



VAB 84 Vertikal Amplitude Limiter

General Description

The VAB 84 Vertical Amplitude Limiter has been specially developed for use in disk re-recording systems.

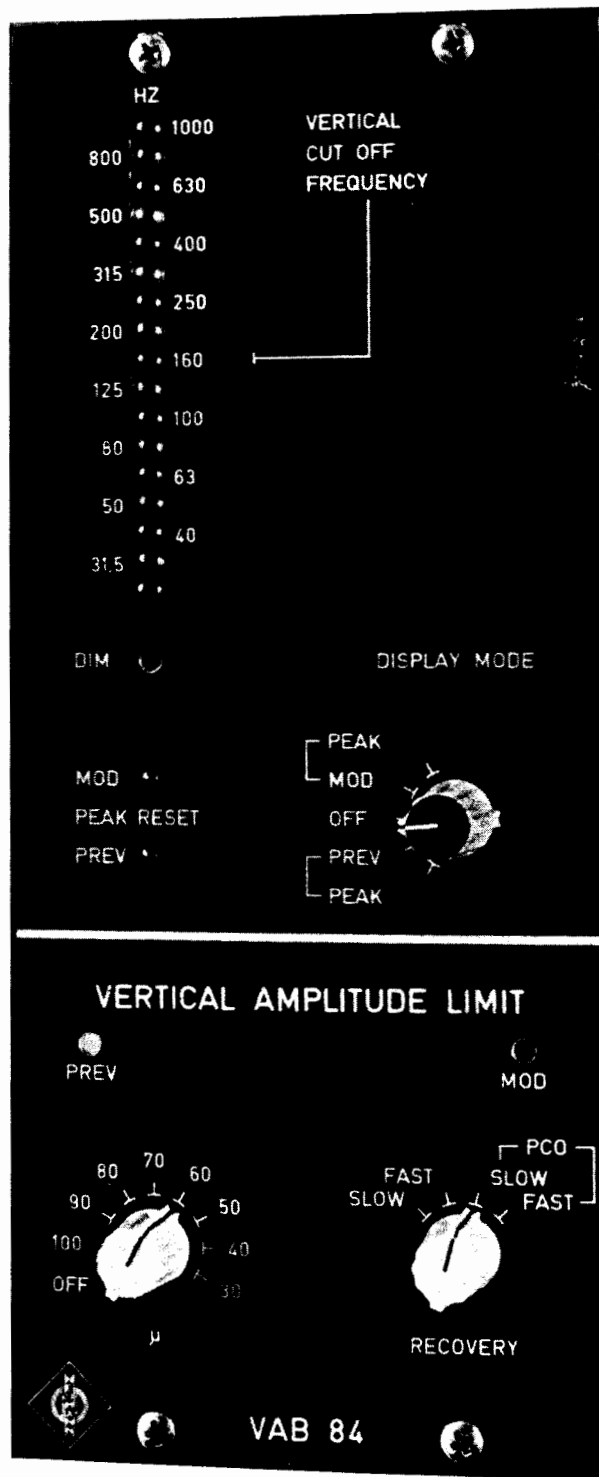
When cutting phonograph disks, it is often desirable for various reasons to impose some limitation on the vertical excursion of the cutting stylus.

With the advent of the VAB 84, a device is now available which makes automatic limitation of the vertical signal possible with minimum effect on the signal itself, which is actually processed only for the very brief periods in which an adjustable limit value is exceeded.

In principle, the vertical signal is limited by a highpass filter, the limit frequency of which is controlled as a function of the frequency and amplitude of the vertical signal and an adjustable limit value for the vertical excursion of the cutting stylus. As a result, frequencies below the automatically self-adjusting limit frequency are suppressed by 6 dB per octave. Flank signal components are simultaneously transferred to the other channel in each case.

By reason of the control principal and the characteristic of dynamic response, the desired effect of cutting depth limitation is attained without restriction, and is nevertheless virtually inaudible.

The VAB 84 is available as a standard broadcast cassette A 2 (80 x 190 mm).



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Technical Description

Functional units of the VAB 84

Since the preview and modulation signals must be processed in the same way for precise feed and cutting depth control, the VAB 84 is provided with two identical sub-assemblies for processing the signals for the preview and modulation channels, plus a control and display unit which is common to both (FIG. 2).

Signal processing

The limiting function is exercised by a control circuit, the regulating unit of which is a low-pass filter with controllable limit frequency. A vertical signal obtained from the input signals passes through this filter and opposes the vertical component of the flank signal with reversed sign in an adding stage. The vertical signal, after being reduced in this way, is again recovered from the outputs to constitute the actual or momentary value for the control circuit, which, after comparison with the pre-set required value, regulates the limit frequency of the filter in such a way that the vertical excursion of the cutting stylus does not exceed the pre-determined limit (FIG. 1).

The resultant effect on the vertical signal is consequently that of a controlled high-pass filter (FIG. 3). The limit frequency is controllable over the entire recorded frequency range, although it is seldom that a frequency of 1000 Hz is exceeded in practice. If the limiter is not called into action, the limit frequency remains below 0.1 Hz, and the vertical signal is therefore unaffected.

The advantage of this method is that no re-matrixing of the left/right signals as sum-and-difference signals is necessary. In addition, there is no need to interpose the variable filter in the main signal path.

The limit value for the modulated vertical excursion of the cutting stylus is adjustable in steps of 10μ from 30μ to 100μ , or in the case of the VAB 84/2, in steps of 0.4 mil from 1.2 to 4.0 mil.

The compression ratio of the limiter is fixed at 20:1 (FIG. 6).

The response time of the limiter is very short, corresponding more or less to the rise time of the signal. This means that the selected limit value is not exceeded, even when short vertical signal peaks occur.

The recovery time is variable, amounting to about 200 msec. per frequency decade in the FAST setting and about 700 msec in the SLOW setting. In addition, two recovery characteristics are selectable:

In normal operation (SLOW or FAST), the recovery characteristic appears similar to a \cos^2 curve (FIG. 7). This enables very short reset times to be attained without any signal distortion at low frequencies. The effective overall time over which the signal is influenced is thus reduced to a minimum. Above all, spatial components (vertical signal) of a stereo signal no longer masked by the triggering signal on decay remain virtually unaffected.

In the PCD mode, an additional feature ensures that short signal peaks (< 100 msec) over a range corresponding to a half decade of the controlled limit frequency at the most are flattened practically instantaneously (FIG. 7). This reduces the possibility of the filter being overloaded by short programme peaks, without any loss of the limiting effect. If the programme is strong on transients, the control system can be adapted to cope with a high ratio of peaks to average levels.

The PCD mode should be used, however, only in the special cases mentioned, as the exceptional limitation of signal peaks is likely to give rise to unavoidable distortions, although these will not be audible, owing to their brevity.

Display unit

A LED scale calibrated in Hz shows the frequency range covered by the control system in the form of a light band up to limit frequency of the high-pass function.

This display can be selected to refer to either preview or modulation signals. In addition, the display unit is provided with a resettable peak value memory for each of the two signals for subsequent indication of the highest limit frequency reached.

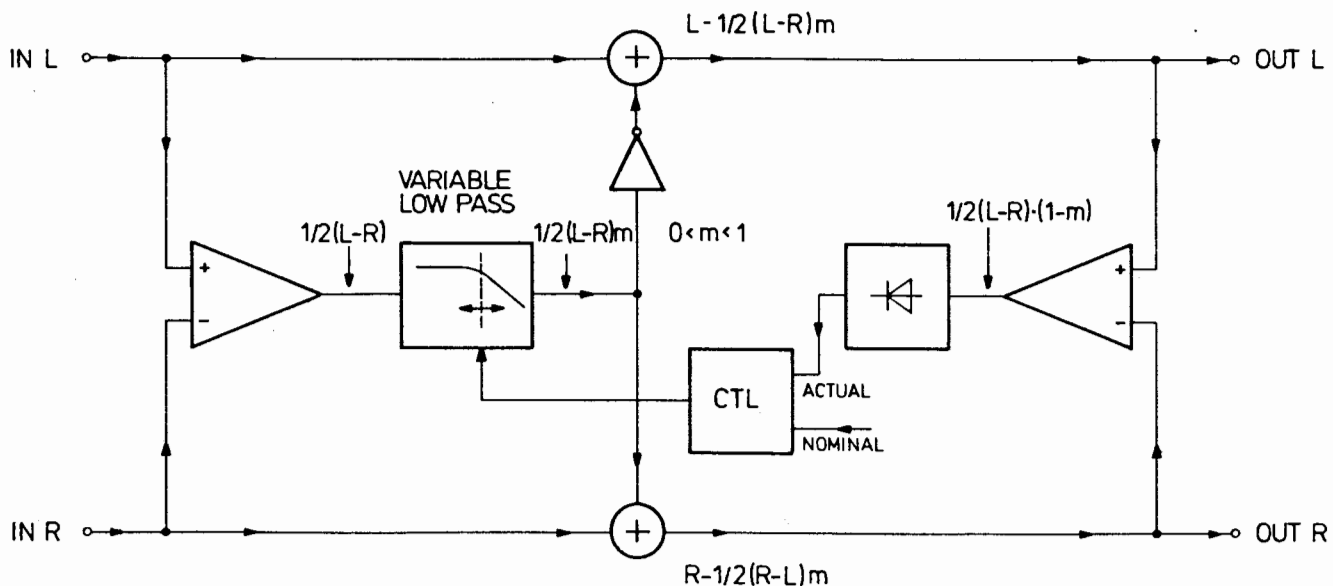


Fig. 1 Principle of function of the VAB 84

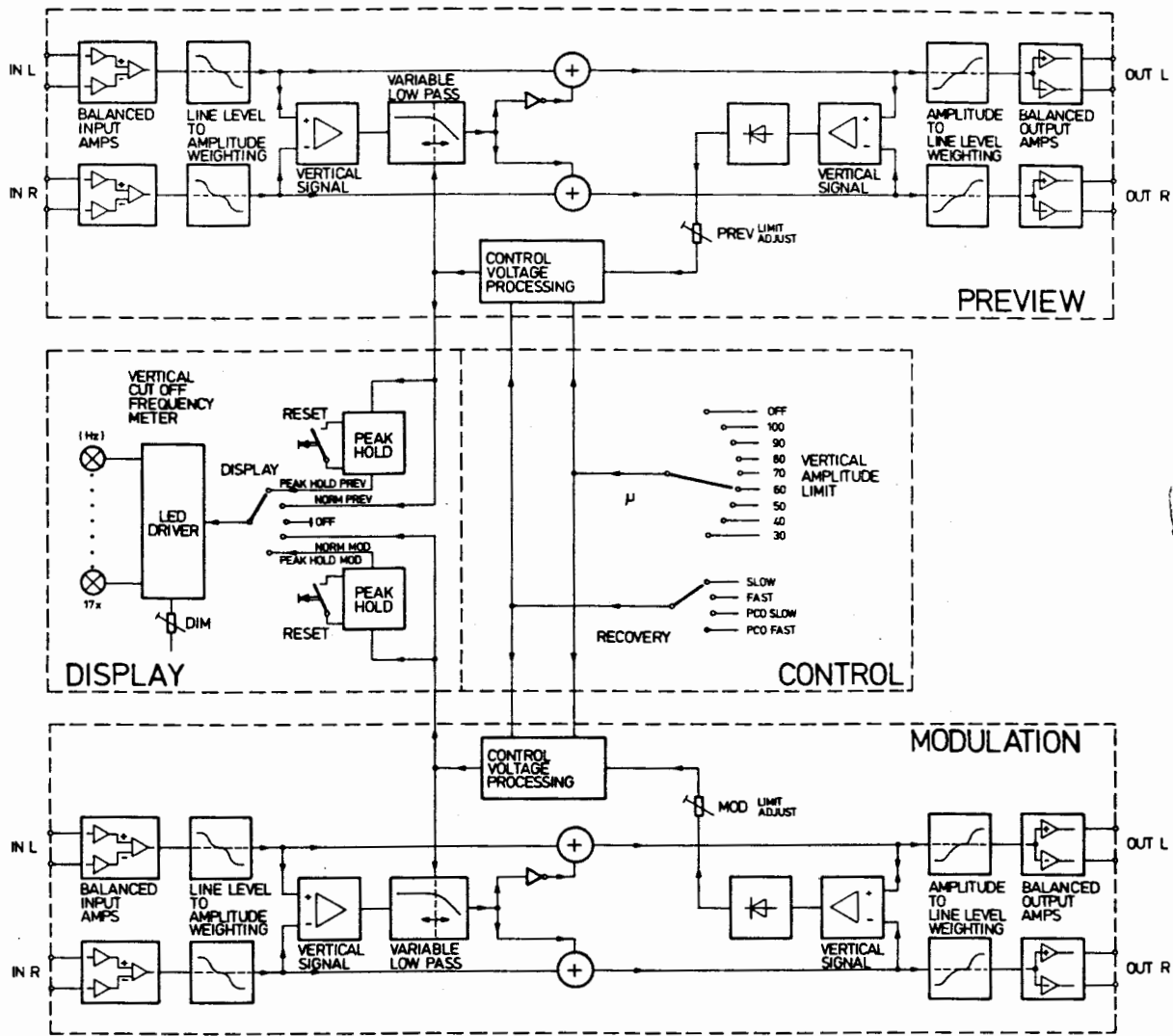


Fig. 2 Schematic diagram of the VAB 84

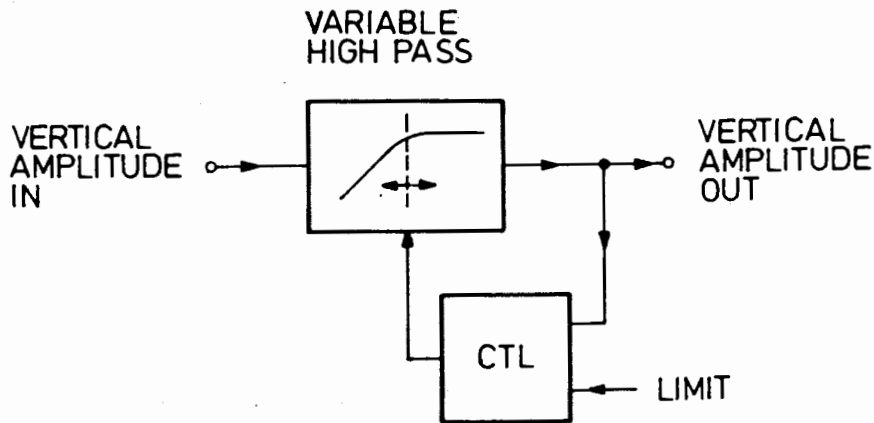


Fig. 3 Resulting control of the vertical signal

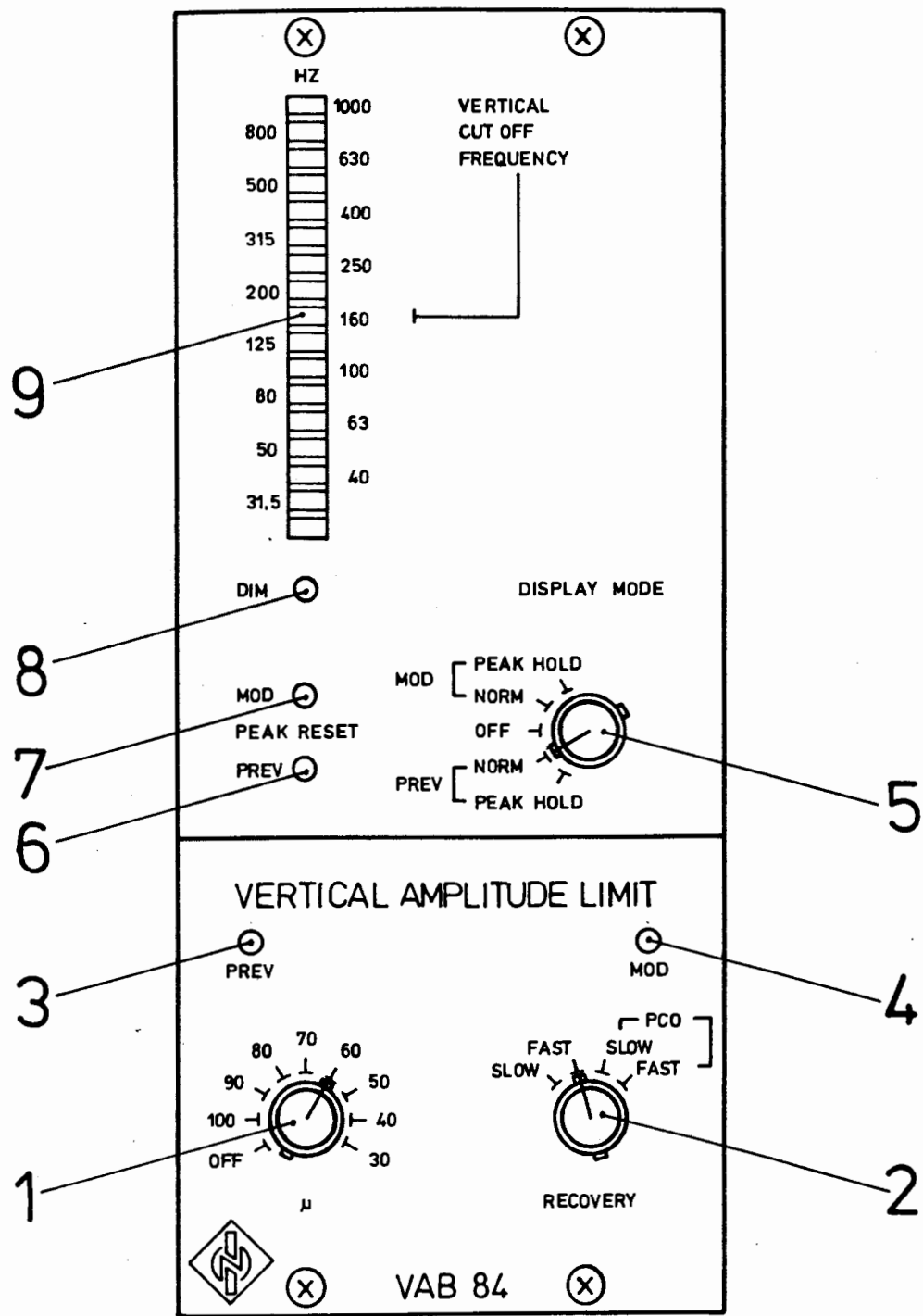


Fig. 5 Display and controls

Operation and Controls of the VAB 84

Installation

In order to be able to evaluate and limit the vertical amplitudes to be actually cut independently of any influencing of the signal in the control desk (mixing console), the VAB 84 must be arranged directly in front of the modulation inputs of the SAL 74/82 or the preview inputs of the VMS 80/82 as the case may be. If installed in a control desk, the VAB 84 must be the final unit to influence the signal. The VAB 84 has no transformers. The inputs are symmetrical and floating within the range of the ± 15 V operating voltage. They can thus be also asymmetricaly modulated. The outputs are coercively symmetrical to 0V, i.e. neither of the two output leads may have 0V applied to it.

The necessary connections are shown in FIG. 4.

Controls and display (FIG. 5)

Switch 1 " μ ":

This switch is used to set the limit value for the modulation dependent vertical excursion of the recording stylus. For the cutting procedure, the following correlation applies:

The controlled, as yet unmodulated cutting depth (width) indicated by the DEPTH METER is the sum of the BASIC DEPTH and the set limit value for the simple vertical amplitude (VERTICAL AMPLITUDE LIMIT).

Example:

Basic depth	:	40 μ
Set limit value for vertical amplitude	:	60 μ
Resulting in a maximum controlled cutting depth of	:	100 μ

Superimposed on the latter is the modulation, limited to $\pm 60 \mu$.
(These figures correspond with the groove width optically measured through the inspection microscope).
The widest point of the modulated groove is thus : 160 μ

Switch 2 "RECOVERY"

Adjustment of decay time and characteristic, see "Signal processing". The position "FAST" is recommended as the normal setting.

Trimmers 3 "PREV" and 4 "MOD"

For adjustment to nominal level, see "Trimming".

Switch 5 "DISPLAY MODE":

This switch is used to select between PREV or MOD channels display. In the "NORM" positions, the actual limit frequency is indicated continuously. In the positions "PEAK HOLD", the highest modulation of the filter attained since the last reset is shown. In the position "OFF", the display on the LED scale 9 is switched off, although the peak value storage of the limiter function remains unaffected.

Switches 6/7 "PEAK RESET PREV/MOD"

Separate resetting of the peak value memory for the limit frequency. This can be used, for example, for comparative measurements.

Trimmer 8 "DIM"

To adjust the brightness of the LED display.

LED scale 9 "VERTICAL CUT-OFF FREQUENCY"

Light bar display for the limiting effect. Displays the limit frequency attained.

Trimming

In order to adjust the VAB 84 to the nominal level in use, the procedure is as follows:

1. Set switch " μ " to position OFF.
2. Set BASIC DEPTCH on VMS 80/82 to 40 μ /1.6 mil.
3. Feed vertical signal (L/R in phase opposition) 100 Hz into preview and modulation channels.
4. Set level in such a way that the DEPTH METER of the VMS 80/82 reads "140 μ /5.6 mil".
5. Set switch " μ " to position "60 μ /2.4 mil".
6. Using trimmer "PREV", adjust reading of DEPTH METER of the VMS 80/82 to "100 μ /4.0 mil".
7. Measure level of prev signal with VU meters.
8. Using trimmer "MOD" adjust, level of Mod signal on VU meters exactly to the value shown for the Prev channels in 7.

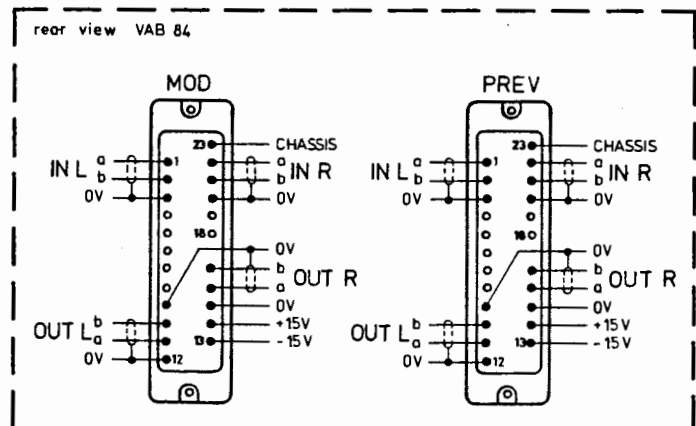


Fig. 4 Connecting diagram (matching socket, soldering side view)

Technical Data

0.775 V \pm 0 dB

Inputs

Input	Symmetrical, floating (within operating voltage)
Input impedance over recorded frequency range	> 8 k Ω m
Input asymmetry damping at 15 kHz	> 54 dB
Maximum permissible input level	
20 Hz ... 20 kHz	+15 dB
60 Hz ... 20 kHz	+20 dB

Limiters

Function principle	controlled high-pass filter
Range of the controlled limiting frequency	0.1 Hz ... > 4 kHz
Frequency range of control	20 ... 20,000 Hz
Compression ratio	20 : 1
Response threshold (vertical stylus excursion)	30 μ ... 100 μ variable in steps of 10 μ
Decay time:	
Slow	700 msec/frequency decade
Fast	200 msec/frequency decade
PCO slow, PCO fast	two steps:
	1. step 5 msec or decay time
	2. step see Slow, Fast
Display	LED light bar for cut-off frequency
Display range	31.5 Hz ... 1 kHz in 1/3 octave steps

Outputs

Output	Coercively symmetrical to 0V
Output impedance over recorded frequency range	< 100 Ω m
Permissible output load	> 2 k Ω m
Maximum output level into 2 k Ω m	+20 dB
Frequency range	20 ... 20,000 Hz
Frequency linearity over recorded range related to 1 kHz	\pm 0.2 dB
THD over recorded frequency range:	
Position OFF	< 0.1%
With limiter in operation	< 0.3%
Noise level, weighted per CCIR 468	< -82 dB
Noise level, unweighted per DIN 45405	< -92 dB
Channel separation:	
Modulation-/preview channels	
20 ... 20,000 Hz	> 90 dB
Left/right channels	
100 Hz ... 20,000 Hz	> 60 dB
20 Hz ... 20,000 Hz	> 46 dB

Power Supply

Nominal operating voltage	\pm 15 V \pm 5%
Current drain at \pm 15 V	max. \pm 350 mA RMS
Plug connections	2 x T 2700
Required counterpart	2 x T 2701
Housing	A 2 cassette
Weight	approx. 1.2 kg
Permissible ambient temperature	0...50 $^{\circ}$ C

Errors excepted. Subject to changes.

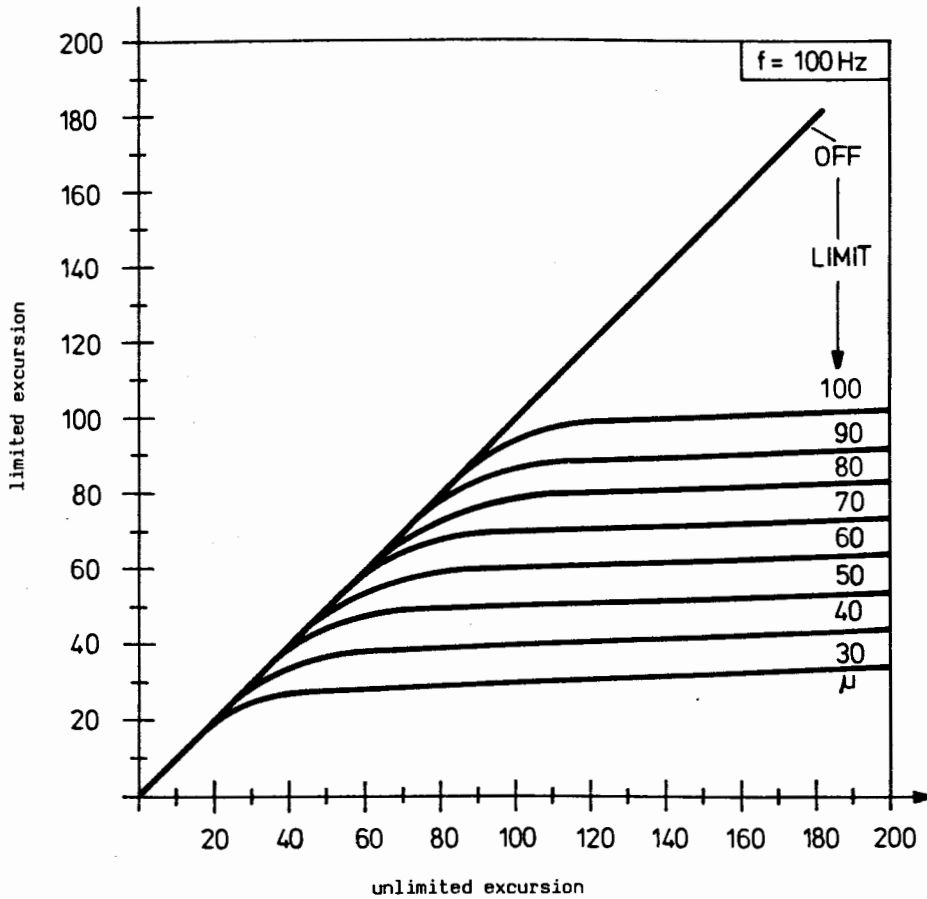


Fig. 6 Limiter characteristic, $f = 100 \text{ Hz}$
parameter: set vertical amplitude limit

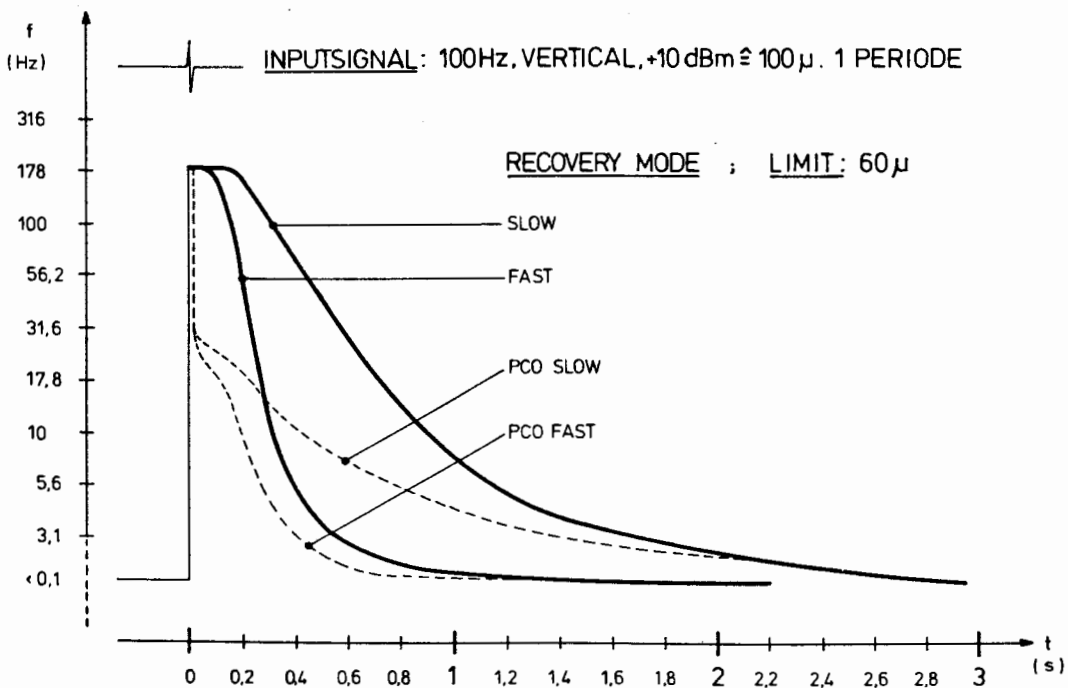
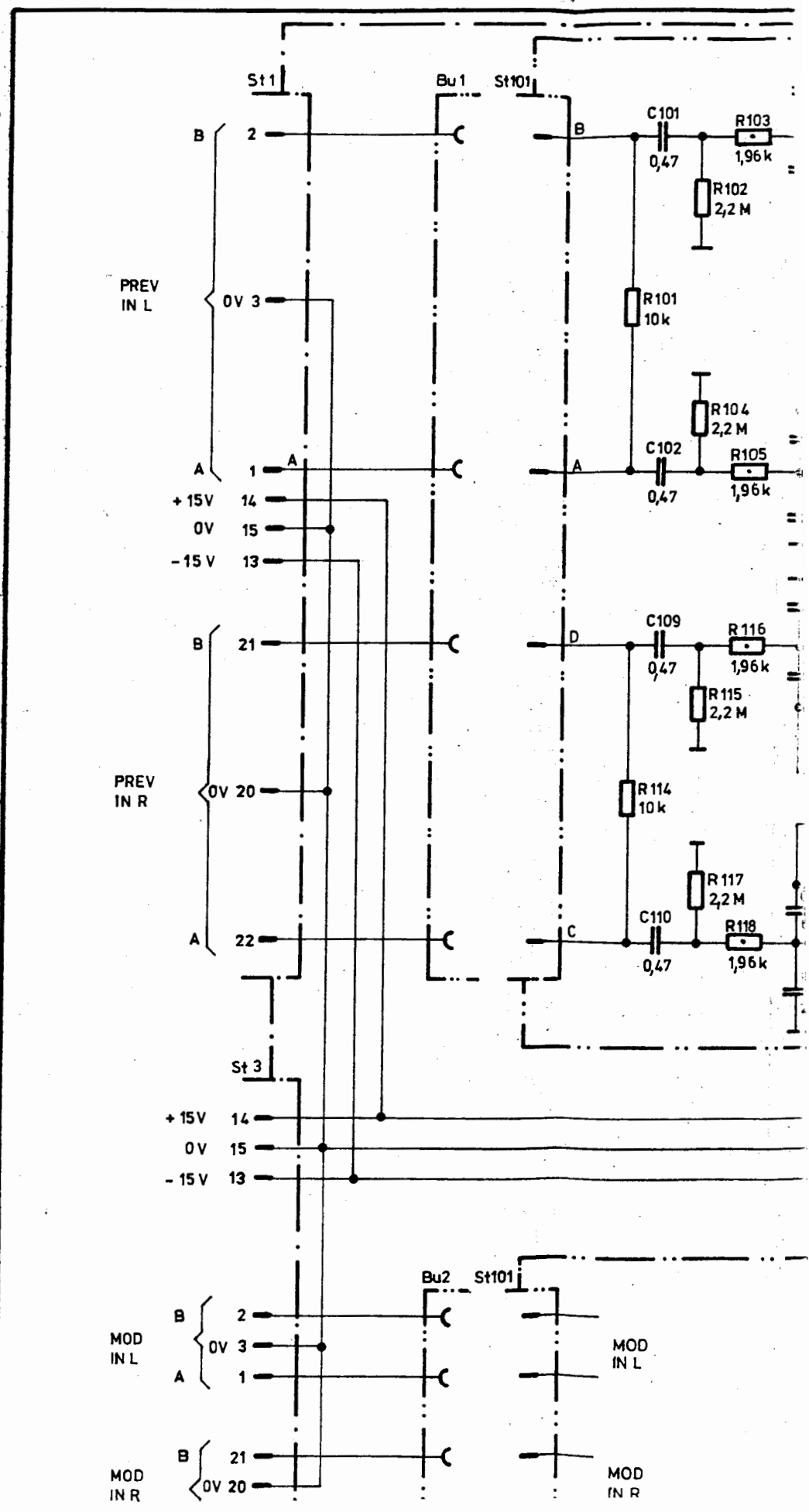


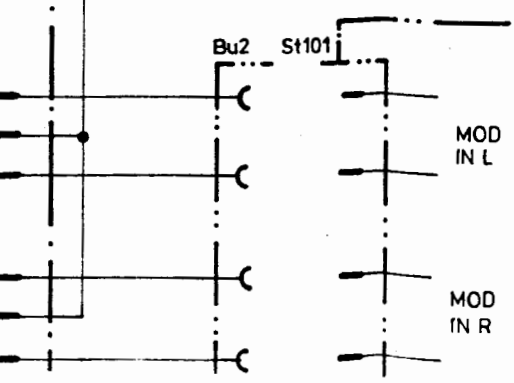
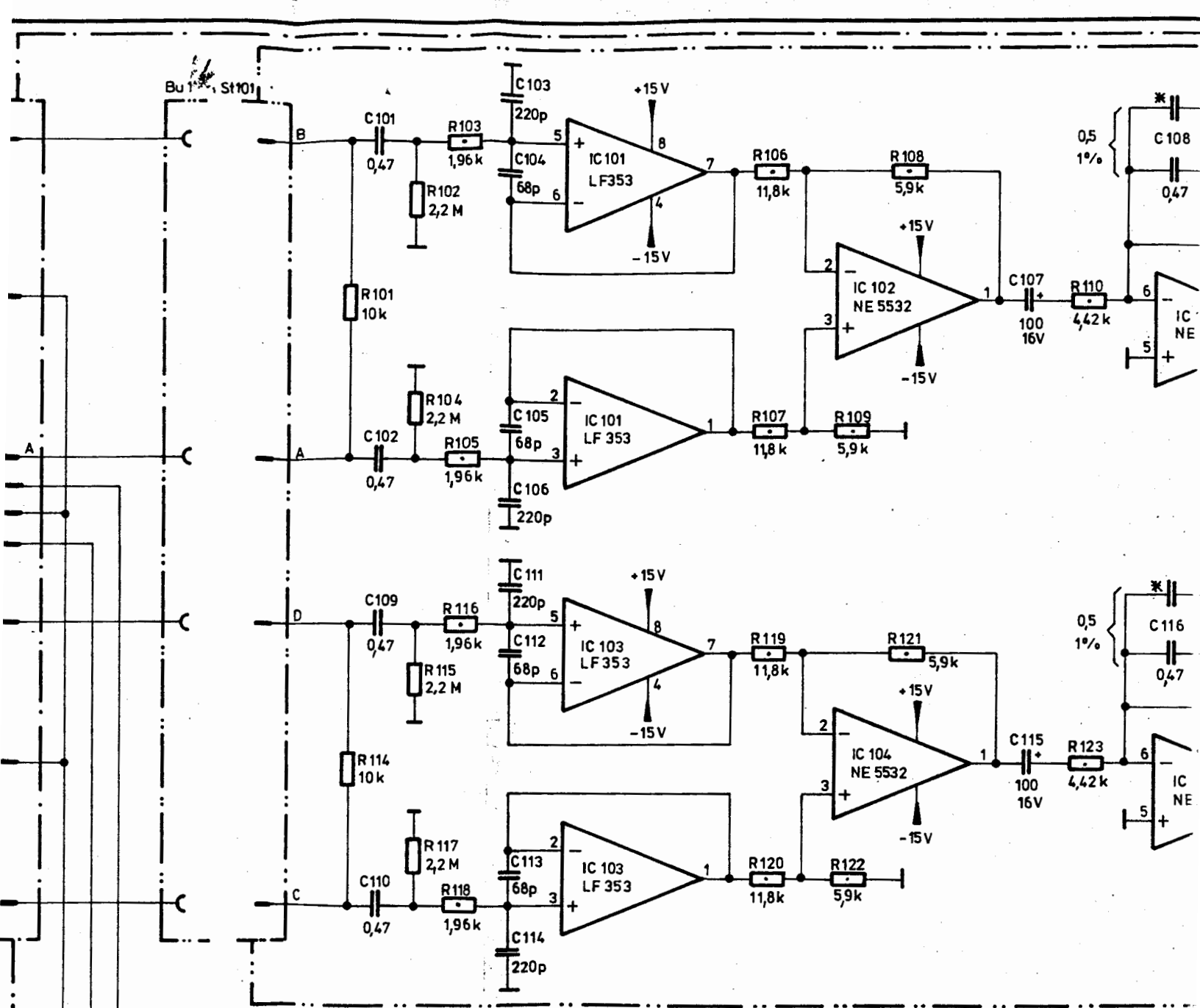
Fig. 7 Recovery characteristic after limitation
of a 100 Hz pulse from 100 μ to 60 μ

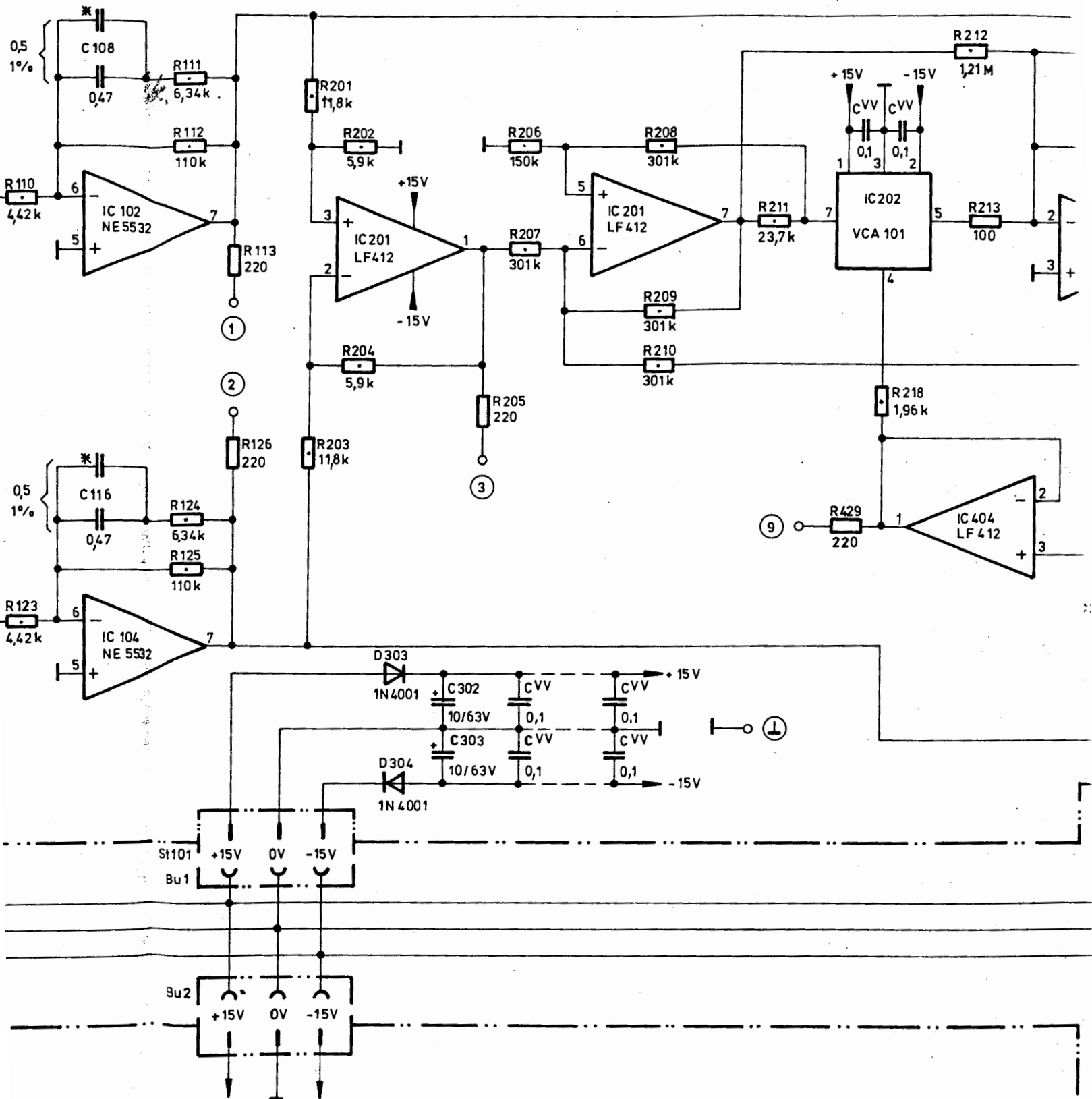
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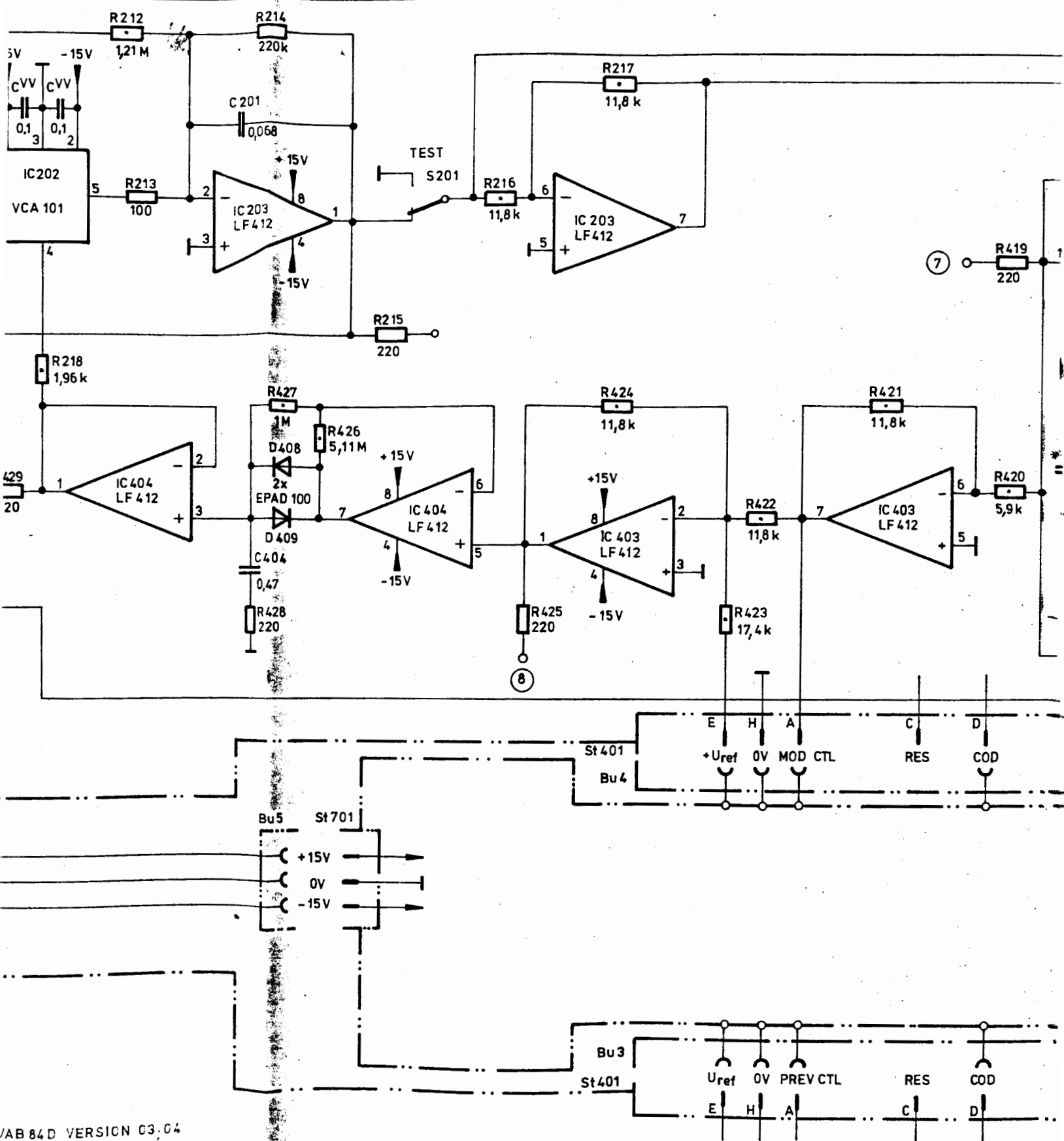




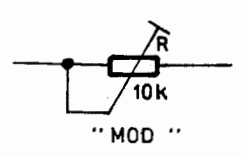
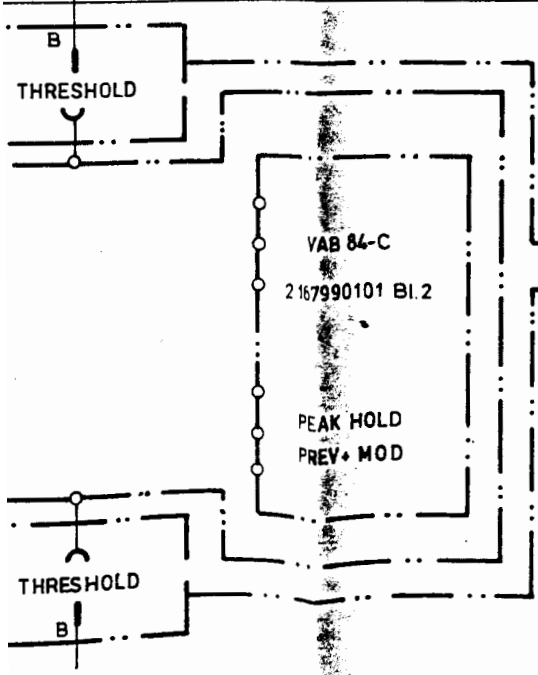
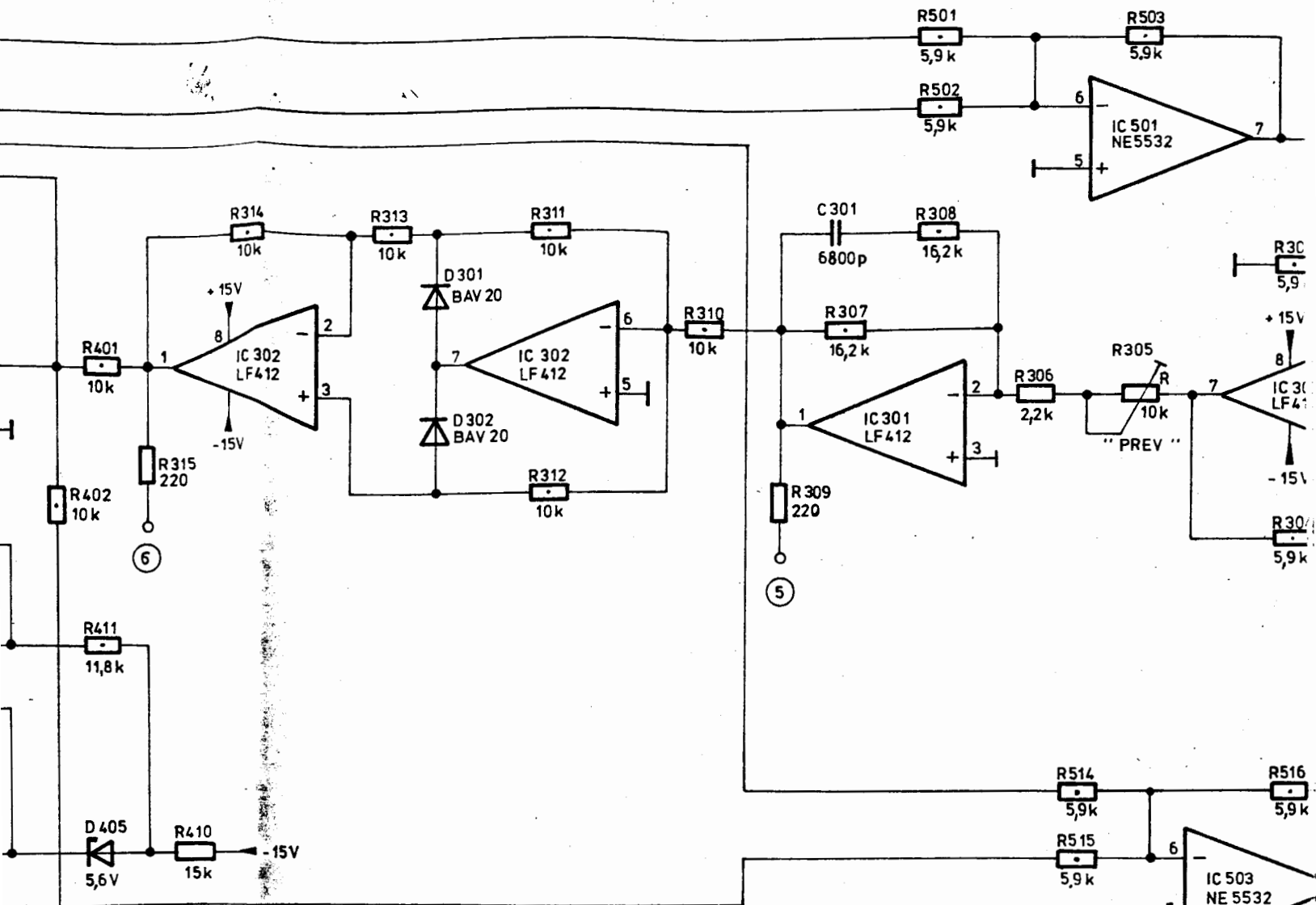


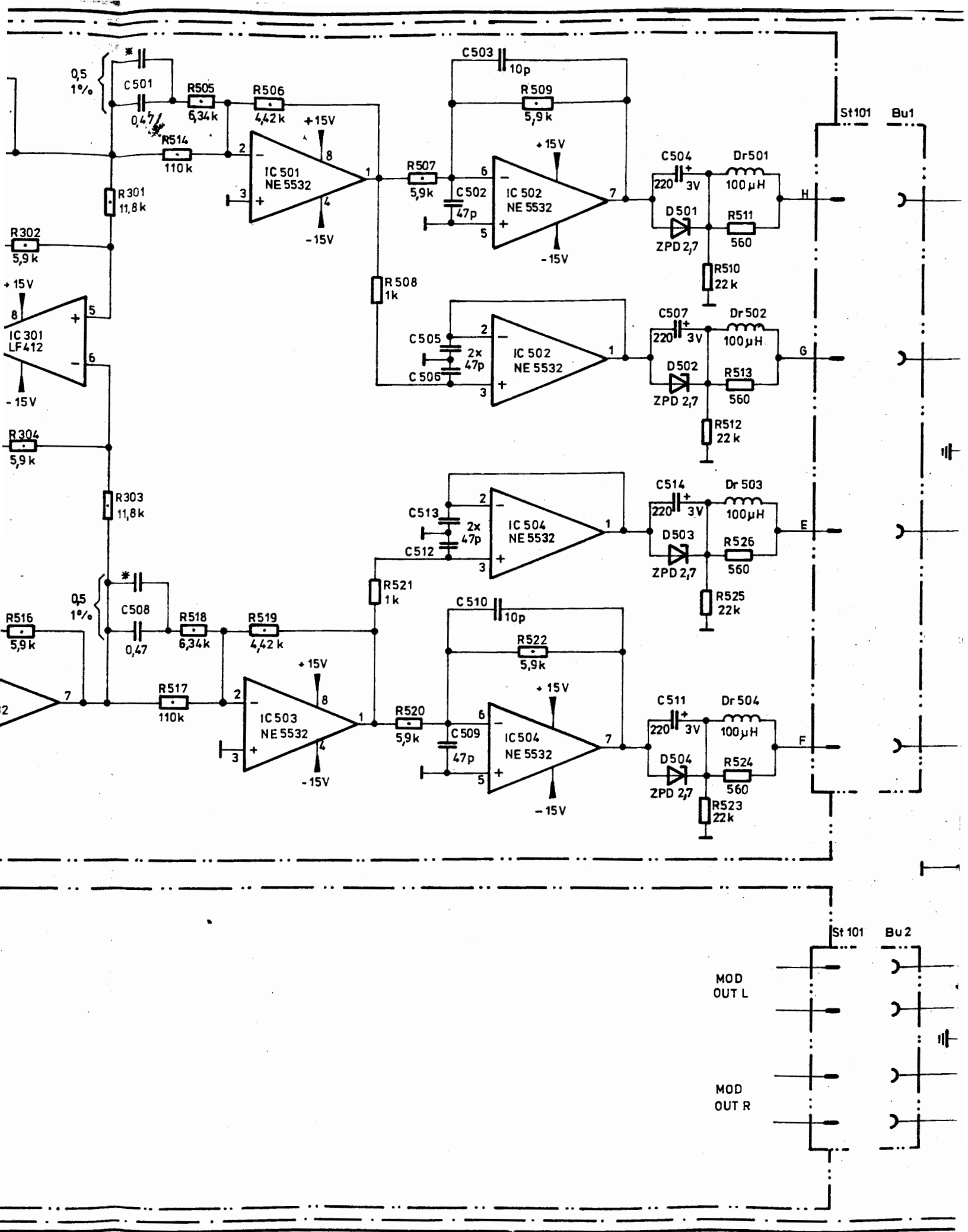
VAB 84- A MOD - KANAL

DIESER KANAL FEHLT IM GERÄT VAB 84D VERSION 03,04
 THIS CHANNEL IS MISSING IN VAB 84D VERSION 03,04



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 84D VERSION 03,04

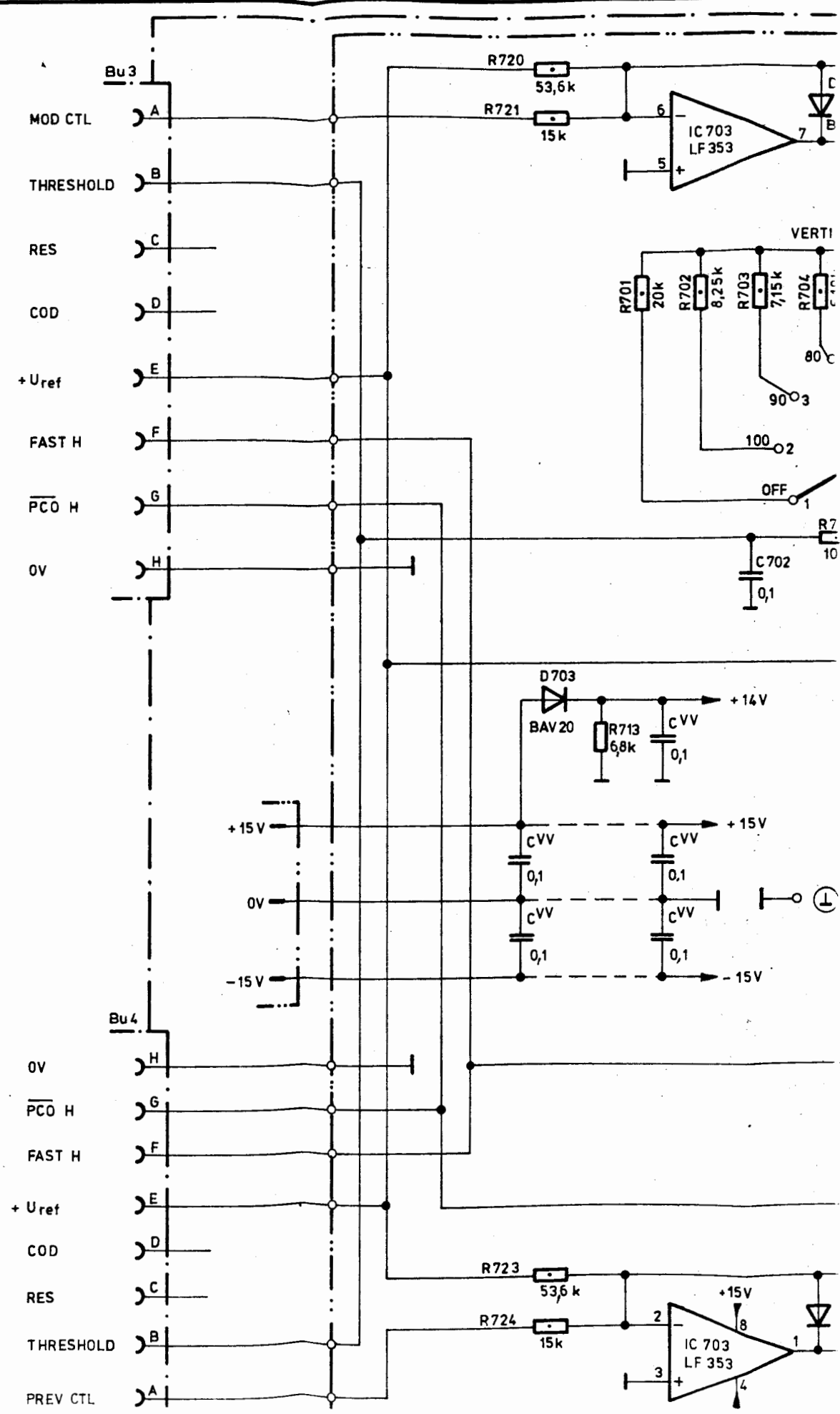




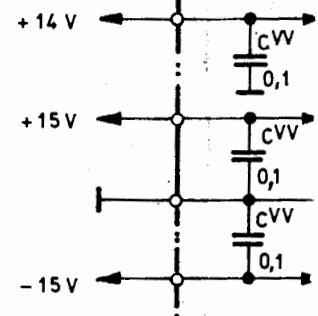
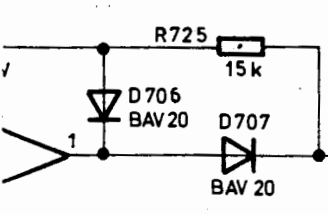
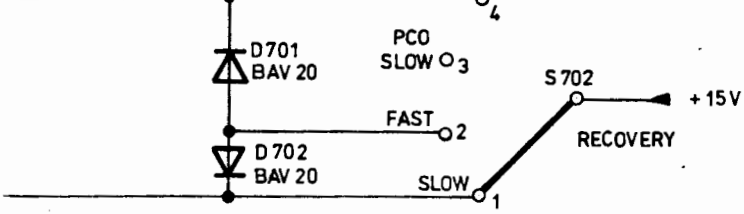
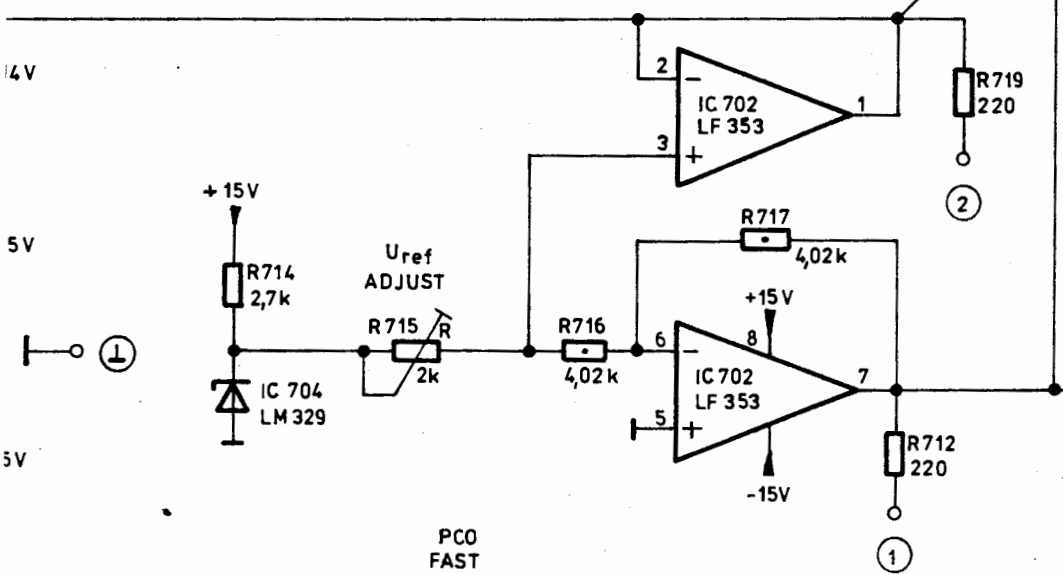
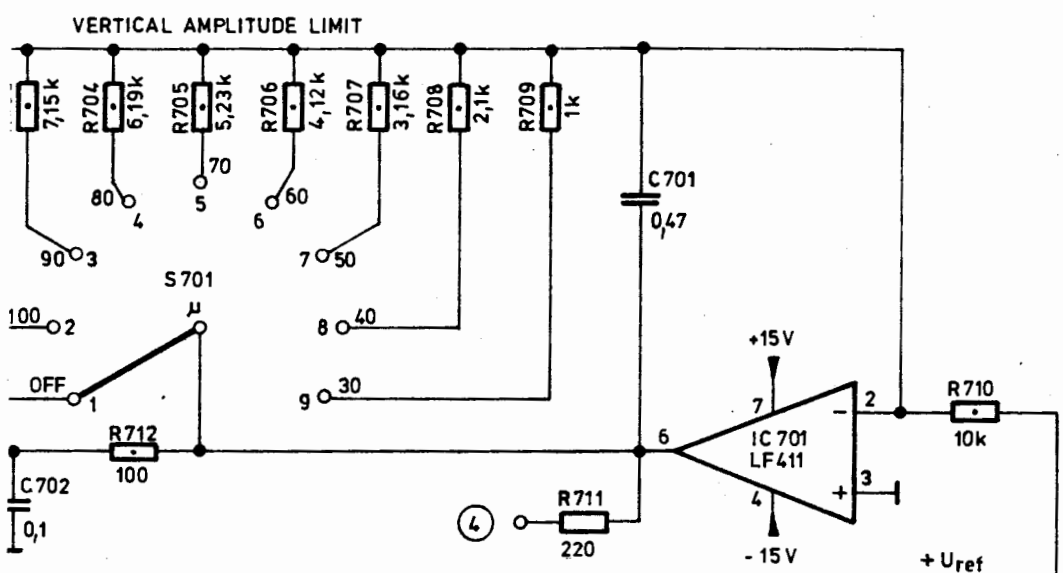
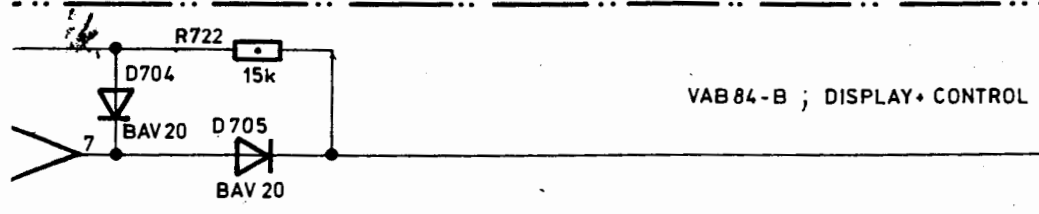
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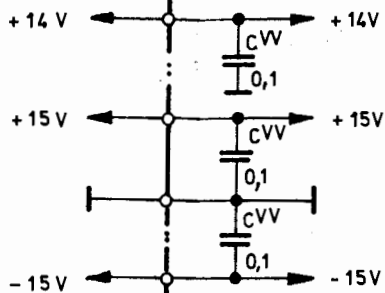
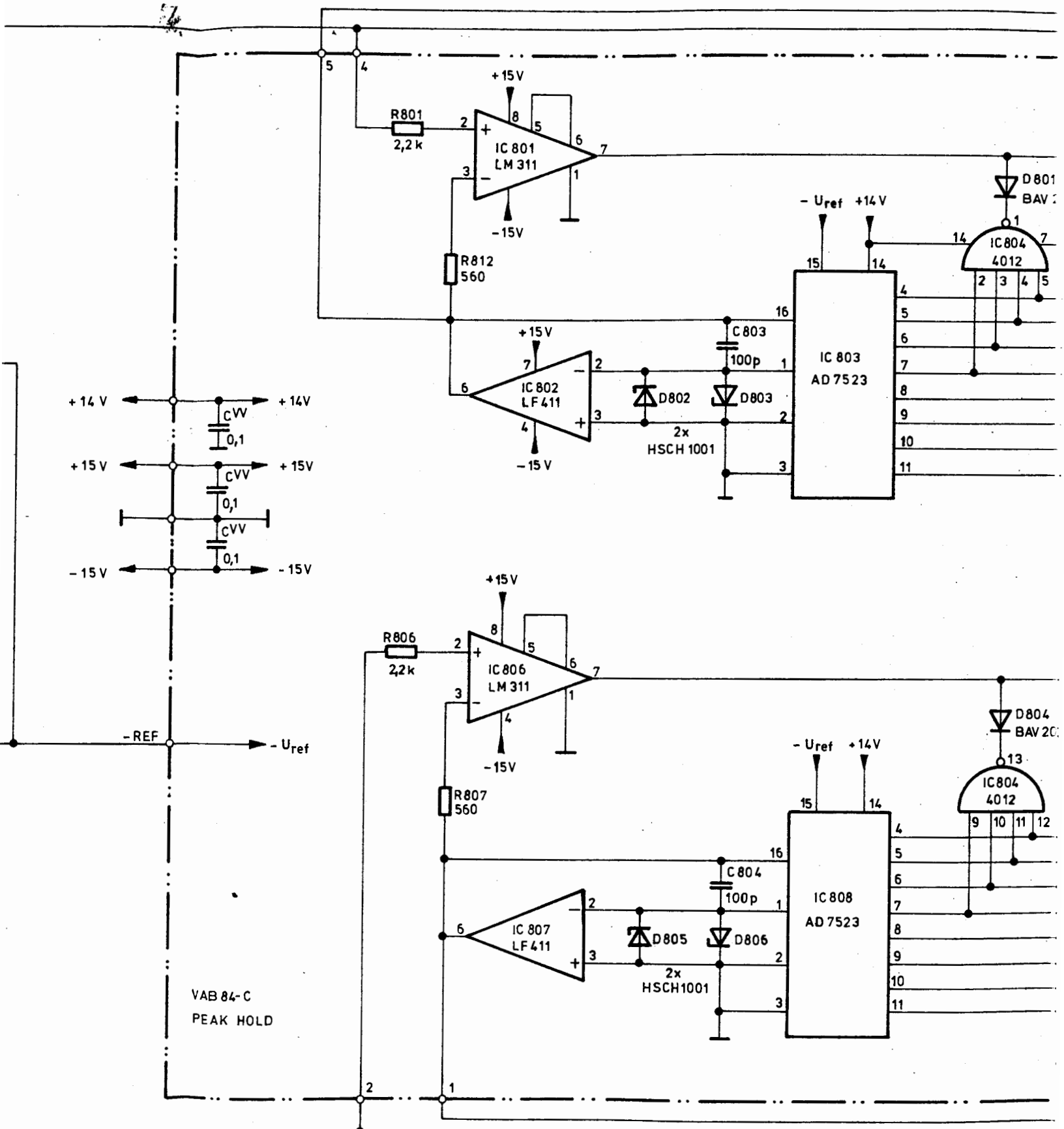
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VAB 84-C
PEAK HC

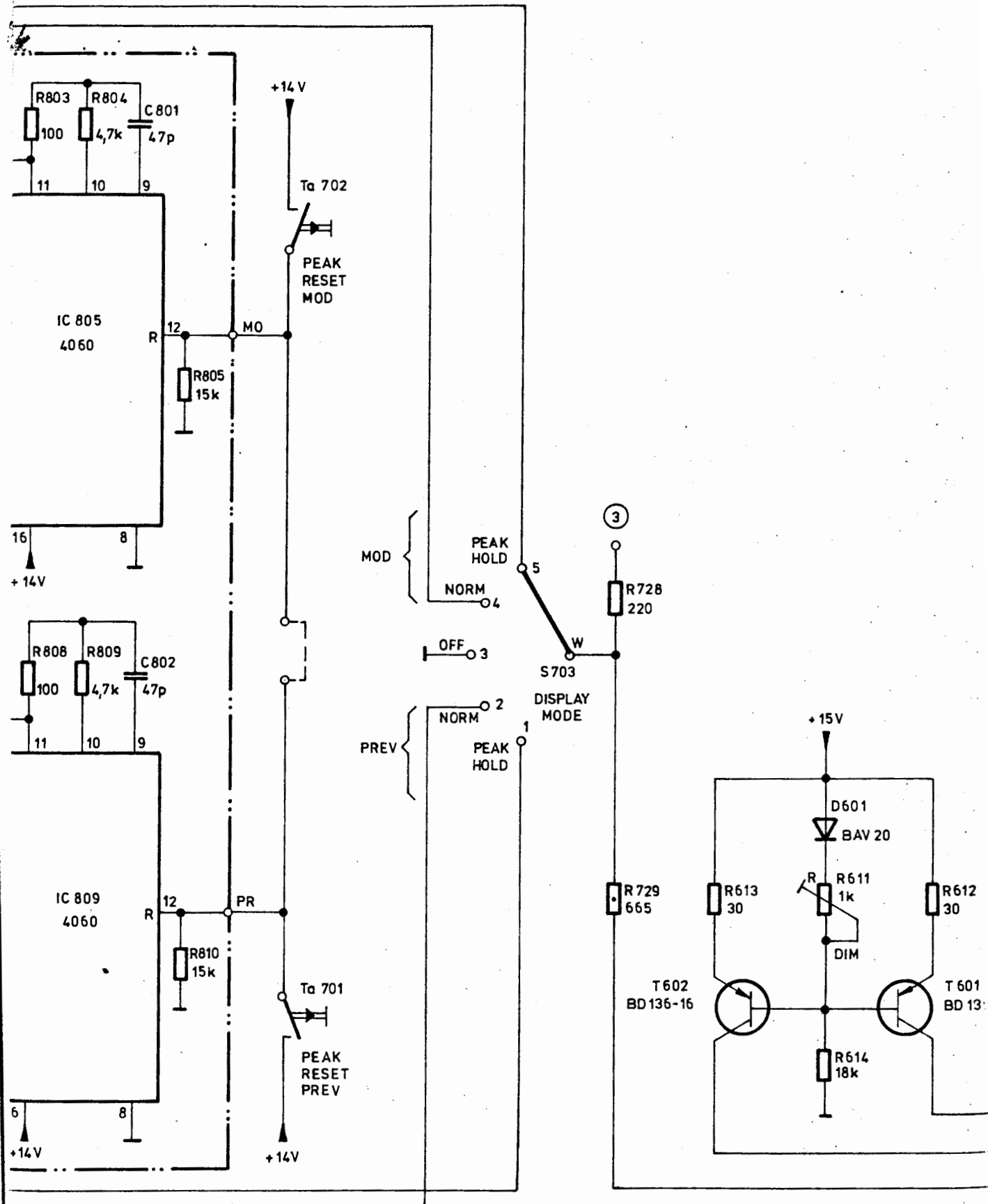


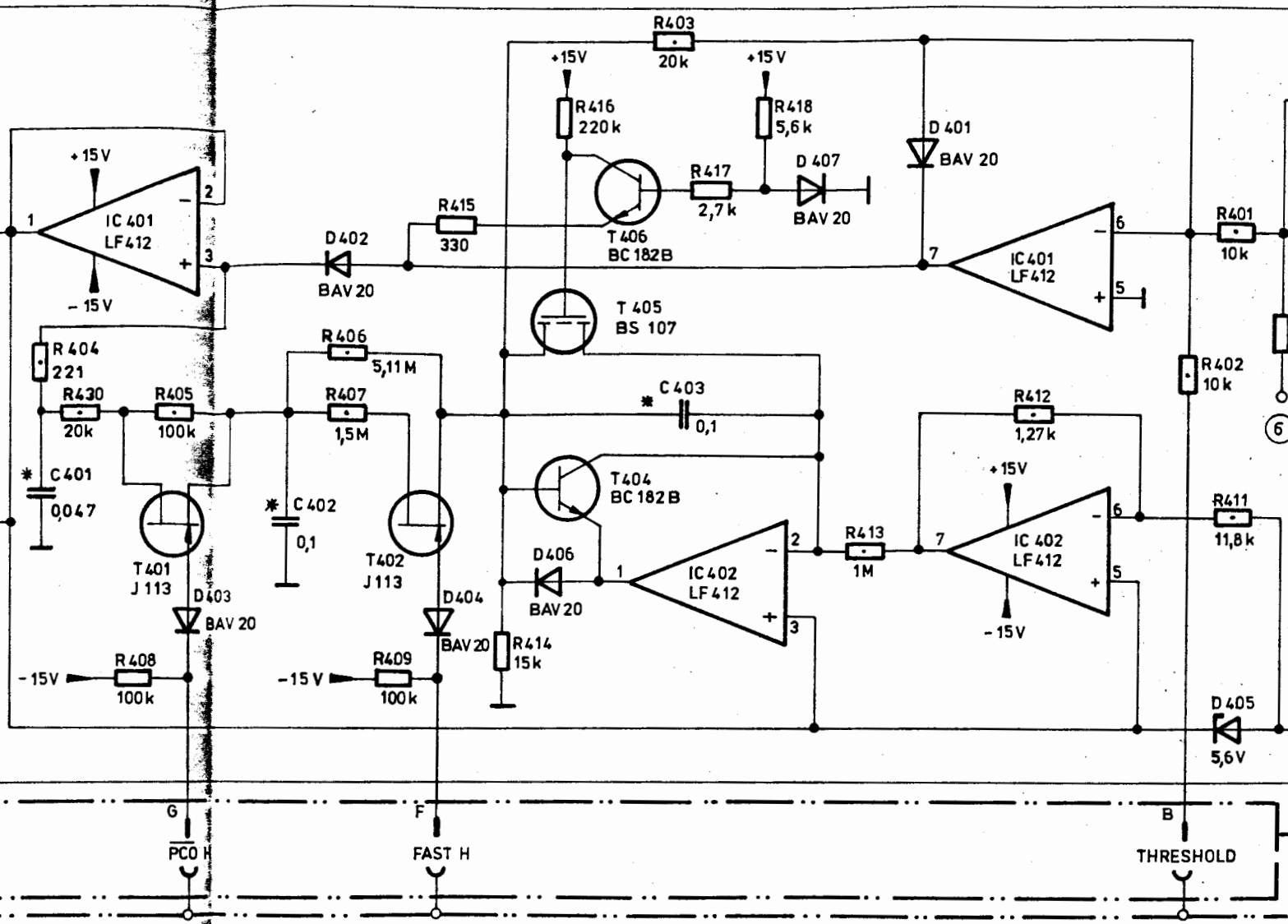
VAB 84-C
PEAK HOLD

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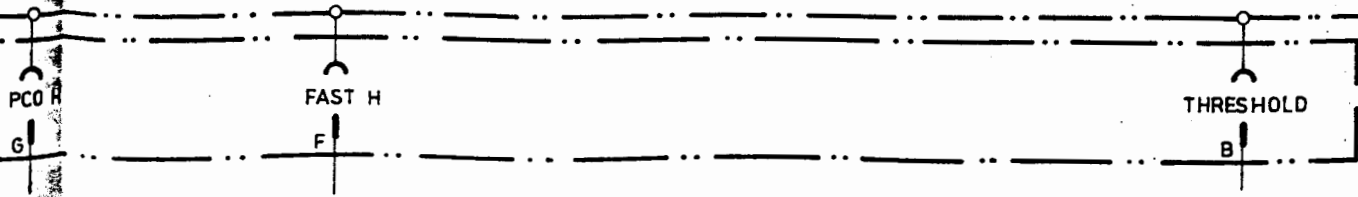
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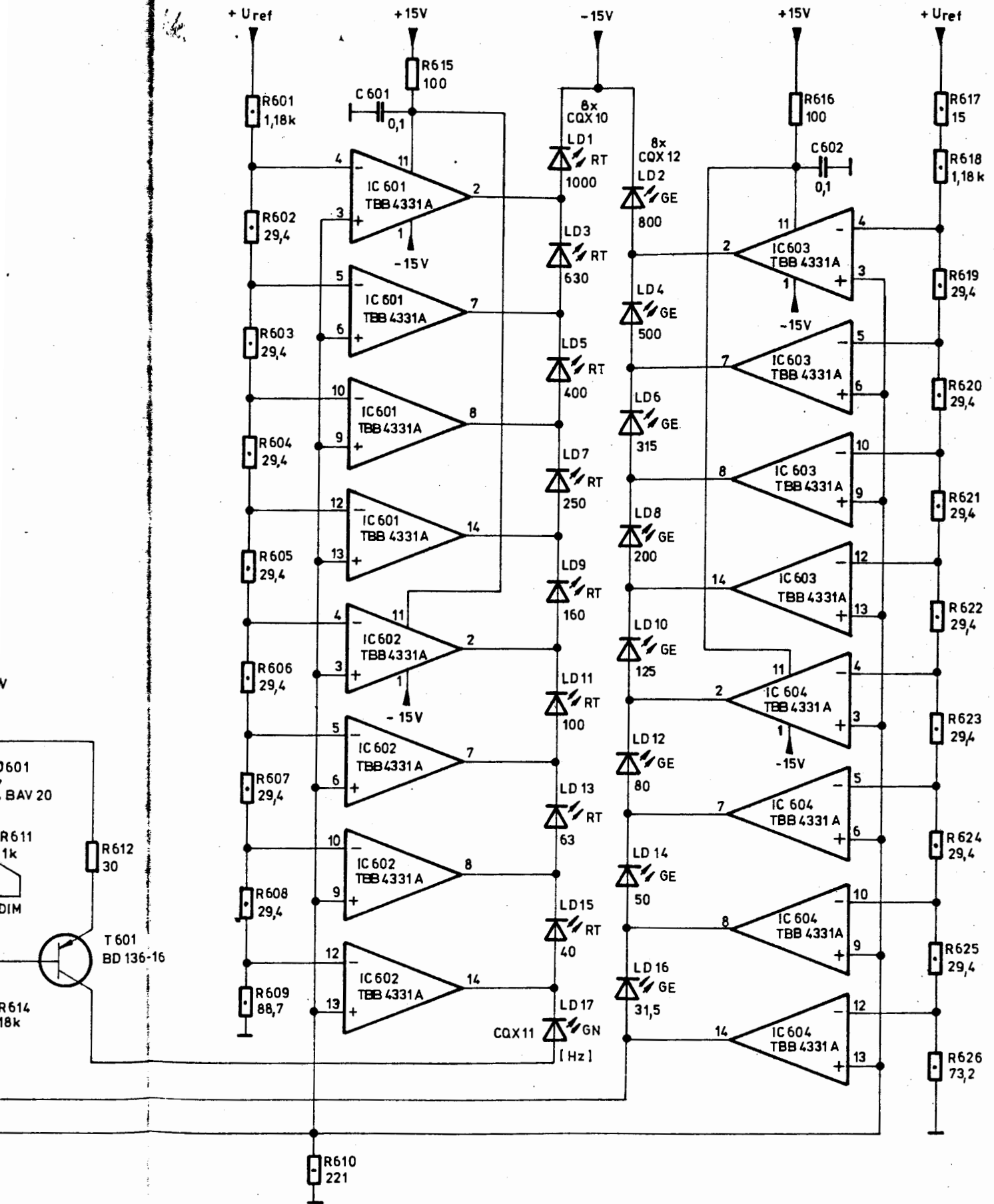




VAB 84-B; DISPLAY + CONTROL
2 167990101 BI. 2



VERTICAL
CUT OFF
FREQUENCY

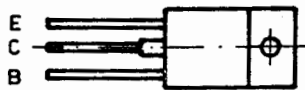
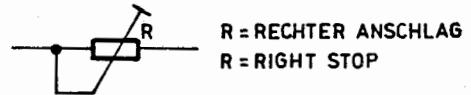
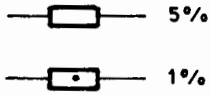


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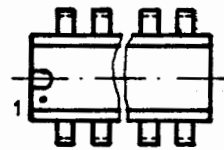
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BEI ERSATZTEILBESTELLUNG BITTE
GERÄT NR. U. POS.-ZAHLEN ANGEBEN
FOR REPLACEMENT PLEASE ALWAYS
GIVE SERIAL & PART NO.



BD 136-16



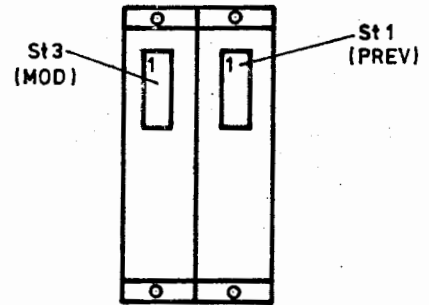
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LF 353
LM 311
14 POL.: TBB 4331 A
4012
16 POL.: 4060

VON OBEN GESEHEN
TOP VIEW



LM 329

AUF DIE STIFTE GESEHEN
PIN VIEW



RÜCKANSICHT
BACK VIEW

VERTIKAL AMPLITUDEN BEGRENZER VAB 84
VERTICAL AMPLITUDE LIMITER VAB 84

2 167990103 BI. 2



GEORG NEUMANN GMBH
BERLIN

8.4.86 Te. *Hein*