

# **User's Manual**

## **TUBE-TECH LCA 2B**

### **compressor and limiter**

#### **DESCRIPTION:**

The TUBE-TECH LCA 2B is a two-channel unit with an independent compressor and limiter per channel. The unit is all tubebased (except for the power supply and sidechain circuit). Output gaincontrol is placed between the VCA and output stage. The VCA (1 dual triode) is placed between the input transformer and the output stage (2 dual triodes). The audio signal is picked up after the VCA and fed to the sidechain circuit. The control signal from the compressor and from the limiter is combined and sent to the link switch and to the control amp, which feeds the VCA. The bi-directional link busses are accessible at two 1/4" stereo jack sockets on the rear panel. The channels can be linked together for stereo applications and also linked to other LCA 2B's via the two link busses and a standard stereo jack/jack cord.

The compressor has six attack/release presets as well as manual control. The limiter attack/release is fixed and equipped with an on/off switch.

The LED display is fed from the control amp. The limiter LED is fed from the limiter buffer.

The audio path is fully symmetrical from input to output.

Input and output have fully floating transformers.

All DC voltages are stabilised, except the anode voltage for the output stage, which is only filtered.

#### **COMPRESSOR INTERCONNECTION:**

The sidechain sockets for interconnection of several compressors are located on the rear panel.

A switch (LINK 1, LINK 2) on the front selects which compressors are interconnected, and on which bus they are connected. If you select LINK 1 on both channels, they will perform exact the same gainreduction.

Having several connected compressors in a rack, you can select which compressors you will have working together.

By selecting e.g. LCA 2B no 1, ch. 1 on link 1, LCA 2B no 2, ch. 2 on link 1 and LCA 2B no 3, ch. 1 on link 1, they are now interconnected and all three will perform the exact same compression.

The interconnection implies, that the unit, which performs the most compression, is controlling the others.

To choose which one you want to control, select the attack/release time, the threshold and the ratio on that unit, and turn the threshold fully counter clockwise on the reminding compressors.

It is of course possible to have all the interconnected compressors control each other simultaneously.

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## **CONTROLS:**

**GAIN:** The **gain** control is used to "adjust" for the gain loss, which takes place when the unit is compressing. It is placed between VCA and output stage. The **gain**-control is continuously variable from -6dB to +10dB.

**DISPLAY:** The green LED display shows the gain reduction for both the compressor and for the limiter. A red LED shows if the limiter is active.  
The display is from the factory supplied in dot mode. This can be altered to a bar by placing a strap on U6 (U106) from pin 3 to pin 9

**LINK SWITCH:** Interconnects several compressors on link 1 or link 2.  
If the compressor is left in the off position, it works entirely independently.

**IN/BYPASS:** This switch switches the compressor in and out of the signal path. In the bypass position the entire unit is switch out.

## **COMPRESSOR:**

**RATIO:** The **ratio** control varies the ratio by which the input signal is compressed.  
If the ratio selected is to 2:1, and the input signal increases 10dB, the output signal is only increased by 5dB. The **ratio** control is continuously variable from 1,6:1 to 20:1.

**THRESHOLD:** The threshold is the point where the compressor begins its action. It is defined as the point where the gain is reduced by 1dB.  
The threshold is related to the output level and is continuously variable from off to -10dBU.

**NOTE:** **If both the RATIO control and the THRESHOLD control are at their extreme (> 15:1 and < -5dB), overreaction can be expected.**

**ATTACK:** The **attack** control chooses how fast/slow the compressor responds to an increase in the input signal.  
The attack control is continuously variable from 0.3 to 70 milliseconds.

**RELEASE:** The **release** control chooses how fast/slow the compressor responds to a decrease in the input signal.  
The release control is continuously variable from 0,07 to 2 seconds.

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## ATTACK/RELEASE SELECT:

This switch selects how the compressor reacts to an increase (**attack**) or decrease (**release**) of the input signal.

There are two settings of the switch:

1. Manual  
Attack time: from 0.3 mS to 10 mS  
Release time: from 0.07 sec to 2 sec
2. Preset

|        | Attack | Release    |
|--------|--------|------------|
| pos 1. | 1,5 mS | 0,25 S     |
| pos 2. | 1,5 mS | 0,8 S      |
| pos 3. | 3 mS   | 2,2 S      |
| pos 4. | 6 mS   | 5,0 S      |
| pos 5. | 3 mS   | 0,5/4 S    |
| pos 6. | 1,5 mS | 0,5/4/20 S |

The release time in position 5 and 6 is program dependent, that is:

|          |                               |       |
|----------|-------------------------------|-------|
| pos 5, 6 | for short peaks:              | 0,5 S |
| pos 5, 6 | for long peaks:               | 4 S   |
| pos 6    | for continuously high levels: | 20 S  |

## LIMITER:

**ON/OFF** This switch defeats the limiter when in the **off** position

**THRESHOLD:** The threshold is related to the output level and is continuously variable from off to 0dBu.

|          |        |
|----------|--------|
| Ratio:   | 20:1   |
| Attack:  | 0,6 mS |
| Release: | 0,5 S  |

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## **ADJUSTMENT PROCEDURE:**

### **CAUTION:**

**Before making any adjustment let the unit heat-up at least 30 min.**

Always check the DC voltages at the power supply.

When the VCA tube has been replaced, adjustment of:  
**BASIC GAIN, GAIN REDUCTION, BALANCE, shall be carried out.**

**!!! OBS. IT IS IMPORTANT THAT THE VCA-TUBE IN BOTH CHANNELS ARE OF SAME MANUFACTURE AS THE CHARACTERISTICS WILL DIFFER BETWEEN DIFFERENT BRANDS AND MIGHT CAUSE DIFFERENCES IN TRACKING.**

The adjustment procedure refers to channel 1. The trim pots in brackets are for channel 2.

At the sidechain jack sockets at the rear of the unit, the tip is link 1 and the ring is link 2.

### **ADJUSTMENT OF BASIC GAIN:**

- 1) Turn the **THRESHOLD**-control for the compressor and limiter fully counter-clockwise.
- 2) Apply a signal of 1 kHz, 0,0dBu to the input of the compressor.
- 3) Turn the **GAIN**-control fully clockwise (+10).
- 4) Adjust the preset **GAIN** P3 (P103) (located on amp/psu PCB) to an output-reading of +10,0dBu.

### **ADJUSTMENT OF GAINREDUCTION:**

- 1) Turn the **THRESHOLD**-control for the compressor and limiter fully counter-clockwise.
- 2) Apply a signal of 0,0dBu, 1 kHz to the input of the compressor.
- 3) Adjust the **GAIN**-control to an output-reading of 0,0dBu.
- 4) Apply a DC-voltage of ±5,000 V into the sidechain jack socket (tip).
- 5) Set the **LINK**-switch at LINK 1 and observe that the output level has dropped to -20,0dBu. If this is not the case, adjust the level with P7 (P107) at the sidechain PCB, to obtain a drop of -20,0dB.  
The level might increase a little (+0.5 to +1dB) from the instantaneously value (within 5-10 sec.). This is quite normal. (180516)

### **ADJUSTMENT OF DISPLAY:**

- 1) Turn the **THRESHOLD**-control for the compressor and limiter fully counter-clockwise.
- 2) Apply a DC-voltage of  $\pm 5,000 \text{ V}$  into the sidechain jack socket (tip).
- 3) Set the **LINK**-switch at LINK 1 and observe that the -15 LED just turns off and the -20 LED is on.
- 4) If this is not the case, adjust P8 (P108) at the sidechain PCB.

### **TEST OF TRACKING:**

- 1) Turn the **THRESHOLD**-control for the compressor and limiter fully counter-clockwise.
- 2) Apply a signal of 0,0dBu, 1 kHz to the input of the compressor.
- 3) Adjust the **GAIN**-control to an output-reading of 0,0dBu.
- 4) Apply a DC-voltage of  $\pm 1,750 \text{ V}$  into the sidechain jack socket (tip).
- 5) Set the **LINK**-switch at LINK 1 and observe that the output level has dropped to within -7,0dBu and -9,0dBu. If this is not the case, the VCA tube shall be rejected and replaced with a new one.

## **ADJUSTMENT OF BALANCE IN THE VCA TUBE (V1, V101):**

As a quick check of the balance of the VCA tube, adjust the output to a level of **0dBu** and turn the LIMITER THRESHOLD slow CW until the LIM led turns slightly on. If the led turn on abruptly or starts oscillating, the balance should be readjusted.

- 1) Turn the **THRESHOLD**-control for the compressor and limiter fully counter clockwise, and the **GAIN**-control fully clockwise.
- 2) Switch the **LINK**-switch to **LINK 2**.
- 3) Apply a sine wave of **1 kHz, +15dBu** via a 1K $\Omega$  resistor into the sidechain jack socket (ring).  
(The +15dBu shall be measured before the 1K $\Omega$  resistor.) \*
- 4) Adjust trim pot P2 (P102) (located on amp/psu PCB) to a minimum reading at the output.
- 5) Reduce the level of the sine wave to -5dBu.
- 6) Adjust trim pot P1 (P101) (located on amp/psu PCB) to a minimum reading at the output.
- 7) Repeat step **3 - 6**.
- 8) When both adjustments are at minimum, the level at the output shall be:  
+15dBu less than -13dBu  
+5dBu less than -14dBu  
-5dBu less than -21dBu  
If this cannot be obtained, the VCA tube shall be rejected and replaced with new one.

\* If the sine wave from the oscillator is observed on oscilloscope after the 1K $\Omega$  resistor, the negative part of the sine wave has been clamped to ground.

**We recommend that the balance adjustment of the VCA should be carried out every 6 month.**

NOTE: 0 dBu = 0,775V

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## **SPECIFICATIONS FOR LCA 2B**

**Input impedance:** > 2 k $\Omega$   
**Output impedance:** < 60  $\Omega$   
**Distortion (THD+n @ 40 Hz):**  
0 dBu: < 0,15 %  
10 dBu: < 0,15 %  
Max output (1% THD+n): > +26 dBu

**Noise (R<sub>g</sub>=200 $\Omega$ ):**  
Gain: 0 dB 10 dB  
22 Hz-22 kHz: < -85 dBu < -80 dBu  
CCIR-468-3: < -75 dBu < -70 dBu

**Frequency response (-3 dB):** 5 Hz - 40 kHz  
**Gain:** -6 dB - +10 dB  
**Crosstalk (20 Hz-22 kHz):** < -70 dB  
**CMRR (@ 10 kHz):** < -60 dB  
**Tracking (0 to -20 dB gain reduction):** +/-1 dB  
**LED display for gain reduction:** 0 dB to 20 dB

**Compressor:**  
Ratio: 1,6:1 to 20:1  
Threshold: off to -10 dBu  
Attack (manual): 0,2 to 70 mS  
Release (manual): 0,1 to 2 S  
Preset attack/release:

|        | Attack | Release    |
|--------|--------|------------|
| pos 1. | 1,5 mS | 0,25 S     |
| pos 2. | 1,5 mS | 0,8 S      |
| pos 3. | 3 mS   | 2,2 S      |
| pos 4. | 6 mS   | 5,0 S      |
| pos 5. | 3 mS   | 0,5/4 S    |
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The release time in position 5 and 6 is program dependent, that is:

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| pos 6    | for continuously high levels: | 20 S  |

**Limiters:**  
Threshold: off to 0 dBu  
Attack: 0,6 mS  
Release: 0,5 S  
Ratio: 20:1

LED indicating limiting

**Tubes:** 2xECC81, 2xECC82, 2xECC83  
**Dimensions:** H: 2 units, W: 19", D: 205 mm  
**Weight:** 6.5 kg  
**Power requirements:**  
(115V/230 V, 50-60 Hz): 30-45 W

All specifications at R<sub>L</sub>=600 $\Omega$

Lydkraft reserves the right to alter specifications without prior notice

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**SERVICE HINTS:**

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| <u>SYMPTOM</u>  | <u>CAUSE</u>              | <u>ACTION</u>                              |
|---|---------------------------|--|
| Noise   | Unbalance in VCA tube     | Adjust balance                             |
| Noise   | Noisy VCA tube (V1, V101) | Replace and adjust                         |
| Noise   | Control amp IC 4 (IC 104) | Replace. Check gain reduction and readjust |
| Hum   | +12V, +110V, +15V PSU     | Repair                                     |
| Overshoot when compressing                                  | Unbalance in VCA tube     | Adjust balance                             |
| Oscillations with no signal and max ratio and low threshold | Unbalance in VCA tube     | Adjust balance (replace tube)              |