TUBE-TECH CL 1B
compressor

DESCRIPTION
The TUBE-TECH compressor CL 1B, differs from many other compressors, in that the gain-reduction element is made from a non-semiconductor element, which in itself has a very low harmonic distortion and none of the non-linearity problems involved when using most semiconductor elements. Furthermore there is no long-term degradation of the element thus giving it almost infinite life.
This element is placed after the input-transformer of the compressor and followed by an all tubebased amplifier with a gain of -∞ dB to +30 dB.
Thus the signal is not fed through any semiconductor circuitry on its way to the output.

The amplifier consists of two tubes (valves) in push-pull configuration (one ECC 83 as the pre-amp and phase splitter, and one ECC 82 as the output stage), and an output transformer.

The power supply for the pre-amp and phase splitter are stabilized and the heaters of both tubes (valves) are fed with a stabilized DC voltage.

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

Both input and output are balanced (600Ω) and fully floating.
The in/out key switches the compressor in and out without clicks.

THE SIDECHAIN:
The sidechain is the only part of the compressor that contains semiconductors. They are used for three reasons: First they do not affect the sound reproduction, second they have a high slew rate, which is of importance for the performance of the compressor and third they don't take up much room.
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

The **attack/release select** switch makes it possible to use these two circuits separately or combine their functions.
This gives a feature not normally obtained in other compressors:
In the combined (fix./man.)state the attack- and release controls makes it possible to obtain a complex release-time slope. (see page 4)

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COMPRESSOR INTERCONNECTION:

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

A switch (BUS SELECT) 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 bus 1, and compressor 2,3,6 and 9 on bus 2, leaving compressor 4 and 6 in the off position.
Compressor 1,5,7,8 are now interconnected and all four will perform the exact same compression. This apply to compressor 2,3,6 and 9 as well. Compressor 4 and 6 are independent.

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

NB: Remember to set the ratiocontrol and the gaincontrol 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: bus 1, ring: bus 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 which 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 +30 dB.

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 10 dB, the output signal is only increased by 5 db.The **ratio** control is continuously variable from 2:1 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 +20dBm to -40 dBm.

METER:

The VU-meter switch has three positions:

1. **Input** The meter is reading the level at the input socket.
2. **Compression** 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 outputsocket. "0 VU" is equivalent to +4 dBm.

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

IN/OUT: This leverswitch switches the compressor in and out of the signal path. The out position bypasses the entire compressor.

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 0.5 to 300 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 0,05 to 10 seconds.

ATTACK/RELEASE SELECT:

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

There are three settings of the switch:

1. Fixed.
   attack time: 1 msec
   release time: 50 msec

2. Manual.
   attack time: from 0.5 msec to 300 msec
   release time: from 0.05 sec to 10 sec

3. Fix/man.
   This setting combines the release times of fixed and manual mode. The attack time is as in the fixed mode.

The fix/man mode always has a fast attack, but it is possible to obtain a release time depending on the input signal, e.g. get a fast release when the peak disappears, then superseded shortly thereafter by the release time selected by the release control.

From the time the peak disappears, until the selected release time takes over, is dependent upon the setting of the attack control. That is, the attack control changes function from a pure attack control, to a control of delay with the same time range.

- The more **CW** the attack control is turned, the longer time before the release control takes over.

  The more **CCW** the attack control is turned, the shorter time before the release control takes over.

This function is valid only if the time of the peak is shorter than the setting of the attack control.

If the peak of the program is longer than the setting of the attack control, or if the attack control has reached the full **CCW** position, it will respond as in the manual mode.

The fix/man mode acts as an automatic release function with a constant fast attack time and fast release time for short peaks and a longer release times for longer peaks.

This setting is mainly intended for use on program material (overall compression).

BUS SELECT:

Interconnects several compressors on bus 1 or bus 2.
If the compressor is left in the off position, it works entirely independently.

SUGGESTED APPLICATIONS
OF
TUBE-TECH COMPRESSOR CL 1B

In the following, you will find suggestions on various applications of the TUBE-TECH compressor CL 1B. They are given as a convenient guide to enable you to familiarize 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

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

STANDARD COMPRESSION:

BASS, PIANO, GUITAR, KEYBOARDS AND VOCALS

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

HEAVY COMPRESSION ON INSTRUMENTS:

LINE GUITAR AND PIANO

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

COMPRESSION OF DRUMS:

SNARE AND BASS DRUM

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

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 2:1

4) Apply a signal of 1 kHz, 0,0 dBm into the input of the compressor.

5) Adjust the **GAIN**-control to an output-reading of 0,0 dBm.

6) Adjust P 4 (P 2)* 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 outputlevel has dropped to -10,0 dBm. If this is not the case, adjust the compression tracking (see above)

8 Adjust P 3 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 +/- 0,5 dB when reading compression.

ADJUSTMENT OF THE RELEASE CONTROL:

1) Set the **METER** switch in position compression.

2) Set the **attack/release SELECT** switch in position manual.

3) Apply a signal of 1 kHz, 0,0 dBm into the input of the compressor.

4) Adjust the **THRESHOLD**-control to a reading of -10 VU of the **VU-meter**

5) Set the **ATTACK**-control at fast.

6) Set the **RELEASE**-control at slow.

7) Switch off the 1 kHz and observe that the VU meter moves to 0 VU in approx. 10 sec.

8) If this is not the case, adjust P 1 (P 5)*, to obtain a release time of approximately 10 sec.

* The trimpots in parenthesis refers to PCB 870316-0,1,2

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 bus 1 and ring is bus 2).

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

ADJUSTMENT OF BASIC GAIN:

1) Apply a signal of 1 kHz, -30,0 dBm into the input of the compressor.

2) Turn the **GAIN**-control fully clockwise.

3) Set the **RATIO**-control at 2:1

4) Adjust the preset **GAIN** (located on amp/psu PCB) to an output-reading of 0,0 dBm.

ADJUSTMENT OF COMPRESSION TRACKING:

1) Turn the **THRESHOLD**-control fully counter-clockwise.

2) Set the **RATIO**-control at 2:1.

3) Set the **BUS-select**-switch at 1.

4) Apply a signal of 1 kHz, 0,0 dBm into the input of the compressor.

5) Adjust the **GAIN**-control to an output-reading of 0,0 dBm.

6) Apply a DC-voltage of +250,0 mV into the sidechain jack socket (tip) and observe that the outputlevel has dropped to -10,0 dB.

7) If this is not the case, adjust the level with P 2 (P 1)*, to obtain a drop of exactly -10,0 dB.

* The trimpots in parenthesis refers to PCB 870316-0,1,2

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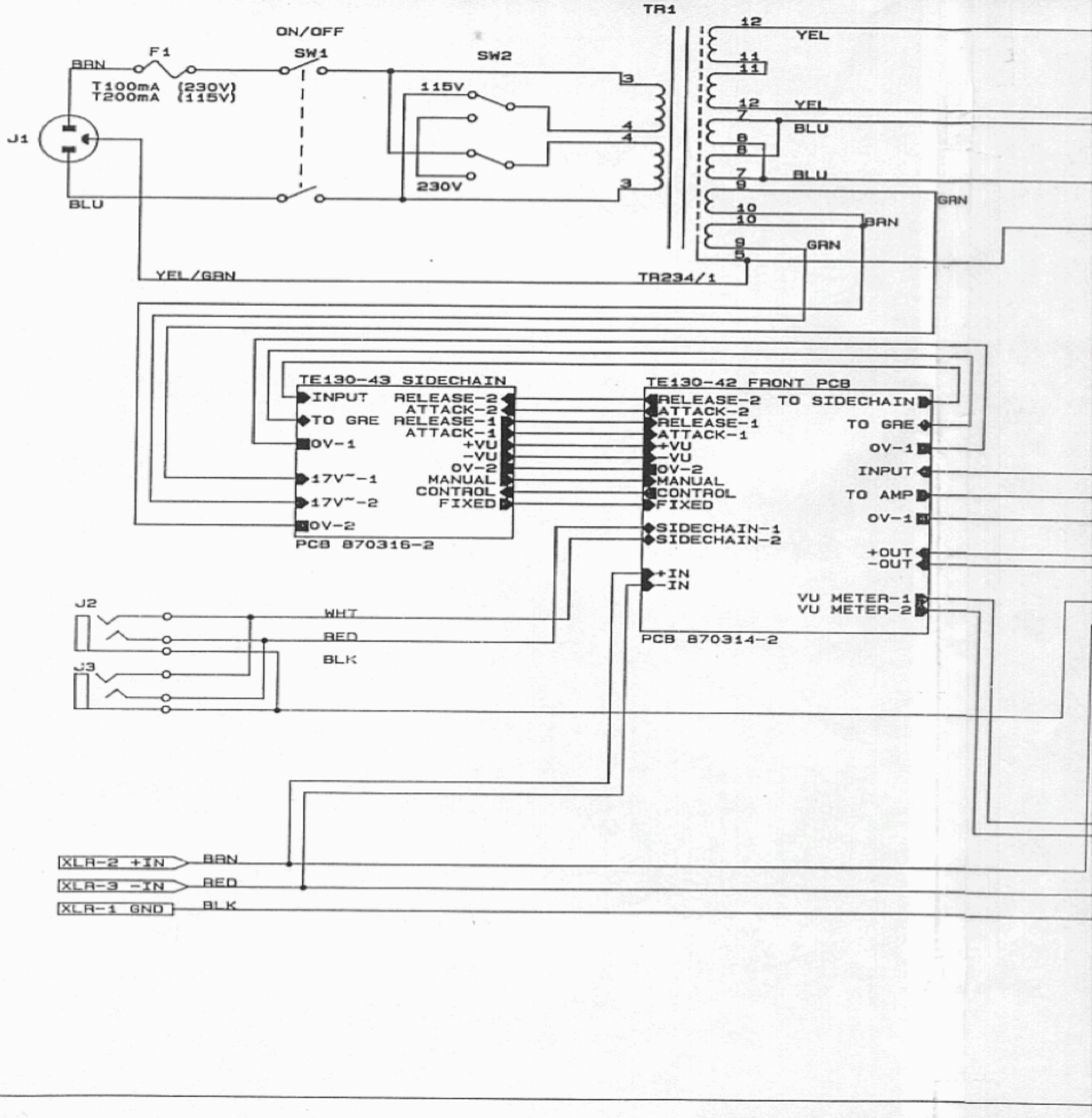
TR1
ON/OFF
SW1
SW2
F1
BRN
T100mA (230V)
T200mA (115V)
J1
BLU
115V
230V
YEL/GRN
TR234/1
12
YEL
11
11
12
YEL
7
BLU
8
8
7
BLU
9
GRN
10
10
BRN
9
GRN
5
TE130-43 SIDECHAIN
INPUT
TO GRE
0V-1
17V~-1
17V~-2
0V-2
RELEASE-2
ATTACK-2
RELEASE-1
ATTACK-1
+VU
-VU
0V-2
MANUAL
CONTROL
FIXED
PCB 870316-2
TE130-42 FRONT PCB
RELEASE-2
ATTACK-2
RELEASE-1
ATTACK-1
+VU
-VU
0V-2
MANUAL
CONTROL
FIXED
SIDECHAIN-1
SIDECHAIN-2
+IN
-IN
TO SIDECHAIN
TO GRE
0V-1
INPUT
TO AMP
0V-1
+OUT
-OUT
VU METER-1
VU METER-2
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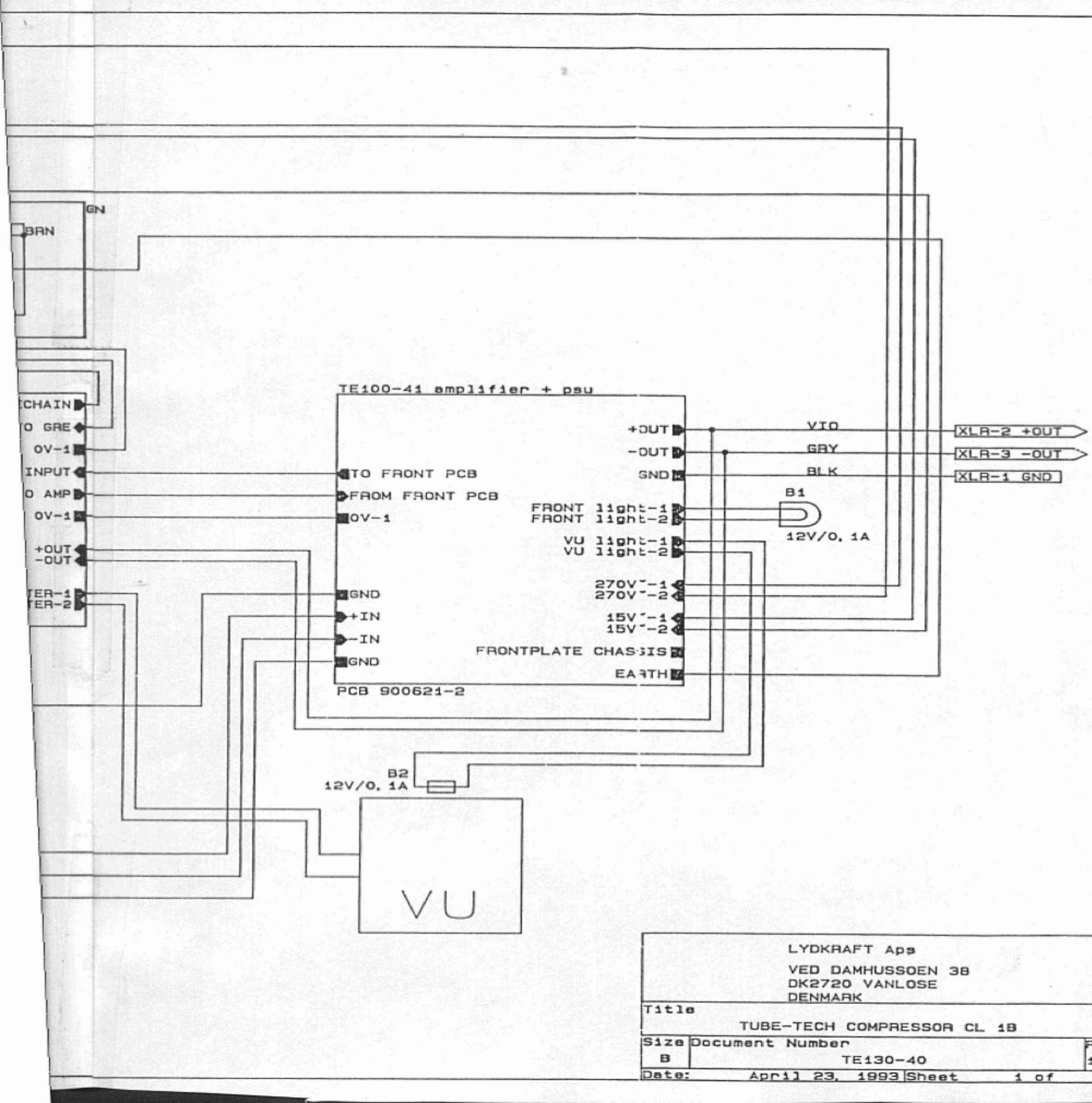
WHT
RED
BLK
XLR-2 +IN
XLR-3 -IN
XLR-1 GND
BRN
RED
BLK



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Title

TUBE-TECH COMPRESSOR CL 1B

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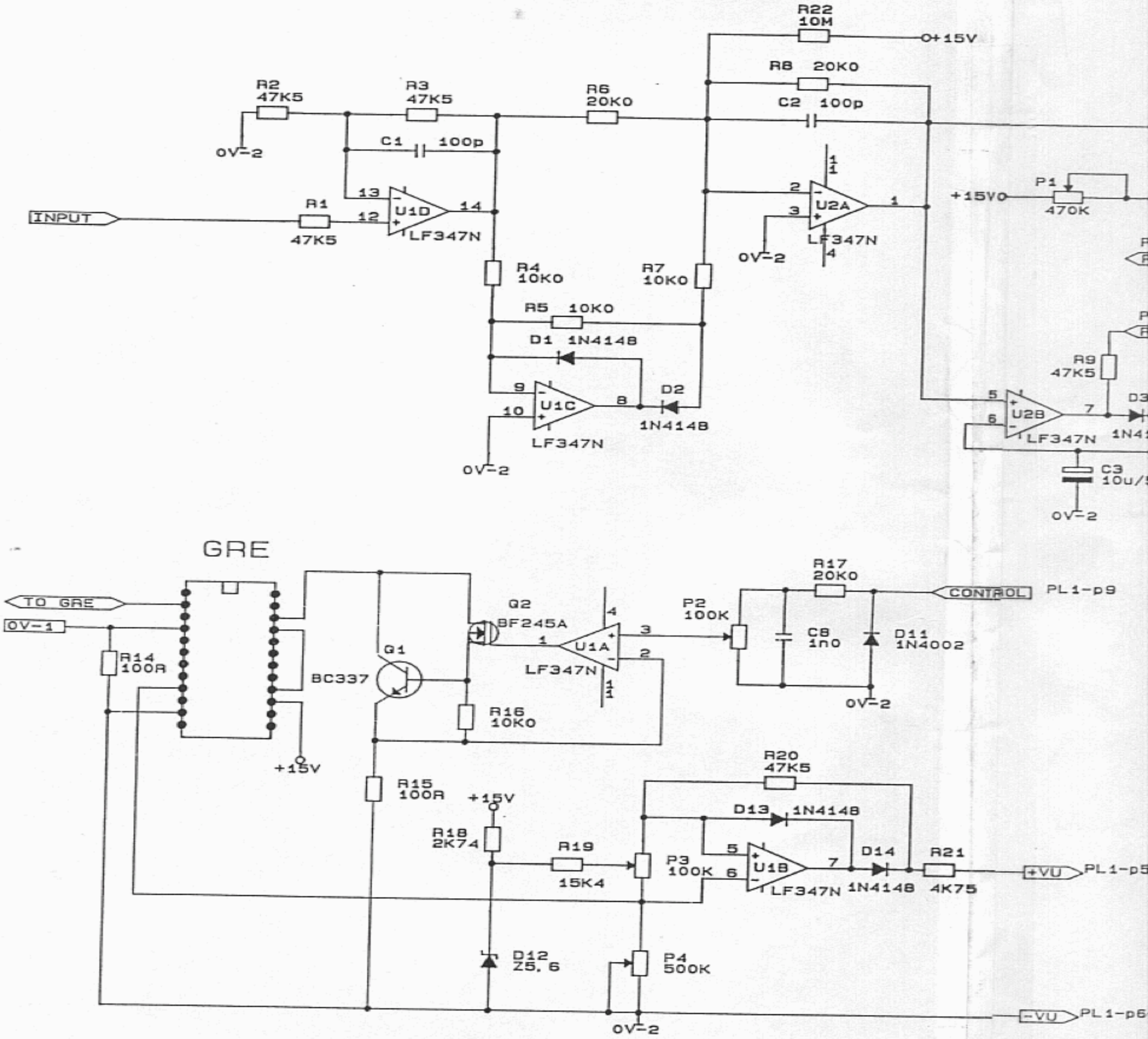
Date: April 23, 1993	Sheet 1 of 4	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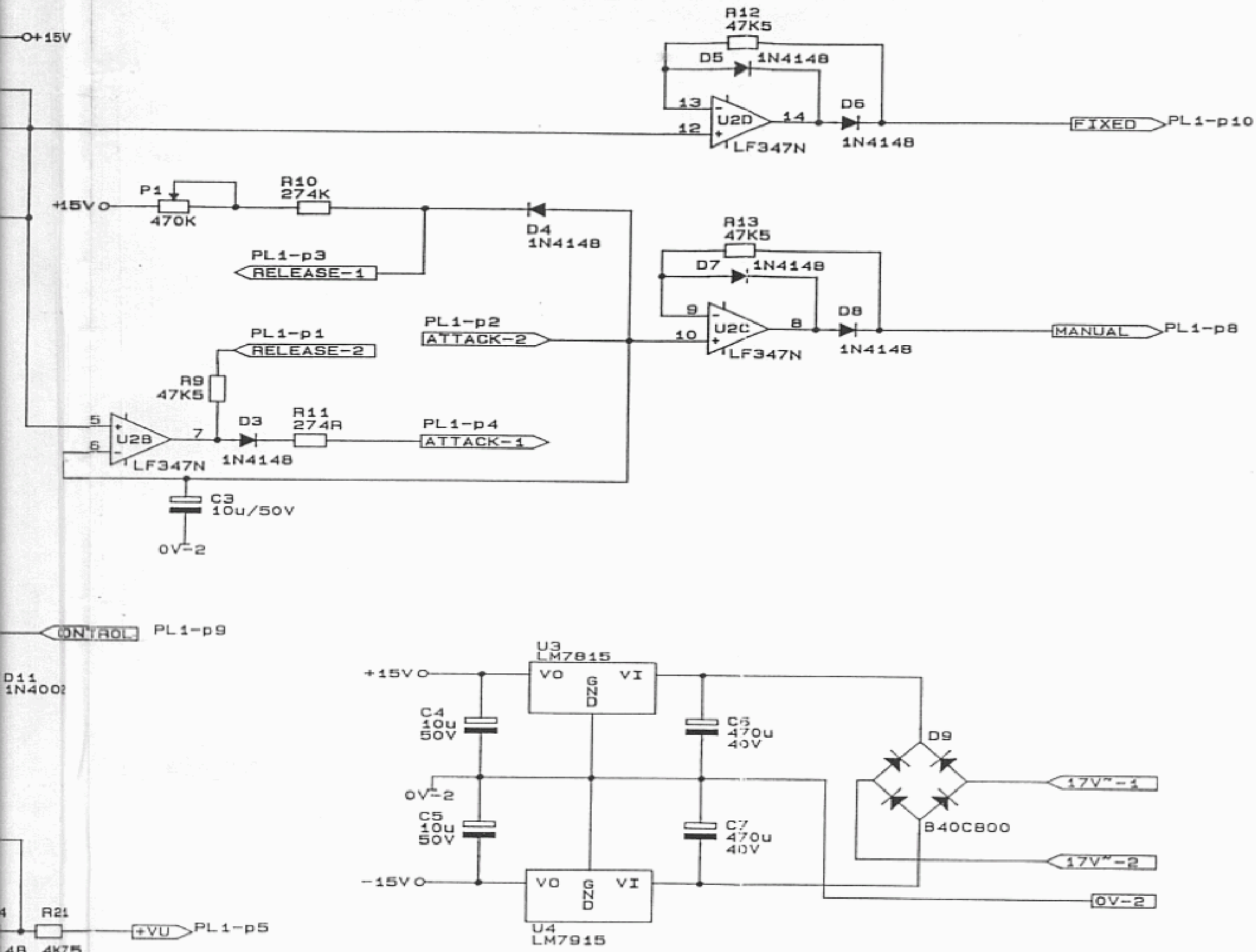
10M
+15V
R8 20KO
R2
47K5
R3
47K5
R6
20KO
C2 100p
0V-2
C1 100p
INPUT
R1
47K5
U1D
LF347N
U2A
LF347N
P1
470K
+15VO
R4
10KO
R7
10KO
R5 10KO
D1 1N4148
U1C
LF347N
D2
1N4148
R9
47K5
U2B
LF347N
C3
10u/
GRE
TO GRE
0V-1
R14
100R
BC337
Q1
Q2
BF245A
U1A
LF347N
R16
10KO
+15V
R17
20KO
CONTROL
PL1-p9
P2
100K
C8
1nO
D11
1N4002
0V-2
R15
100R
+15V
R18
2K74
R19
15K4
R20
47K5
D13 1N4148
P3
100K
U1B
LF347N
D14
1N4148
R21
4K75
+VU
PL1-p5
D12
Z5.6
P4
500K
-VU
PL1-p6
0V-2



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Title: TUBE-TECH CL 1B sidechain		
Size: B	Document Number: TE130-43	REV: 1.0
Date: April 12, 1993	Sheet 4 of 4	

FROM FRONT PCB YEL

TO FRONT PCB ORA

0V-1 BLK

TR1
CL 1B- TR230-2
ME 1B- TR200-1
PE 1C- TR200-1

+IN BRN

-IN RED

GND BLK

+240V

R3 200K

R6 100K

R9 475K

C2 22n/400V

C6 u33/250V

V1A ECC83

V1B ECC83

C3 u33/250V

C1 10u/50V

R4 2K26

C4 100p

R5 1M00

R7 2K61

R2 1M00

P1 47CE

R26 47K5

R8 100K

R10 51K1

R13 4K7 2W

R24 1K00

T1 BU

T2 BUX87

R20 1M00

T3 BUX

270V~-1 YEL

270V~-2 YEL

F1 T100mA

R17 1K0

R18 1K5

R19 2K2

D1 B380C800

C10 100u/450V

C11 100u/450V

C12 100u/450V

C13 2u2/385V

D3 Z9.1

15V~-1 BLU

15V~-2 BLU

F2 T630mA

D2 B40C800

IC1 LM7812 VI GND VO

R21 1K21

C14 1000u/25V

C15 u10/50V

C16 u10/50V

VU light-1 BLU

VU light-2 BLU

R25 68R1

FRONT light-1 BLU

FRONT light-2 BLU

R16 68R1

+240V
+270V
TR2
TR242/1
R6
100K
R9
475K
C6
u33/250V
V1B
ECC83
V2A
ECC82
V2B
ECC82
C3
u33/250V
R11
1M00
R12
1M00
R7
2K61
R8
100K
R10
51K1
R13
4K7
2W
C7
47u
63V
R14
4K7
2W
C8
47u/63V
VIO
+OUT
R15
1K00
C9
3n3/400V
-OUT
GRY
BLK
GND
+270V
T1
BUX85
+240V
T2
BUX87
R20
1M00
R22
1M00
T3
BUX87
C13
2u2/385v
/450V
D3
Z9.1
R23
133K
PIN 5 V1, V2
R21
-1K21-
3o1Ω
VO
+12V
PIN 4 V1, V2
C16
u10/50V
EARTH
FRONTPLATE CHASSIS

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Title
TUBE-TECH CL 1B, ME 1B, PE 1C AMPLIFIER

Size	Document Number	REV
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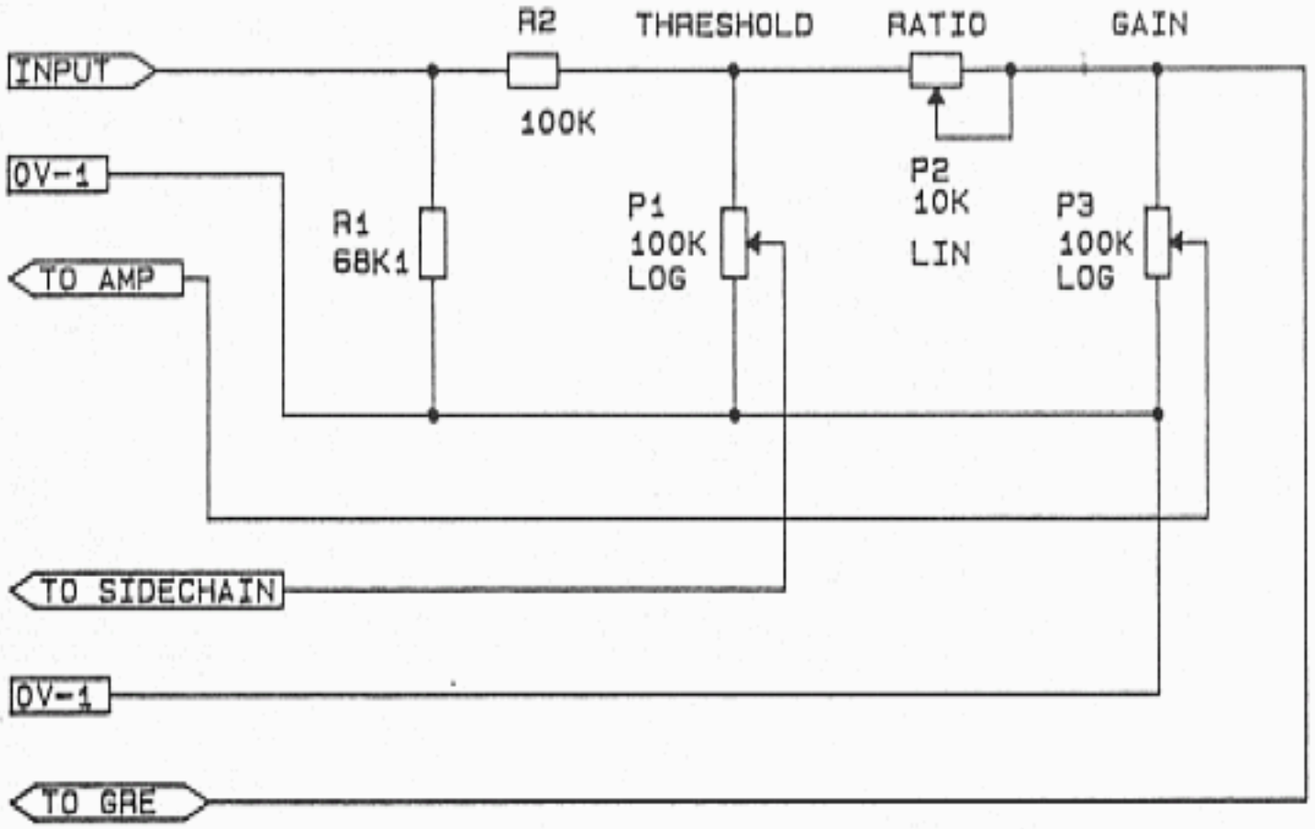
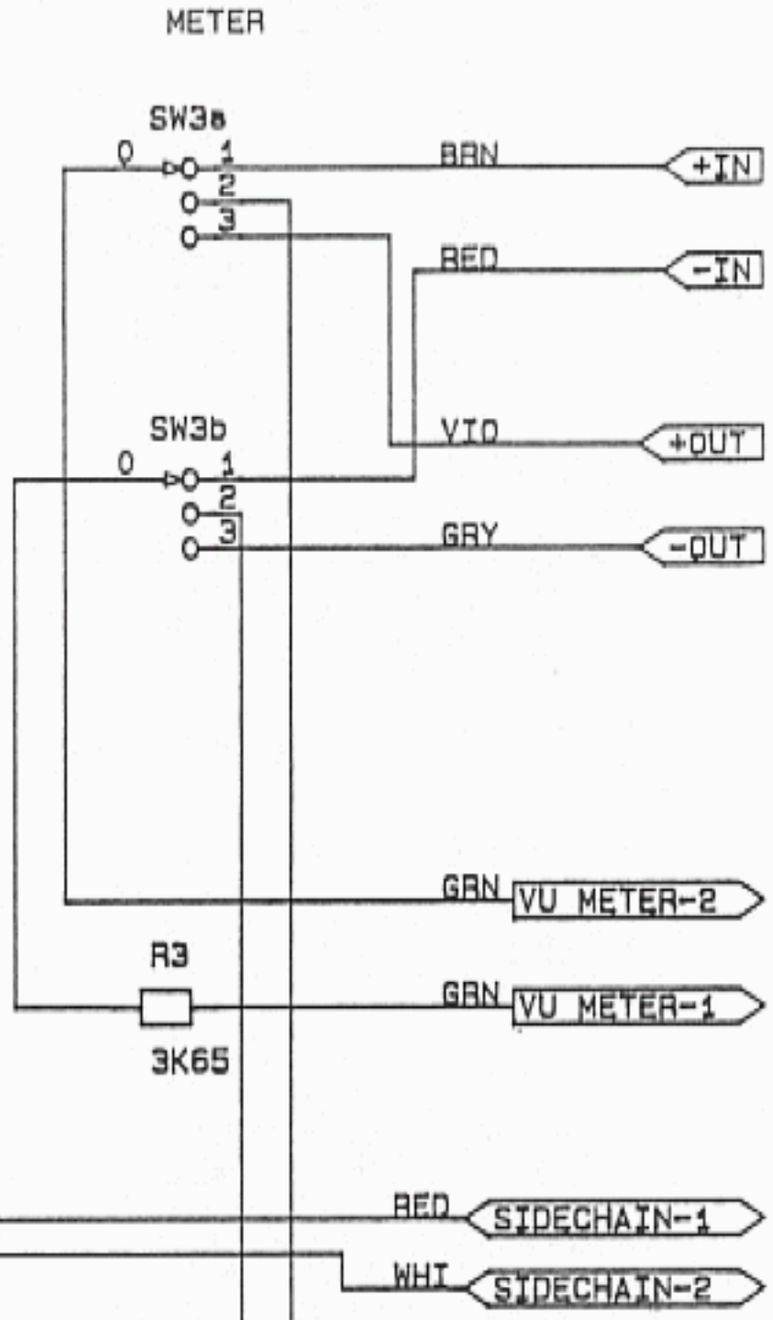
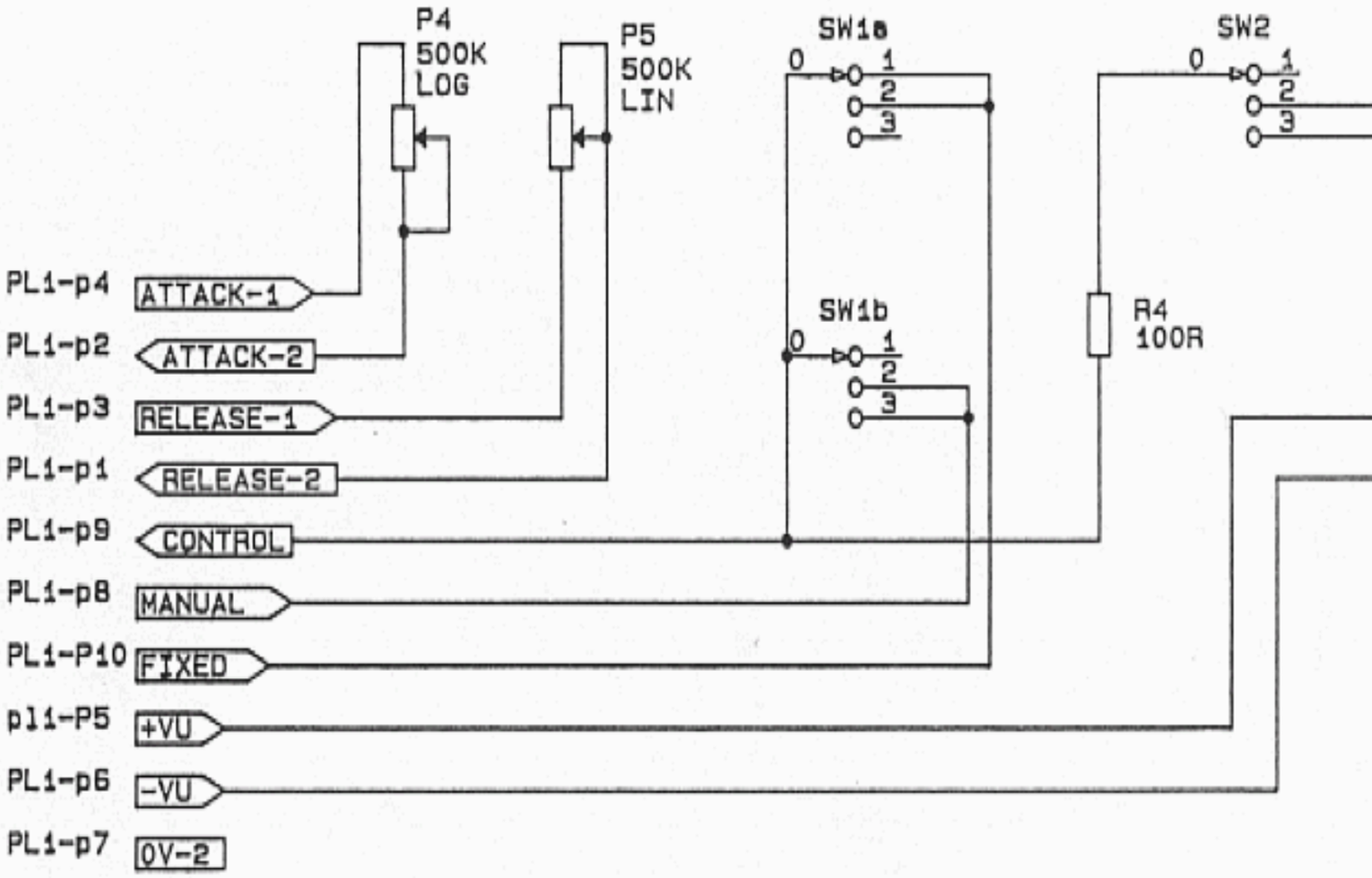
Date: April 12, 1993	Sheet 2 of 4	





ATTACK RELEASE ATTACK/RELEASE SELECT SIDECHAIN BUS SELECT



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TUBE-TECH FRONT PCB

Size	Document Number	REV
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