

# **TUBE-TECH CL 2A** **dual compressor**

## **DESCRIPTION.**

The TUBE-TECH compressor CL 2A is a dual opto compressor with a gain reduction element, which have no long-term degradation and almost infinite life. This element are placed after the input-transformers of the compressors and followed by an all tube-based amplifier with a gain of  $-\infty$  dB to +10 dB.

Thus the signal is not fed through any semiconductor circuitry on its way to the output.

The amplifier is based on two tubes (dual triodes) in push-pull configuration (one ECC 83 as a differential amplifier, and one ECC 82 as the output stage), and an output transformer.

The power supply for the differential amplifiers is stabilised and the heaters of all four tubes are fed with a stabilised DC voltage.

The two amplifiers (including input and output transformer) and the power supplies are placed on one PC-board.

Both input and output are balanced and fully floating.

The compressors are switched in and out via two relays (click less).

## **THE SIDCHAIN:**

The two side chains are the only part of the compressor that contains semiconductors. It contains two J-FET quad op-amps, one npn-transistor and one FET-transistor, which handles the signal for the gain-reduction element.

The compressor contains two time constants circuits:

1. Fixed attack and release times
2. Variable attack and release times

## **COMPRESSOR INTERCONNECTION:**

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

A switch on the front selects which compressors are interconnected, and on which bus they are connected. If you e.g. have 10 compressors in a rack, you can select compressor 1,5,7 and 8 on link 1, and compressor 2,3,6 and 9 on link 2, leaving compressor 4 and 6 in the off position.

Compressor 1,5,7,8 is now interconnected and all four will perform the exact same compression. This applies to compressor 2,3,6 and 9 as well. Compressor 4 and 6 are independent.

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The interconnection implies, that the unit that 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 remaining compressors.

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

**NB:** Remember to set the ratio-control and the gain-control in the same position on the "slaves". Otherwise the stereo image could be shifted during compression. The attack/release-control on the slaves will have no effect.

The input/output capability of the sidechain-circuit allows up to **ten** compressors to be linked together.

They are connected in parallel with a standard 1/4" stereo jack/-jack cord.  
(tip: link 1, ring: link 2).

The two jack socket on the rear panel is connected in parallel and both are input/output.

## **CONTROLS:**

**GAIN:** The **gain** control is used to "make up" for the gain loss that takes place when the unit is compressing. It is placed after the gain-reduction circuit and therefore has no influence on the threshold setting. The **gain-control** is continuously variable from off to +10 dB.

**RATIO:** The **ratio** control varies the ratio by which the input signal is compressed. If the ratio selected is to 1,5:1, and the input signal increases 12 dB, the output signal is only increased by 8 dB. The **ratio** control is continuously variable from 1,5:1 to 10:1.

**THRESHOLD:** The threshold is the point where the compressor begins its action. It is defined as the point where the gain is reduced by 1 dB.  
The threshold is continuously variable from off to -20 dBU.

### **METER:**

The VU-meter switch has two positions:

1. **Comp.** The VU-meter is reading gainreduction. Its rest position is "0 VU", and the amount of compression is shown as a decreasing deflection in dB.
3. **Output** The VU-meter is reading the level at the output socket. "0 VU" is equivalent to +4 dBU.

**NB:** Leave the meter switch in position **compression** as it might introduce distortion if left in **output** position.

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- IN/OUT:** Switches the compressor in and out of the signal path.  
In the out position the entire compressor is bypassed.
- 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 1 to 60 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 0,06 to 2 seconds.

**ATTACK/RELEASE SELECT:**

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

There are two settings of the switch:

1. Fixed.  
Attack time: 3 mS  
Release time: 60 mS
2. Manual.  
Attack time: from 1 mS to 60 mS  
Release time: from 0.06 S to 2 S

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

**SUGGESTED APPLICATIONS**  
**OF**  
**TUBE-TECH COMPRESSOR CL 2A**

In the following, you will find suggestions on various applications of the TUBE-TECH compressor CL 2A. They are given as a convenient guide to enable you to familiarise yourself with the different aspects of using the compressor. We have not mentioned specific settings of gain and threshold as they are dependent upon input levels. Instead we have specified how much compression in dB, we feel, is needed for the various examples.

**OVERALL COMPRESSION:**

**FINAL MIX**

<b><u>COMPRESSION NEEDED:</u></b>	<b>3-4 dB</b>
<u>Attack/release select:</u>	<b>Fix/man</b>
<u>Attack:</u>	<b>2 o'clock</b>
<u>Release:</u>	<b>10 o'clock</b>
<u>Ratio:</u>	<b>9 o'clock</b>

**STANDARD COMPRESSION:**

**BASS, PIANO, GUITAR, KEYBOARDS AND VOCALS**

<b><u>COMPRESSION NEEDED:</u></b>	<b>4-5 dB</b>
<u>Attack/release select:</u>	<b>Manual</b>
<u>Attack:</u>	<b>2 o'clock</b>
<u>Release:</u>	<b>10 o'clock</b>
<u>Ratio:</u>	<b>10-2 o'clock</b>

**HEAVY COMPRESSION ON INSTRUMENTS:**

**LINE GUITAR AND PIANO**

<b><u>COMPRESSION NEEDED:</u></b>	<b>10 dB</b>
<u>Attack/release select:</u>	<b>Manual</b>
<u>Attack:</u>	<b>7 o'clock</b>
<u>Release:</u>	<b>1 o'clock</b>
<u>Ratio:</u>	<b>3 o'clock</b>

**COMPRESSION OF DRUMS:**

**SNARE AND BASS DRUM**

<b><u>COMPRESSION NEEDED:</u></b>	<b>2-3 dB</b>
<u>Attack/release select:</u>	<b>Fixed</b>
<u>Ratio:</u>	<b>9-12 o'clock</b>

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## **ADJUSTMENT PROCEDURE:**

### **CAUTION:**

**Before making any adjustment let the unit heat-up at least 15 min.**

**Observe that the offset-voltage measured at the sidechain jack socket, when the THRESHOLD is off, is not greater than +/- 15 mV DC in both position "fixed" and "manual".**

**(tip is link 1 and ring is link 2).**

If the voltage exceeds this value, replace either IC1 or IC2.

## **THE GRE (GR1) SHALL BE MARKED FROM 1.005 TO 1.175**

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

- 1) Apply a signal of 1 kHz, -10,0 dBu into the input of the compressor.
- 2) Turn the **GAIN**-control fully clockwise.
- 3) Set the **RATIO**-control at 1,5:1
- 4) Adjust the pre-set **GAIN** (P1/P101 located on amp/psu PCB) to an output-reading of 0,0 dBu.

### **ADJUSTMENT OF COMPRESSION TRACKING:**

- 1) Turn the **THRESHOLD**-control fully counter-clockwise.
- 2) Set the **RATIO**-control at 1,5:1.
- 3) Set the **LINK**-switch at link 1.
- 4) Apply a signal of 1 kHz, 0,0 dBu into the input of the compressor.
- 5) Adjust the **GAIN**-control to an output-reading of 0,0 dBu.
- 6) Apply a DC-voltage of +250,0 mV into the sidechain jack socket (tip) and observe that the output level has dropped to -10,0 dB.
- 7) If this is not the case, adjust the level with P 6 (-10dB), to obtain a drop of exactly -10,0 dB.

## **ADJUSTMENT OF THE VU METER READING "COMPRESSION":**

- 1) Turn the **THRESHOLD**-control fully counter-clockwise.
- 2) Switch the **METER**-selector to Compression.
- 3) Set the **RATIO**-control at 1,5:1
- 4) Apply a signal of 1 kHz, 0,0 dBU into the input of the compressor.
- 5) Adjust the **GAIN**-control to an output-reading of 0,0 dBU.
- 6) Adjust P 8 until the meter is reading 0 VU.
- 7) Apply a DC-voltage of +250,0 mV into the sidechain jack socket and observe that the output level has dropped to -10,0 dBU. If this is not the case, adjust the compression tracking (see above)
- 8 Adjust P 7 (-10VU) until the meter is reading -10,0 VU.
- 9) Remove the DC-voltage from the sidechain jack socket.
- 10) Repeat step 6 - 9.

NB: The VU-meter accuracy should be within +/- 1 dB when reading compression.

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## **TECHNICAL SPECIFICATIONS:**

Frequency-response: 5 Hz - 60 kHz +0/-3 dB

Distortion (THD) (40 Hz):

<u>0 dBU:</u>	< 0,15 %
<u>10 dBU:</u>	< 0,15 %
<u>maximum output (1 % THD):</u>	+26,0 dBU
<u>maximum input (1 % THD):</u>	+21,0 dBU

<u>Noise:</u>	<u>Unweighted</u>	<u>CCIR 468-3</u>
<u>Gain = 0 dB:</u>	-80,0 dBU	-70,0 dBU
<u>Gain = +10 dB:</u>	-80,0 dBU	-70,0 dBU

Input impedance: 5 kOhms

Output impedance: < 60 Ohms

Compression Ratio (cont. var.): 1,5:1 to 10:1

Threshold (cont. var.): -20 dBU to off

Gain (cont. var.): off to +10 dB

<u>Attack/Release</u>	<u>Manual</u>		<u>Fixed</u>
	fast	slow	
<u>Attack:</u>	3mS	60mS	3mS
<u>Release:</u>	60mS	2S	60mS

Tracking between interconnected compressors:

(0 to 20 dB compression): < +/- 1 dB