



LIMITER AMPLIFIER 179-280C
INSTRUCTION MANUAL

179-2810-C-4

Limiter amplifier
179-280 C
(Europa card)

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Supply Voltage	24V dc $\pm 10\%$
Max. Ripple Voltage	0,1V pp 50Hz - 20KHz
Current Consumption, no signal	approx. 70mA
Current Consumption, during heat up	approx. 250mA in 45 secs.
Temperature Range	-20°C - +60°C
Frequency Response	20Hz - 20KHz $\pm 0,5$ dB
Input Impedance, 20Hz - 20KHz	22K Ω $\pm 15\%$ balanced floating
Output Impedance, 20Hz - 20KHz	< 40 Ω balanced floating
Minimum Load Impedance	200 Ω
Limiting Threshold ref. to Output	+6dBu $\pm 0,5$ dB <u>Note 1.</u>
Gain below Limiting Threshold	0dB $\pm 0,5$ dB
Limiting Range	15dB
Input Overload Level	+21dBu (8,6V rms, sine)
Distortion, 40Hz - 20KHz	< 0,5% (static conditions)
Attack Time, <u>Note 1.</u>	see curve 179-2615-A-4
Recovery Time, depending on magnitude and duration of input signal.	see curves 179-2512/13-B-4
Control Voltage Output <u>Note 2.</u>	1V dc per 5dB gain reduction.
Control Current Output for Instrument	0,25mA dc per 5dB gain reduction. Instrument 1mA FSD, R _i = 150 Ω gives limiting indication 0-20dB (Linear dB scale)
Limits Indicator Output (LED)	10mA
Noise ref. to output flat RMS (Δf 23kHz)	-73dBu
Frequency dependent Lim. Threshold	Time constant 50 μ sec $\pm 10\%$
Mechanical dimensions	"Europa Card" 160x100 mm.
	DIN 41612 Connector

Note 1.

The output limiting level stated above applies to steady state conditions. Peaks shorter than the attack time will be limited at a level max. 2dB above steady state conditions.

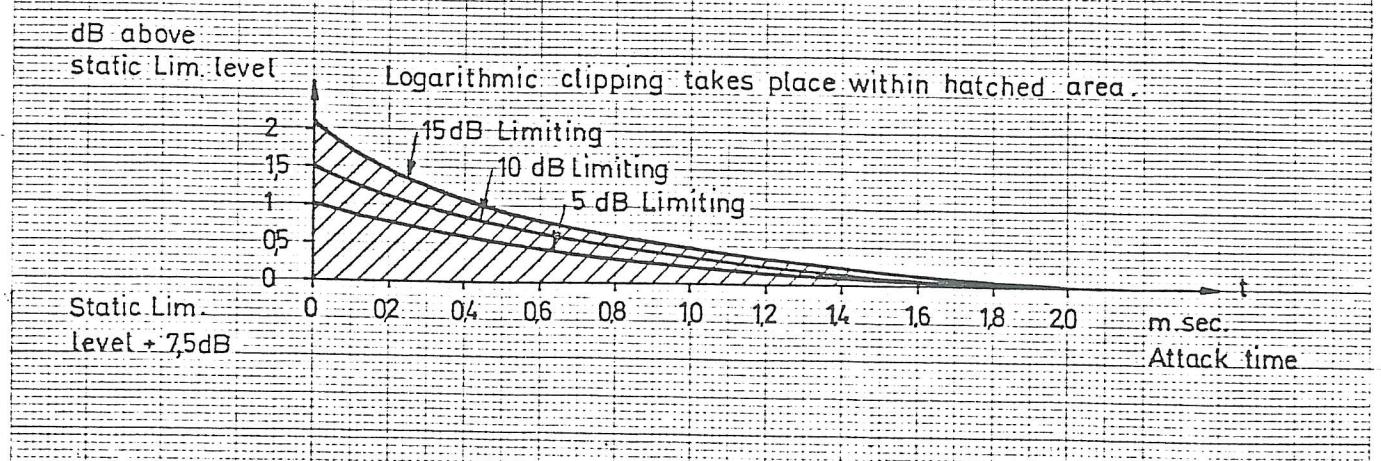
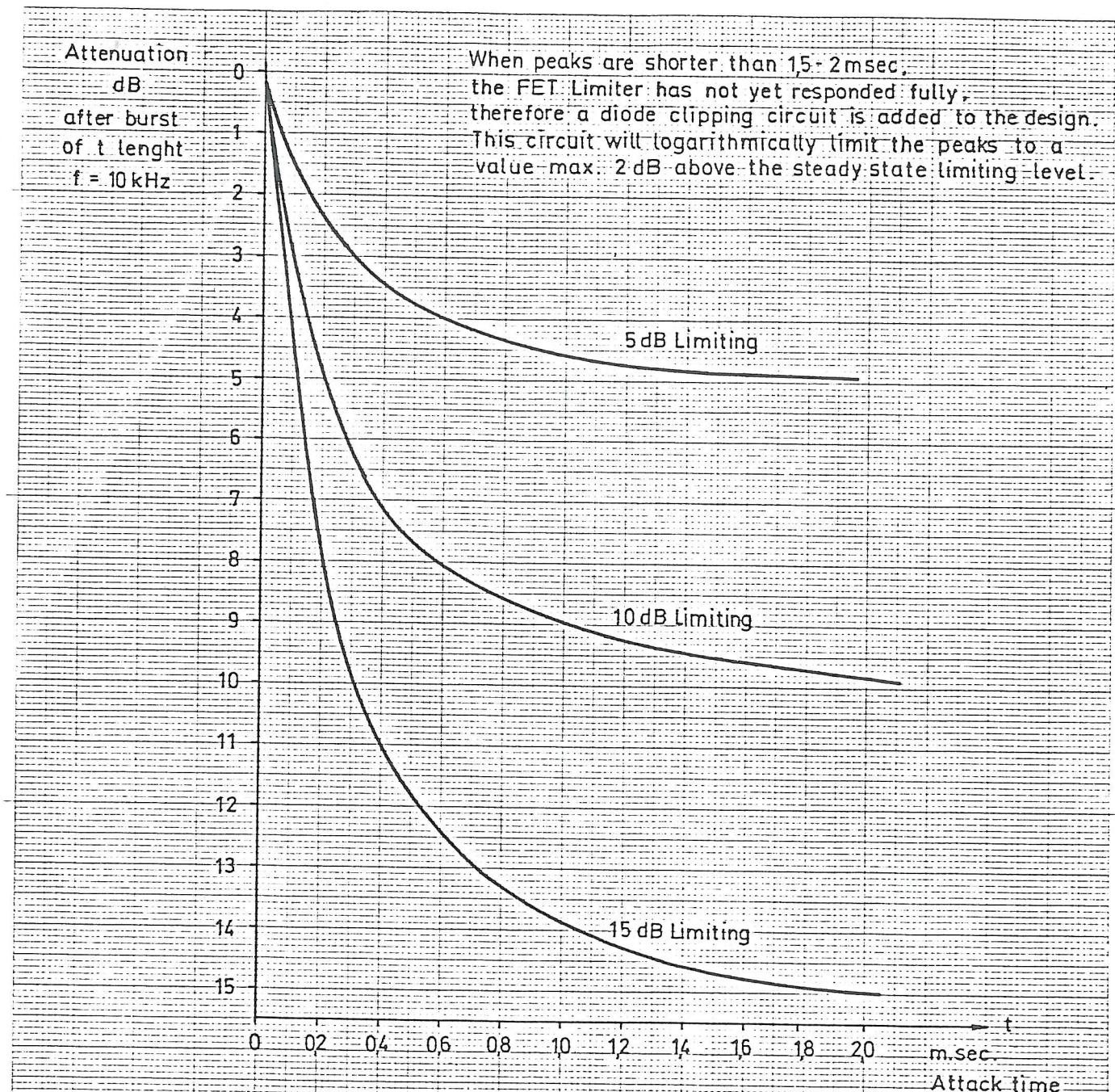
Note 2.

The control voltage of two units may be linked together, to obtain equal gain reduction in the two stereo channels. In this mode terminals 28 "Stereo Control Voltage" and 9 "12V adj." of the two limiters are parallel connected.

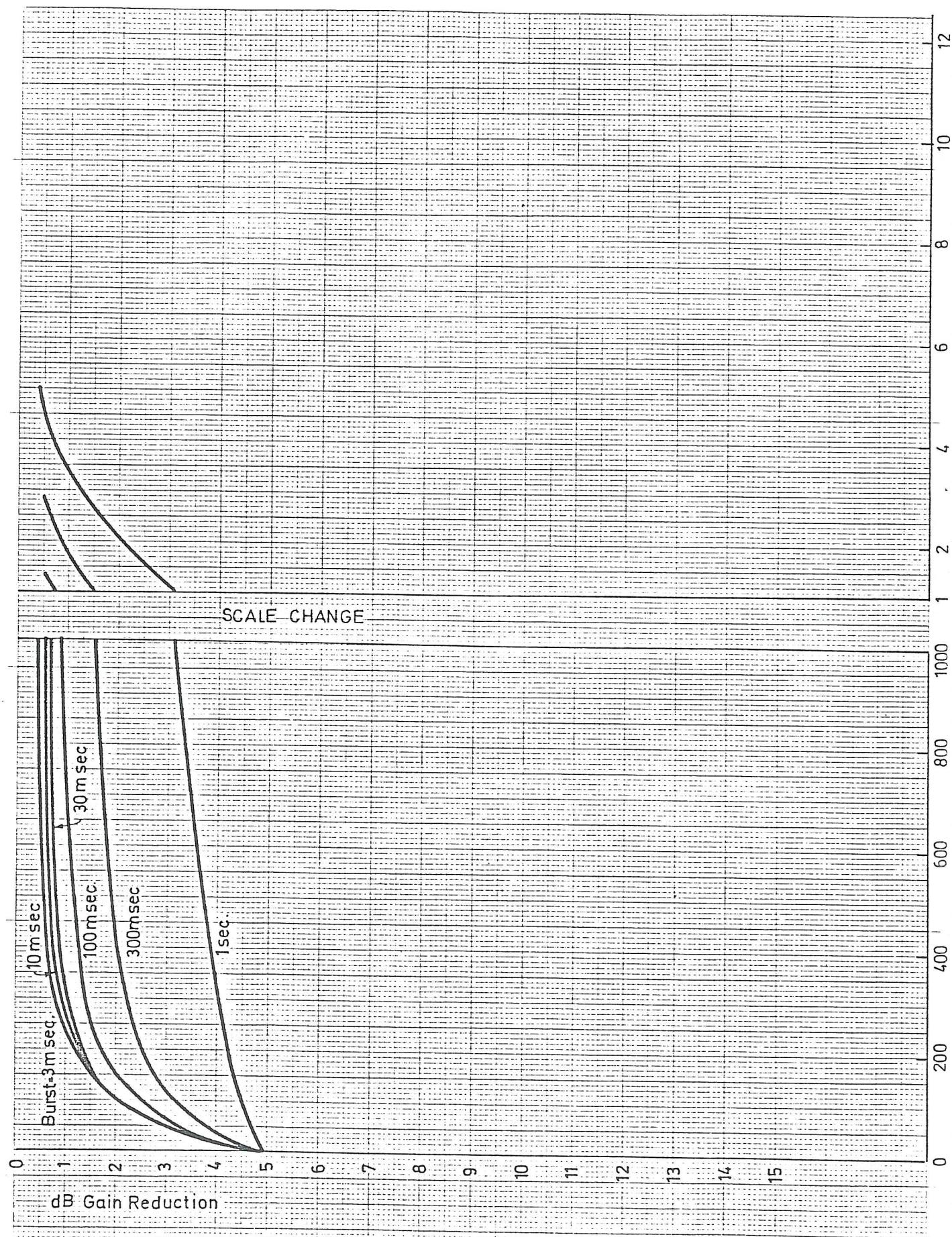
32-pole Euro-card connector:

Terminal a1	Input 0°
" c2	Input 180°
" a9	12V adj.
" c14	 LED indicator output
" a15	
" a19	Output 0°
" c20	Output 180°

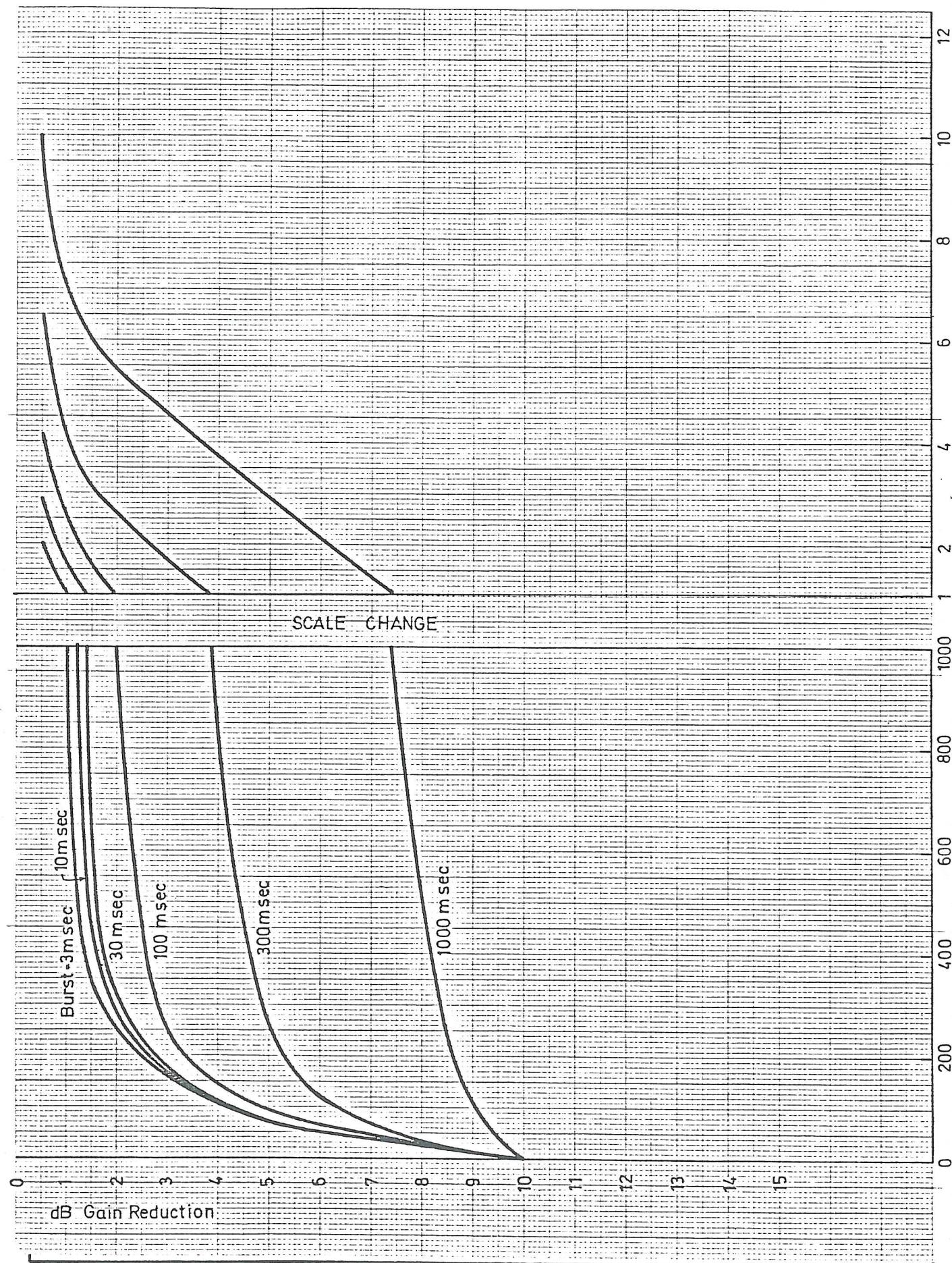
Terminal 26	Meter output negative.
" a27	Meter output positive.
" c28	Stereo Control Voltage.
" a29	+24V Supply Voltage.
" a31	0V Supply Voltage.
" c32	Chassis



Pos.:	Antal:	Materiale:	Behandl.:	Del af:			
Målestok							
Tolerance: \pm mm							
Tegnet : 19.11.73 IW							
Godkendt:		Limiter Amplifier 179-260, Euro Card					
Revideret :		Attacktime Characteristics					
NTP N. TØNNES PEDERSEN A/S							
179-2615 - A - 4							



Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: \pm mm				
Tegnet : 19.6.73 IW				
Godkendt: 1/5-74 B.M.				
Revideret :				
Limiter Amplifier 179-250-B Recovery Characteristics at 5dB Gain Reduction Tone burst 5kHz 3ms to 1000ms				
NTP N. TØNNES PEDERSEN A/S				
179-2512-B-4				



Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: \pm mm				
Tegnet : 19.6.73 IW				
Godkendt: 1/5-74 B.M.		Limiter Amplifier 179-250-B		
Revideret :		Recovery Characteristics at 10dB Gain Reduction.		
		Tone burst 5kHz 3ms to 1000ms		
				NTP N. TØNNES PEDERSEN A/S
				179-2513 - B - 4



Normally the Limiter Amplifier will stay correctly adjusted, except when a component has failed and has been replaced; then it may be necessary to make certain adjustments. Before attempting to make any adjustments, note the permissible indication errors stated in Technical Specifications.

The functions of the trimpotentiometers are as follows:

- P1 Bias adjustment of Op. amp A1

P2 Compensates for individual pinch-off of the F.E.T.(Q1)

P3 Compensates for individual slope $\frac{\Delta R_{SD}}{\Delta V_{GD}}$ of the F.E.T.

P4 Linearity adjustment of the FET Attenuator circuit.

P5 Adjustments for minimum distortion of the FET Attenuator.

Do not attempt to make any adjustments until the current consumption has fallen to a steady level approx. 70 mA after 60 sec. Correct sequence of adjustments is as follows:

a. Bias adjustment of Pl

Conditions: No input signal.

Connect a DC voltmeter (or DC-oscilloscope sens. approx. 20mV/div.) between TP3 and TP2.

T₁ is adjusted until the voltage measured is the same whether T₁ is connected to terminal T₂ or not.

b. Pinch-off adjustment of P2

Conditions: Input signal +6dBu 1kHz.

P2 is adjusted until the output voltage is +6dBu (0dB amplification).

The adjustment range can be altered by connecting or disconnecting R30 and / or R31.

c. Slope dB/V and Linearity adjustment of P3 and P4

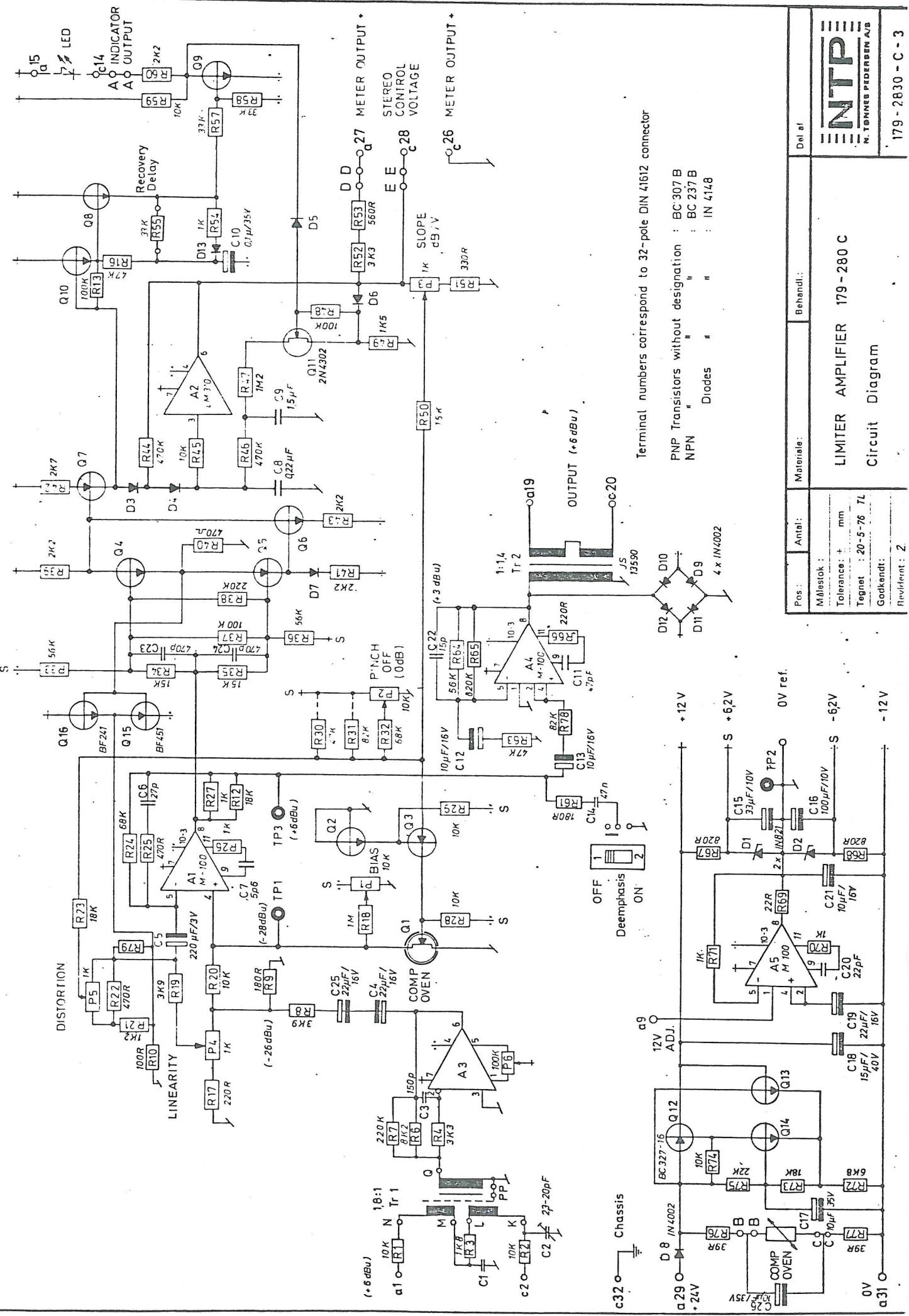
Conditions: Like referred under pos. b.

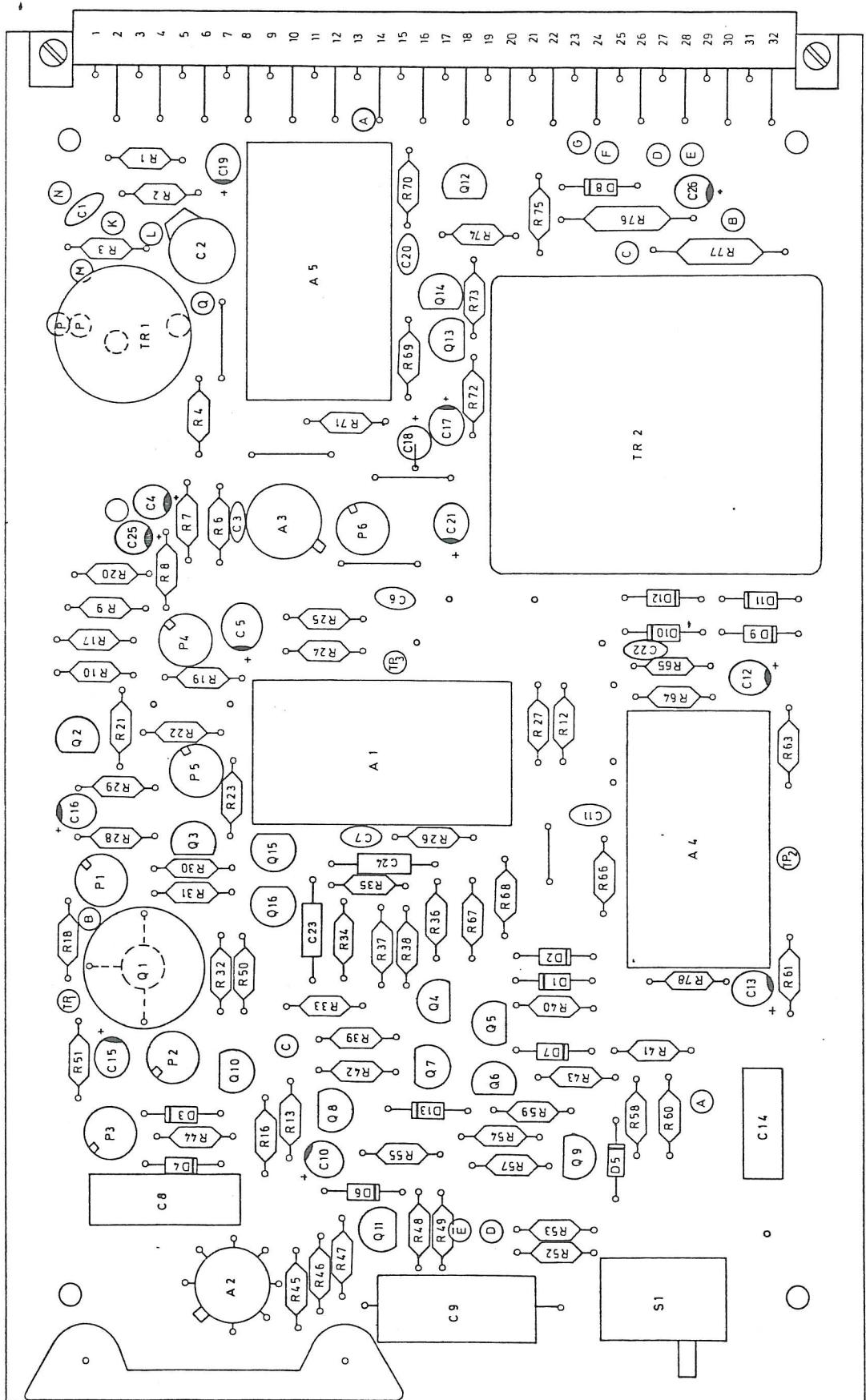
A floating external DC-source 0-6 V is connected between terminal c26 and c28, terminal c28 positive. The DC voltage is set to 3.0 Volt, and P3 is adjusted so that the output level is -9dBu (15dB Attenuation). Now the DC voltage is set to 6.0 Volt, and P4 is adjusted until the output level is -24dBu (30 dB attenuation). Because of mutual dependence between P3 and P4 the adjustments are repeated until correct output level is obtained.

e. Distortion adjustment of P5.

Conditions: Input signal +21dBu 1KHz.

P5 is adjusted to minimum distortion. Because of interaction between P5 and P2, the adjustment mentioned under pos. b might be carried out once more.





Pos.	Anzahl	Material:	Behandl.	Detai
Milestok		LIMITER	AMPLIFIER	NTP
Tolerance :	± mm	179 - 280 C		NTP ELEKTRONIK A/G
Teiget 28.12.77. TL		Component	Lay-out	
Gedruckt:				179 - 2841 - C-3
Revidiert:	/			

Component Lay-out

179 - 2841 - C-3

ISSUED: 27.10.1975 HB/sh
DATE/SIGN.

POS. DESIGN REF.	ANT/ QTY	BETEGNELSE/DESCRIPTION					LEV. FABRIKAT	SUPPL. MANUFACT.
R1		Resistor	10K	5%		1/8W	Resista	SK2
R2	"		10K	"		"	"	"
R3	"		1K8	"		"	"	"
R4	"		3K3	"		"	"	"
R5	"		not used	"		"	"	"
R6	"		8K2	"		"	"	"
R7	"		220K	"		"	"	"
R8	"		3K9	"		"	"	"
R9	"		180R	"		"	"	"
R10	"		100R	"		"	"	"
R11	"		not used	"		"	"	"
R12	"		18K	"		"	"	"
R13	"		100K	"		"	"	"
R14	"		not used	"		"	"	"
R15	"		not used	"		"	"	"
R16	"		47k	"		"	"	"
R17	"		220R	"		"	"	"
R18	"		1M	"		"	"	"
R19	"		3K9	"		"	"	"
R20	"		10K	"		"	"	"
R21	"		1K2	"		"	"	"
R22	"		470R	"		"	"	"
R23	"		18K	"		"	"	"
R24	"		68K	"		"	"	"
R25	"		470R	"		"	"	"
R26	"		1K	"		"	"	"
R27	"		1K	"		"	"	"
R28	"		10K	"		"	"	"
R29	"		10K	"		"	"	"
R30	"		47K	"		"	"	"
R31	"		82K	"		"	"	"
R32	"		68K	"		"	"	"
R33	"		56K	"		"	"	"
R34	"		15K	"		"	"	"
R35	"		15K	"		"	"	"
R36	"		56K	"		"	"	"
R37	"		100K	"		"	"	"
R38	"		220K	"		"	"	"
R39	"		2K2	"		"	"	"
R40	"		470 Ohm	"		"	"	"
R41	"		2K2	"		"	"	"
R42	"		2K7	"		"	"	"
R43	"		2K2	"		"	"	"
R44	"		470K	"		"	"	"
R45	"		10K	"		"	"	"
R46	"		470K	"		"	"	"
R47	"		1M2	"		"	"	"
R48	"		100K	"		"	"	"
R49	"		1K5	"		"	"	"
R50	"		15K	"		"	"	"
R51	"		530R	"		"	"	"
R52	"		3K5	"		"	"	"



Limiter Amplifier 179-280C

STYKLISTE/PARTS LIST

Pag 1 / (3)

No : 179-2831-C-4

ISSUED: 27.10.1975 HB/sh
DATE/SIGN.

ORR.: 1

POS. DESIGN. REF.	ANT. /QTY	BETEGNELSE/DESCRIPTION					LEV. FABRIKAT	SUPPL. MANUFACT.
R53		Resistor	560R	5%	1/8W		Resista	SK2
R54		"	1k	"	"		"	"
R55		"	33k	"	"		"	"
R56		"	not used	"	"		"	"
R57		"	33k	"	"		"	"
R58		"	33k	"	"		"	"
R59		"	10K	"	"		"	"
R60		"	2K2	"	"		"	"
R61		"	180R	"	"		"	"
R62		"	not used	"	"		"	"
R63		"	47K	"	"		"	"
R64		"	56K	"	"		"	"
R65		"	820K	"	"		"	"
R66		"	220R	"	"		"	"
R67		"	820R	"	"		"	"
R68		"	820R	"	"		"	"
R69		"	22R	"	"		"	"
R70		"	1K	"	"		"	"
R71		"	1K	"	"		"	"
R72		"	6K8	"	"		"	"
R73		"	18K	"	"		"	"
R74		"	10K	"	"		"	"
R75		"	22K	"	"		"	"
R76		"	39R	"	1/3W		Beyschlag	"
R77		"	39R	"	"		"	"
R78		"	82K	"	1/8W		"	"
C1		Ceramic cap.	not used					
C2		Trim.	2,3-20pF	9308			TEKELEC	
C3		Ceramic	"	150 pF	2222-632-70151		Miniwatt	
C4			not used					
C5		Tantal cap.	220µF/3V		ETQ5		ER0	
C6		Ceramic cap.	27p/100V	2222-632-70279			Miniwatt	
C7		" "	5p6/100V	2222-632- 57568			Miniwatt	
C8		Polyester cap.	0,22µF	B32234			Siemens	
C9		" "	1,5µF/63V	MKT1813-515/06			ER0	
C10		Tantal cap.	0,1u 35V		ETP1		"	
C11		Ceramic cap.	47pF	2222-632- 70479			Miniwatt	
C12		Tantal	"	10µF/16V	ETP2		ER0	
C13		" "	10µF/16V		"		"	
C14		Polycarbonat cap	47nF 10%	100V	MKC1862-347		0	ER0
C15		Tantal cap.	33µF/10V		ETP3		ER0	
C16		" "	100µF/10V		ETQ5		"	
C17		" "	10µF/35V		ETP3		"	
C18		" "	10µF/35V		ETP3		"	
C19		" "	22µF/16V		ETP3		"	
C20		Ceramic "	22pF	2222-632-70229			Miniwatt	
C21		Tantal "	10µF/16V		ETP2		ER0	
C22		Ceramic"	15p/100V	2222-632-58159			Miniwatt	
C23		Styroflex "	470p/160V	B31310-A1471-H			Siemens	
C24		" "	470p/160V	B31310-A1471-H			"	

POS. DESIGN. REF.	ANT. QTY	BETEGNELSE/DESCRIPTION	*LEV. FABRIKAT	SUPPL. MANUFACT.
P1 P2 P3 P4 P5 P6		Trim potentiometer " " 10K 3329H-103 " " 10K 3329H-103 " " 1K 3329H-102 " " 1K 3329H-102 " " 1K 3329H-102 " " 100K 3329H-104	Bourns " " " " " "	
D1-D2 D3-D7 D8-D12 D13	2 5 5	Ref. diode Si. diode " " " "	1N821 1N4148 1N4002 1N4148	Bourns
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8-Q10 Q11	3	FET Transistor " " " " " " " FET	Si 216 N BC237B BC307B BC237B BC307B BC237B BC307B BC237B 2N4302	NTP Siemens " " " " " " " Amelco
Q12 Q13-Q14 Q15 Q16		Transistor " " " "	BC327-16 BC237B BF451 BF241	Siemens " " " "
A1 A2 A3 A4 A5 Tr1 Tr2		Op. Amp. " " " " " " " " Transformer "	M-100 LM-310 H HA 2605-5 M-100 M-100 BV310-200-101 13590	NTP NS Harris NTP " Beyer J.S.
S1	1	Comp. oven Switch Screen plate Printed Circuit Board Connector STV-P-332-M-9722-303-613 pin layout A1,3,5---31,B2,4,6,...32 Mating connector: STV-N-332-M-9722- 313-616	5 ST 1-2 C42315-A-60-A-2 179-2850 179-2840 ;	Jermyn Siemens NTP " ERNI " ;
NTP NTP ELEKTRONIK A/S		Limiter Amplifier	179-280C	STYKLISTE/PARTS LIST Pag. 3 / (3) No.: 179-2831-C-4