct less). The output voltage from the thyristor will always be a bit less than the line voltage owing to voltage drops thru the thyristor package. This too is normal.

4) Retrim the DOWN Trim

When the UP trim was set the DOWN trim probably moved, as the two are inter-dependant. Hence the need to re-trim. Set the fader for the test channel to OFF & repeat STEP 2. When you are happy with the adjustment turn the trim pot ONE COMPLETE TURN CLOCKWISE. The DOWN trim is now set.

5) Retrim the UP Trim

Repeat STEP 3. When you are happy with the adjustment turn the pot ONE COMPLETE TURN ANTI-CLOCKWISE. The UP trim is now set.

6) That's it

NOTES

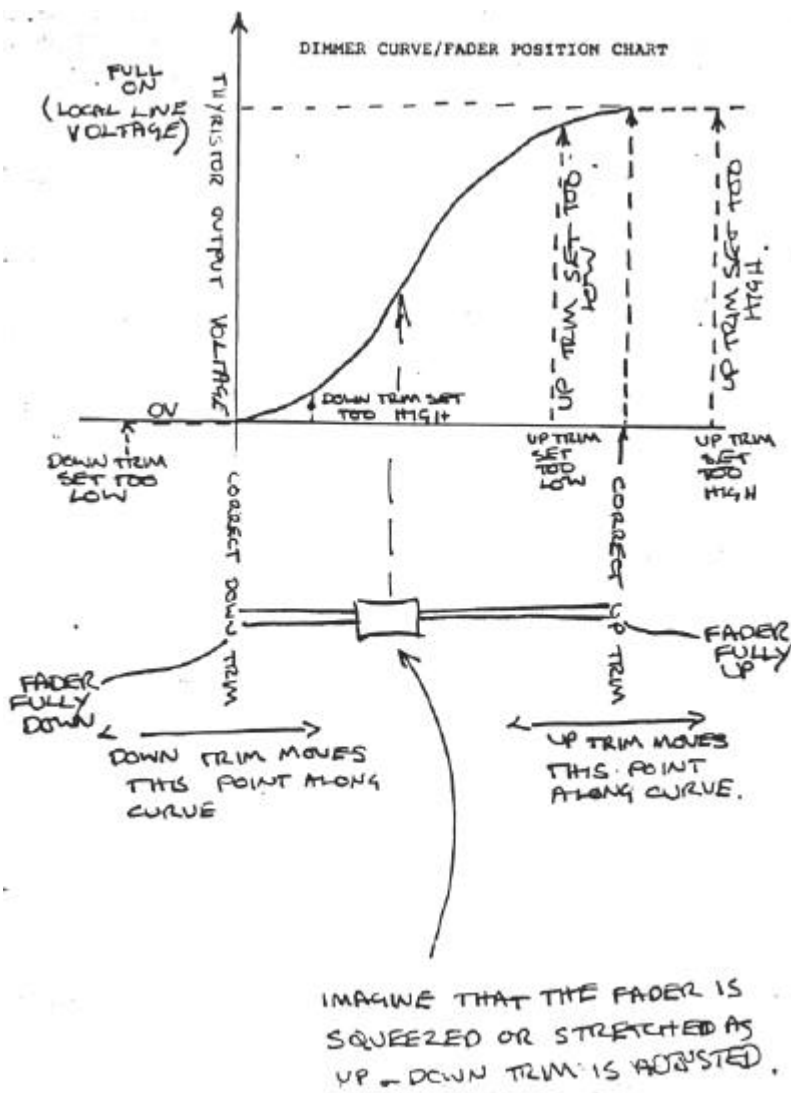
A) Although only one channel was checked the trim for all 12 channels in the dimmer module was set. There is no need to repeat this procedure for any other channels in the dimmer. On the other hand setting the trim on one rack does not alter the, trim on any of the other dimmer racks in a dimmer system.

B) When the 50/60 Cycles switch is moved (i.e. the dimmers are shipped from Europe to the States) the dimmers MUST be retrimmed. This applies for a rack from the States coming back to Europe. It is NOT enough to just check the RAMP test voltage.

C) The method outlined above matches the dimmers to the desk output voltage range exactly. This makes some assumptions on the state of the control voltages from the Desk. Assuming that the voltages are good, this method is better than just testing the cards on a custom jig using a scope in the shop.

D) It may be inconvenient or impossible to have a fader moved for you when you doing all of the above. In this case leave the channel FULL UP on the desk & when asked to set the fader to off, instead unplug the 15 PIN D connector from the back of the rack. To get FULL UP again, just plug it back in..

E) The dimmer test switch on the front of the module does NOT turn the dimmer FULL ON when it is in the FULL position. It puts the selected channel to a level equivalent to a control voltage of about 8 V DC. The dimmer is NOT in trim if the dimmer goes FULL on when you push the test switch to FULL !!



It may be that the control card in the dimmer is so badly out of trim that nothing you do makes an impact on it. At this point if possible try swapping out the control card for a known good one to ascertain if the control card or the dimmer is bad. If it looks as if the dimmer is good then check the bad card for obvious failures, dry joints and the like. If there is nothing obviously wrong with the card then try cleaning the gold plated edge connectors and adjust all three trim pots so that they are in the centre of their travel. The pots used are 10 turn pots, so rotate them continuously in one direction until you here the slider click on the worm gear inside the pot as it reaches one end of the track, then turn the pot screw 5 turns the other way. These two actions often sort out an “untrimmable” card. If you cannot get it to behave, mark on the card what the fault is and return it to the shop.