

NTP

179-4710-A-4

DUAL LIMITER

179-470

Contents:

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Switch Board	Diagram Components Layout Parts List	179-4732-A-4 179-4743-A-4 179-4733-A-4

Limiter 179-400E/F, see instruction manual enclosed for Limiter 179-400E/F.

1/140591.

NTP Elektronik A/S
Knapholm 7
DK-2730 Herlev, Denmark

Telephone: + 45 44 53 11 88
Telefax: + 45 44 53 11 70
Telex: 16378 ntp dk

Cable address: Electrolab
Postal account: 5 11 52 80
Reg. no.: 32426



**Dual Limiter
179-470**

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partslist	179-4731-A-3
Switch board diagram	179-4732-A-4
components layout	179-4743-A-4
partslist	179-4733-A-3

Limiter 179-400, see instruction manual for 179-400.

NTP

General:

Supply voltage	110/220V ± 15%
Current consumption	approx. 100/50mA
Fuse	200/100mA slow
Temperature range	0-45°C ambient temperature

Mechanical Data:

The instrument is housed in a 19 inch 1E cabinet.

Width (frontplate)	483 mm (19")
Width (cabinet)	429 mm
Depth (total)	268 mm
Depth (frontplate)	5 mm
Height	43.6 mm
Weight	4500 g

Audio Data:

See manual for 179-400E/F.



DUAL LIMITER 179-470
TECHNICAL SPECIFICATIONS

179-4711-A-4

General:

Supply voltage : 110/220V ±15%
Current consumption : app. 100/50mA
Fuse : 200/100mA slow
Temperature range : 0-45°C ambient
temperature

Mechanical data:

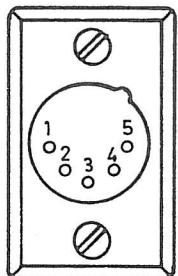
The instrument is housed in a 19-inch 1E cabinet.

Width (frontplate) : 483 mm (19")
Width (cabinet) : 429 mm
Depth (total) : 268 mm
Depth (frontplate) : 5 mm
Height : 43,6 mm
Weight : 4500 g

Audio date:

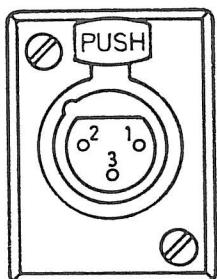
See manual for 179-400

Control voltage grouping



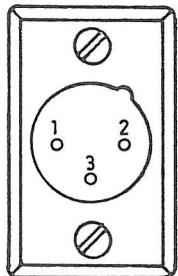
- Pin 5 NC.
4 Control voltage left channel
3 Control voltage right channel
2 Control reference
1 Shield

Input connectors

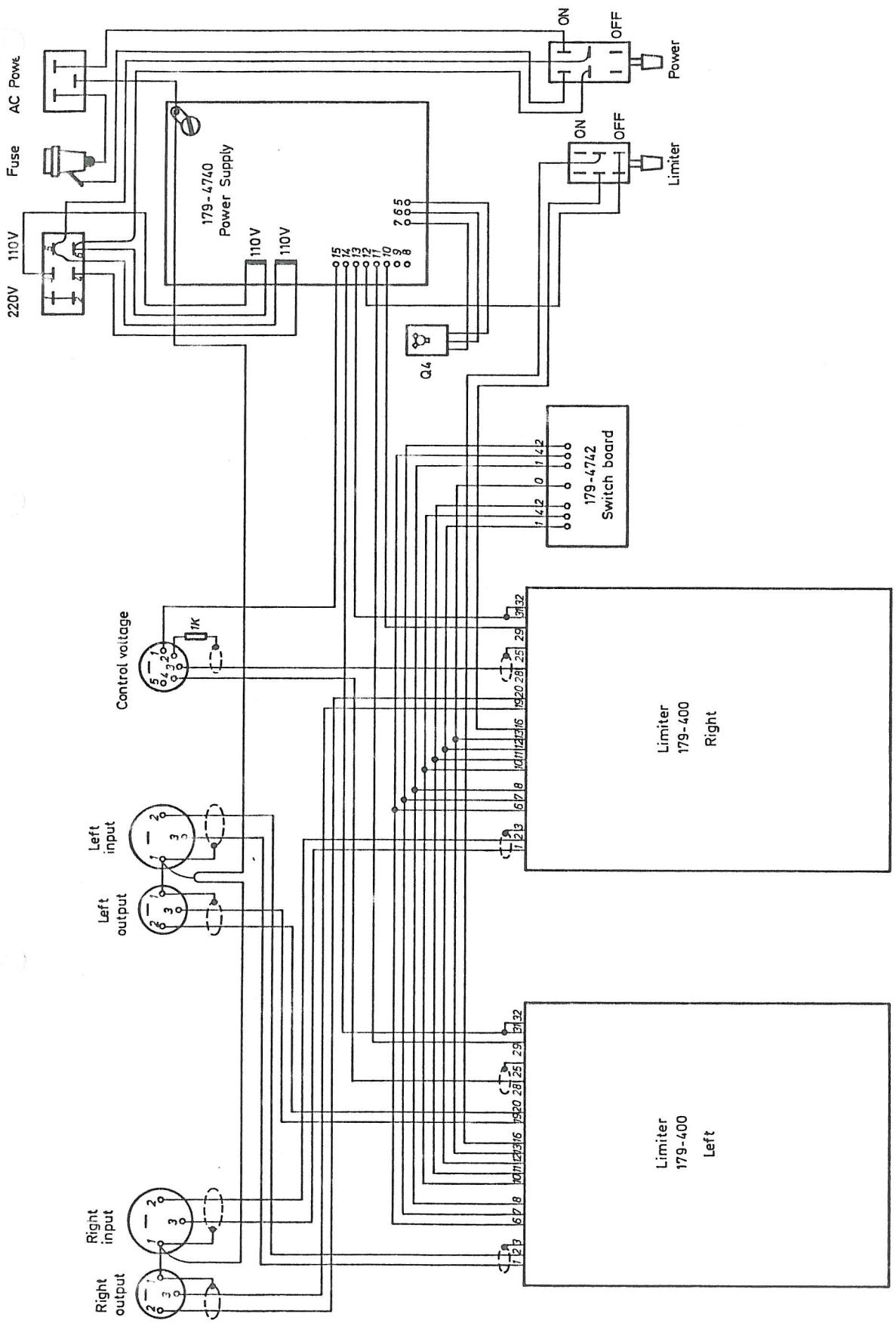


- Pin 1 Shield
2 180° } floating input
3 0° }

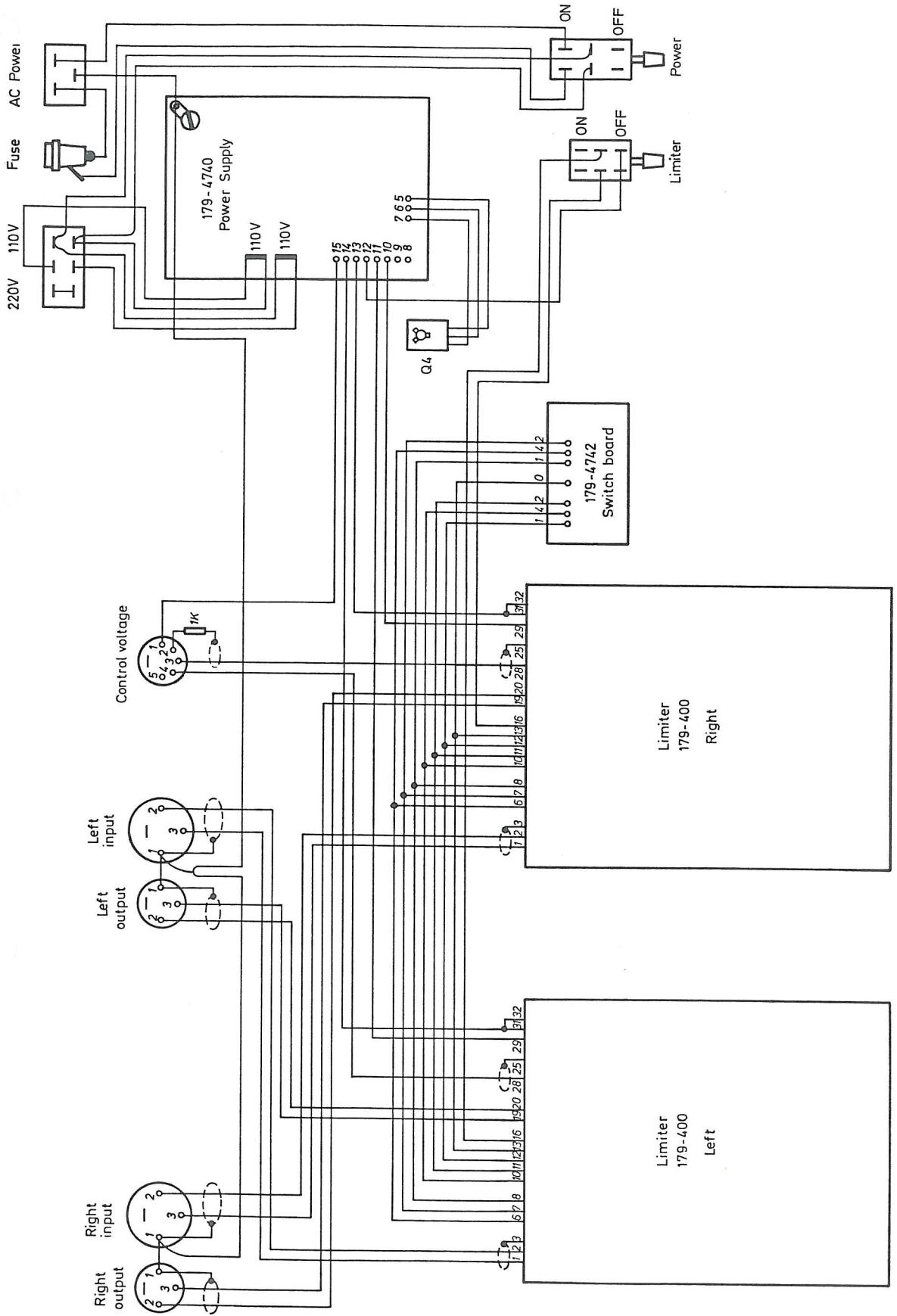
Output connectors



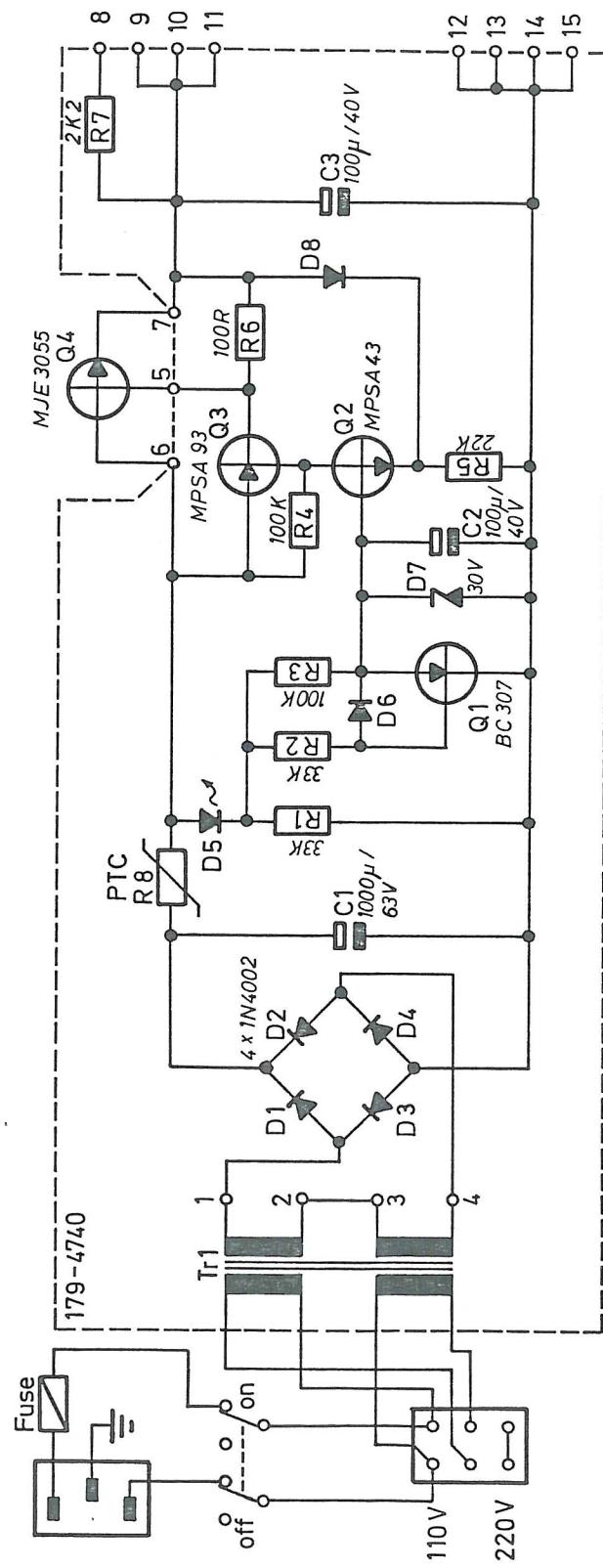
- Pin 1 Shield
2 180° } floating output
3 0° }



Pos.:	Aantal:	Materiale:	Bemärkning:	Detalj:
Målatsatok:				
Tolerans:	± mm			
Tegnat:	: 14.11.85 JL.			
Godkändt:				
Reviderat:	3/92/001			
			Dual Limiter	179-4790
			Schematic diagram	
				179-4705 - A-3



Pos.:	Antal:	Materiale:	Behandl...:	Del al
Målestok :				
Tolerans: ±	mm			Dual Limiter
Tegnet :	14.11.85 JL.			179-470
Godkendt:				Schematic diagram
Revideret:	2.			179-4705 - A-3



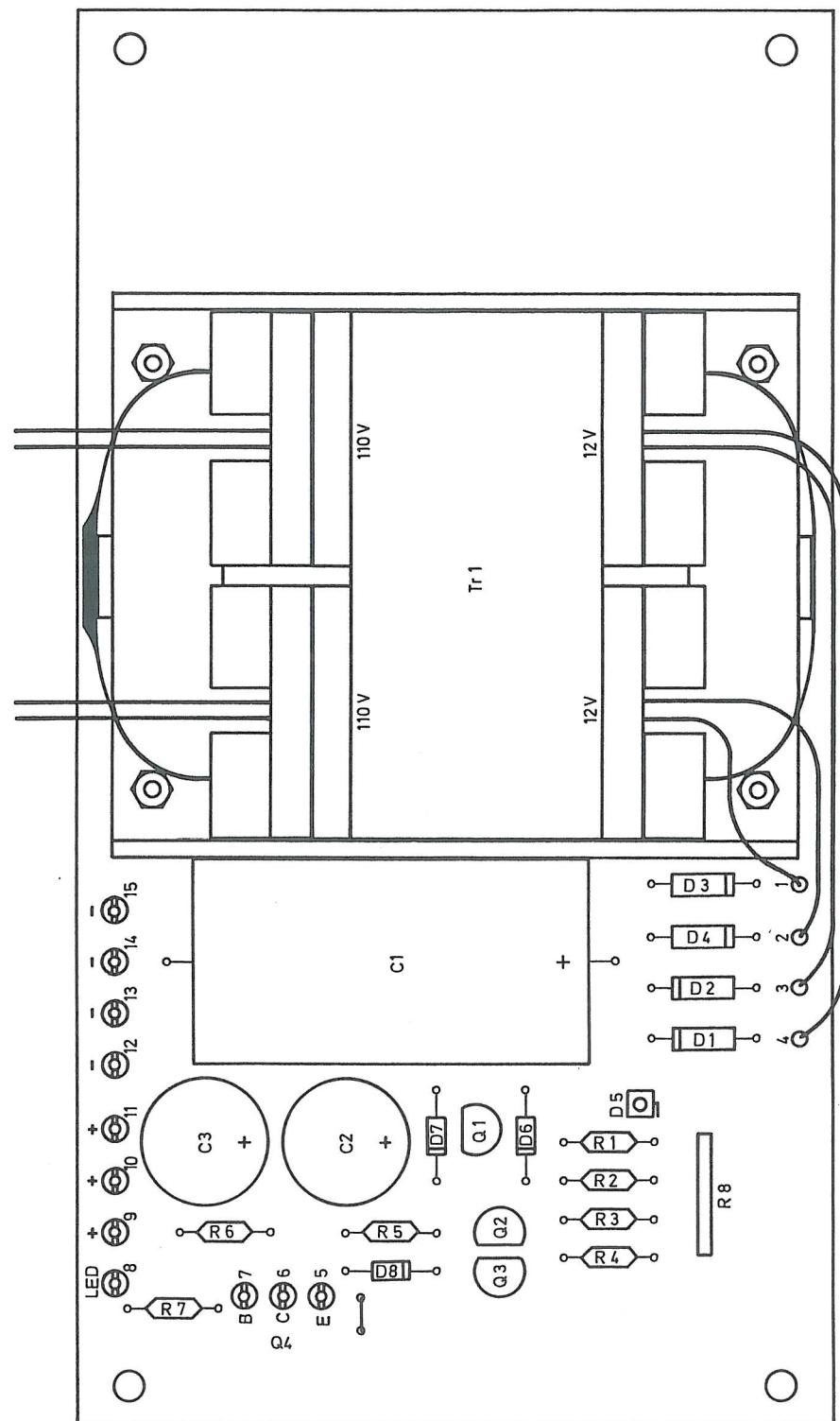
Målestok :	
Konstruktør: P. J.	
Tegnet : 30.8.83.T.L.	
Godkendt :	
Revideret :	

Dual Limiter
Power Supply
Diagram

179-470

NTP
NTP ELEKTRONIK A/S

179-4730 - A-4



Mål : 139,7 x 75,0mm

Målestok :

Konstruktør: P.J.

Tegnet : 2.9.83. T.L.

Godkendt :

Revideret : 1/931214

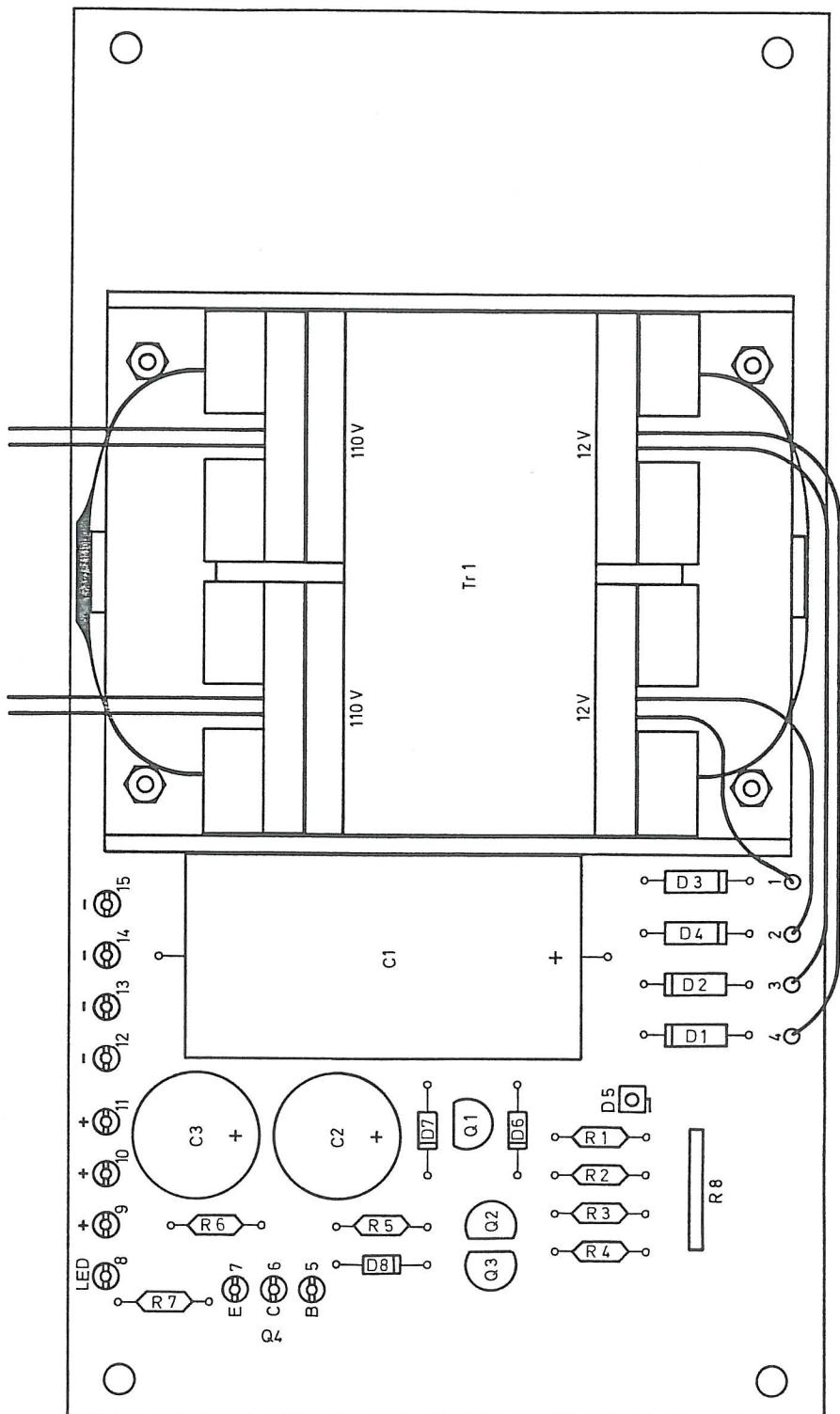
Dual Limiter 179-470

Power Supply

Component Lay-out



179-4741-A-3



Mål : 139,7 x 75,0mm

Målestok :	
Konstruktør :	P.J.
Tegnet :	2.9.83. T.L.
Godkendt :	
Revideret :	

Dual Limiter 179-470
Power Supply
Component Lay-out

NTP
NTP ELEKTRONIK A/S

179-4741-A-3

Multi 27.06.90 12: 0

PARTS LIST

179-4731

PAGE 1

NTP 179-4731 DUAL LIM.AMP., POWER SUPPLY

PARTS LIST

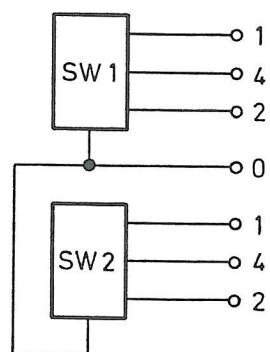
179-4731

REF. NO	NTP-ID.	DESCRIPTION	QTY	PARTS LIST	MANUFACT/DRW. NO.	PART NO.
R 6	RCA-3100	RESISTOR CARBON 100R 0.66W 5	1	MBB 0207	MBB 0207	100R
R 7	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	MBB 0207	MBB 0207	2K2
R 5	RCA-5220	RESISTOR CARBON 22K 0.66W 5%	1	MBB 0207	MBB 0207	22K
R 1	RCA-5330	RESISTOR CARBON 33K 0.66W 5%	1	MBB 0207	MBB 0207	33K
R 2	RCA-5330	RESISTOR CARBON 33K 0.66W 5%	1	MBB 0207	MBB 0207	33K
R 3	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	MBB 0207	MBB 0207	100K
R 4	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	MBB 0207	MBB 0207	100K
R 8	RTC-1370	RESISTOR PTC 3R7	1	PTC Q63100	P2390 C950	
C 1	CFE-1010	CAP ELECTROLYTIC 1000UF/63V	1	FRAKO EFJ1	EFJ1 1000UF	
C 2	CFG-0910	CAP ELECTROLYTIC 1000UF/40V	1	SIEMENS B41316	B41316 A7107	V
C 3	CFG-0910	CAP ELECTROLYTIC 1000UF/40V	1	SIEMENS B41316	B41316 A7107	V
D 5	OES-0116	LED GREEN 1x1	1	SIEMENS LD 471	Q62703-Q102	
D 1	QDS-4002	DIODE, SILICIUM	1	F-126	1N 4002	
D 2	QDS-4002	DIODE, SILICIUM	1	F-126	1N 4002	
D 3	QDS-4002	DIODE, SILICIUM	1	F-126	1N 4002	
D 4	QDS-4002	DIODE, SILICIUM	1	F-126	1N 4002	
D 6	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148	
D 8	QDS-4148	DIODE, SILICIUM	1	QDS-4148	ZPD 30	
D 7	QZD-0300	ZENERDIODE 30.0V	1	DO-35	MPSA 43	
Q 2	QBN-0043	TRANSISTOR, NPN	1	TO-92	MJE 3055	
Q 4	QBN-3055	TRANSISTOR, NPN	1	TO-90	MPSA 93	
Q 3	QBP-0093	TRANSISTOR, PNP	1	TO-92	BC307	
Q 1	QBP-0307	TRANSISTOR, PNP	1	TO-92		
TR 1	LTN-0001	MAINS TRANSFORMER 2x110:2x1	1	METRIC NT14901	NT 14901	
1	MFB-0001	WASHER 3 MM	4	HFC-9161	3MM	
2	MHT-0002	TESTPOINT	8	ASSMANN	ALP 65	
3	MMA-0030	NUT STEEL 3 MM	4	HFC 9832	DIN 934	3MG
4	MSC-3006	SCREW 3 X 6 CHUZ	4	HFC 9033	3 X 6 CHUZ	
6	QBA-0018	ISOLATION BUSH	1	DENKA	BFG-2001	
5	179-4740	P.C. BOARD	1	179-4740-A-3	179-4740	

NTP Parts Listas of date 27-6-1990.Page of .List No.: 179-4731-A-4

SLUT

PARTS LIST 179-4731



BCD Switches

attelser

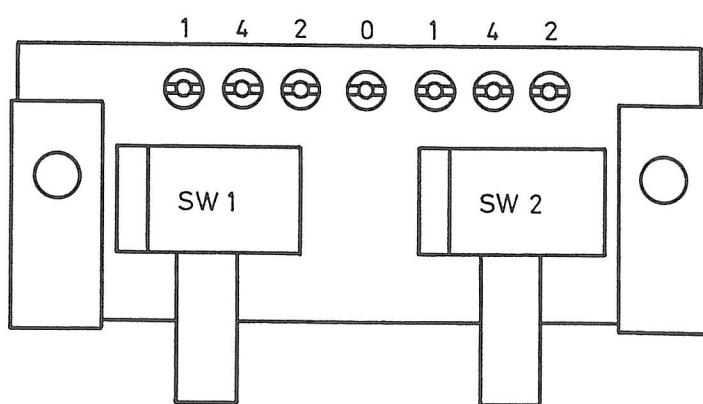
Målestok :
Konstruktør: P.J.
Tegnet : 29.8.83.T.L
Godkendt :
Revideret :

Dual Limiter
Switch board
Diagram

179-470

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179-4732-A-4



Hælser

Mål	: 45 x 81 mm
Konstruktør:	P.J.
Tegnet	: 29.8.83.T.L.
Godkendt :	
Revideret :	

Dual Limiter 179-470
 Switch board
 Component Lay-out



179 - 4743 - A - 4

Multi 29.05.90 9:22

PAGE 1

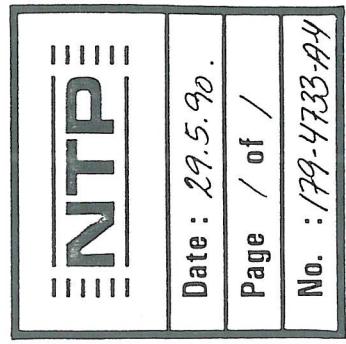
PARTS LIST 179-4733

NTP 179-4733

DUAL LIM.AMP., SWITCH BOARD

PARTS LIST

REF. NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO.	PART NO.
SW 1-2	SRB-0004	ROTARY SWITCH 9 POS YELLOW	2	HOPT & S.	422 020
2	MHT-0002	TESTPOINT	7	ASSMANN	ALP 65
3	179-4742	P.C.BOARD	1	179-4742-A-4	179-4742



Date : 29.5.90.
Page / of /
No. : 179-4733-A4

SLUT

PARTS LIST 179-4733



Limiter Amplifier

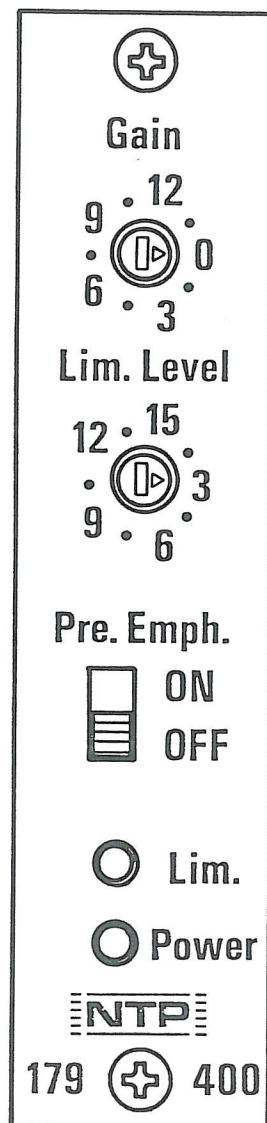
179-400A/B

Contents:

- Frontplate Lay-out
- Technical specification
- Instruction for alignment
- Schematic diagram
- Component lay-out
- Electrical partslist

Draw. No.:

- 179-4009-A-4
- 179-4011-A-4
- 179-4022-A-4
- 179-4030-A-3
- 179-4041-A-3
- 179-4031-A-3



Målestok :	2:1
Konstruktør:	P. J.
Tegnet :	9.11.81.T.L
Godkendt :	
Revideret :	

Limiter Amplifier 179-400
Frontplate Lay - out

NTP
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179-4009-A-4

The use of a high quality VCA in this limiter has made possible the use of the forward regulation principle in the side chain. This in turn is the key to achieving extremely good static as well as dynamic distortion performance. The limiter may easily be tailored by the user to almost any application as limiter threshold, as well as gain is selectable on the front edge, while the programme dependant dual time constant of the recovery function may be programmed on the connector.

The compact design (EURO-bord), the balanced floating input and output, and the wide supply voltage range only add to the versatility of the design.

Supply voltage	:	22-32 V DC
Max. ripple voltage on supply	:	300 mV p.p.
Current consumption	:	55-80 mA
Input impedance, balanced floating	:	20 kOhms $\pm 10\%$
Input CMRR (15 kHz)	:	> 60 dB
Input overload level	:	+21dBu
Output impedance, balanced floating	:	< 40 Ohms
Minimum load resistance	:	300 Ohms
Input gain, adjustable in 1,5dB steps	:	0-13,5 dB $\pm 0,3$ dB
Frequency range -0,5dB	:	20Hz - 20kHz
Distortion 40Hz - 20kHz	:	< 0,1% THD
Output noise (fig. 6), 0dB gain		
unweighted, 23kHz bandwidth	:	RMS -87dBu
weighted (CCIR 468-1, 1976)	:	Peak -76dBu
Output threshold level, adjustable		
in 1,5dB steps	:	3-16,5dBu $\pm 0,3$ dB
Limiting range	:	> 30dB
Attack time	:	1,5ms (note 1)
Recovery time (dual)	:	0,1s upon 20s
or with		
External switch T ₁ (Note 2, fig. 2-5)	:	0,1-0,2-0,4-1-2-4s
T ₂	:	off-1-2-4-10-20s
Recovery delay	:	50ms
"Bypass" control	:	Lim. function is disabled by connecting pin 16 to pin 31. Or by a switch in the E and F-versions.
Output overload level		
(Lim. function disabled)	:	+18dBu max.

Pre-emphasis on threshold level (switch-

(fig. 7) able) : 50 us or off

Control voltage slope

(stereo linking voltage) : 1V/5dB Note 3.

Meter output

: 1 mA/20 dB

Meter impedance

: < 5 kOhms

Lim.led current

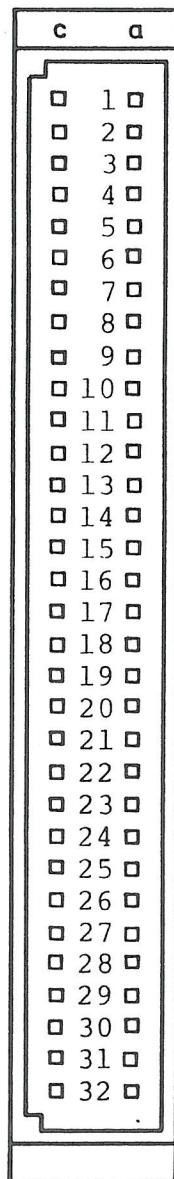
: approx. 10mA

Mechanical outlines

: 100 x 160 mm euroboard

Connector

: 64 pol. DIN pin conn.



{ 0° } input

{ 180° } input screen (-VCC)

C }
B } recovery time 2
A }

C }
B } recovery time 1
A }

-Vcc to recovery time switch

Cathode Lim.led

Anode Lim.led

Lim. off

{ 0° } output

Int.ref. (-Vcc + 9V) (Not to be used)

- } compressor meter

+ } Stereo control voltage (Ref. to pin no. 25)
+Vcc

-Vcc

Screen

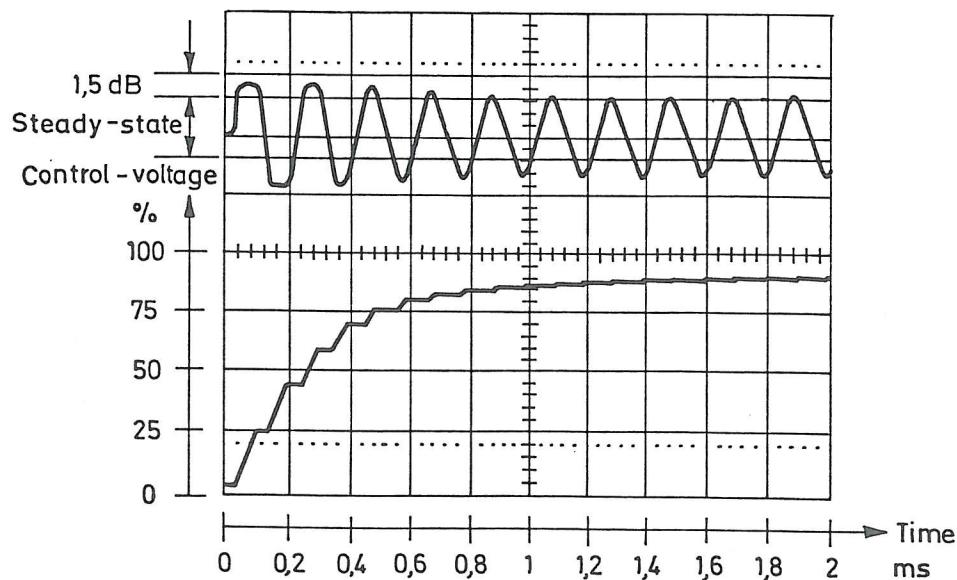
Row a and c connected in the A and E-version.

Both rows in the B and F-version connected.

Note 1:

The attack time is the period of time it takes the control voltage to reach 90% of its steady-state value, measured with 5kHz tone-bursts. Peaks shorter than 1,5 ms will be limited by a full-wave smooth clipping circuit to a value approximately 1,5dB higher than output threshold level with steady sinusodial input signal. Fig. 1.

Fig. 1: Output level and control voltage with 5 kHz tone-burst and input amplitude 10 dB above threshold level.



Note 2.

The recovery times are external switchable and follow the code below:

Recovery time 1		C	B	A
Position				
0	fixed	1	1	1
1	fixed	1	1	0
2	100 ms	1	0	1
3	200 ms	1	0	0
4	400 ms	0	1	1
5	1 s	0	1	0
6	2 s	0	0	1
7	4 s	0	0	0

Recovery time 2		C	B	A
Position				
0	fixed	1	1	1
1	fixed	1	1	0
2	off	1	0	1
3	1 s	1	0	0
4	2 s	0	1	1
5	4 s	0	1	0
6	10 s	0	0	1
7	20 s	0	0	0

Logic levels:

1 = open or 15-32V, 0 = -Vcc (max. = -Vcc +3V)

Note 3.

The control voltage of two units may be linked together to obtain equal gain-reduction.

Fig. 2 Recovery vs time and settings of T_1 .

Gain reduction

$T_2 = \text{off}$

tone-burst = 10s

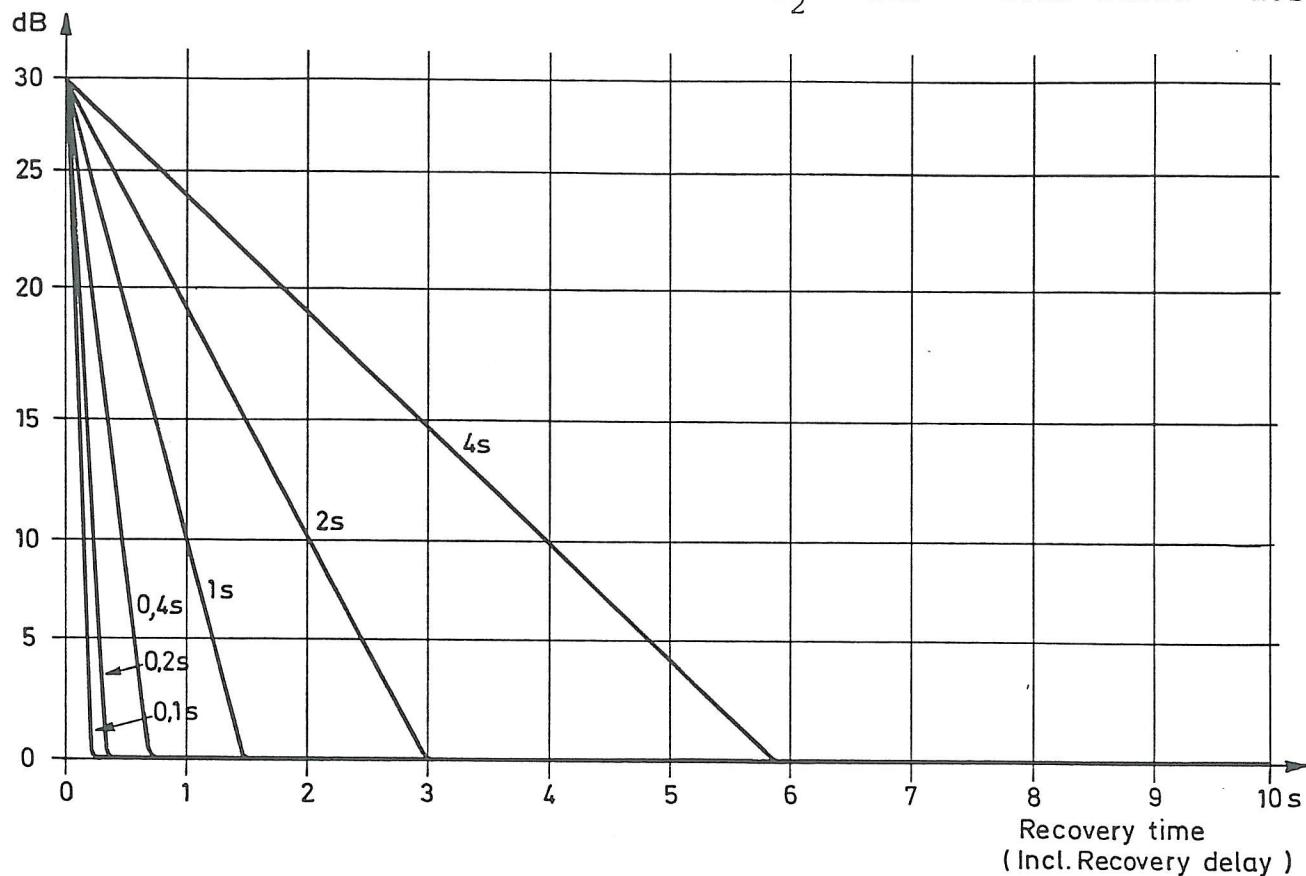


Fig. 3 Recovery vs time and settings of T_2 .

Gain reduction

$T_1 = 0,1\text{s}$

tone-burst = 10s

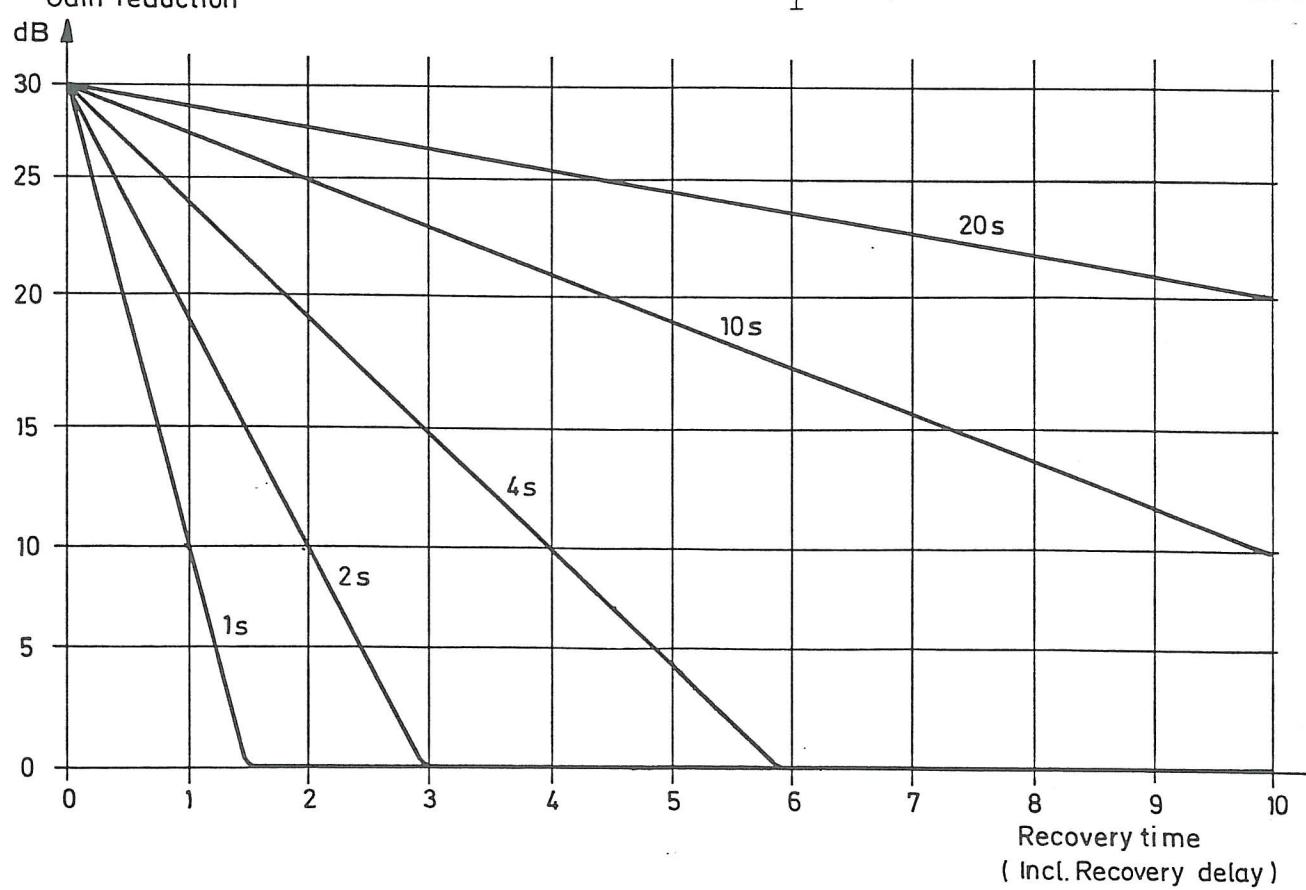


Fig. 4 Recovery vs time and tone-burst length.

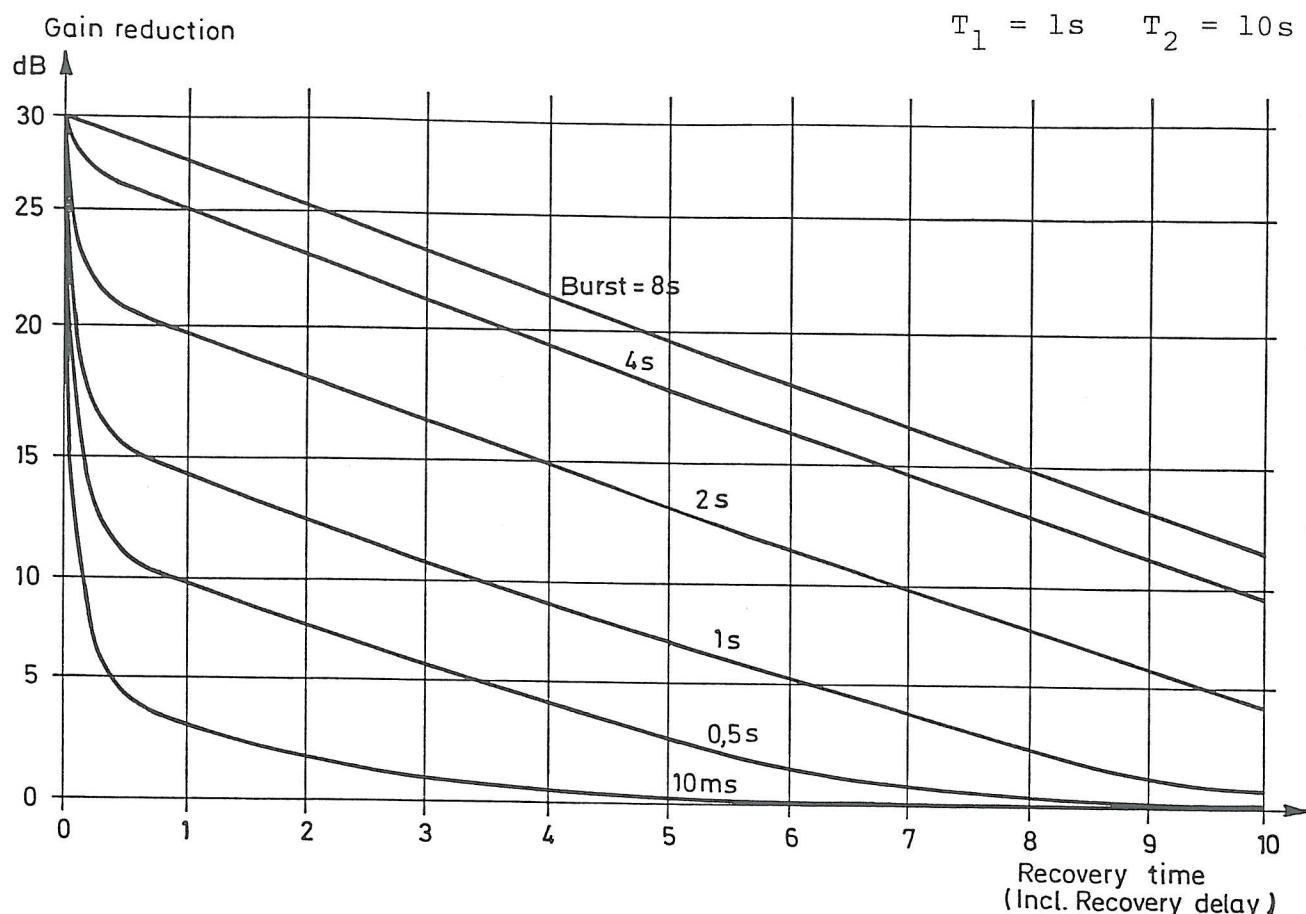


Fig. 5 Recovery vs time and tone-burst length.

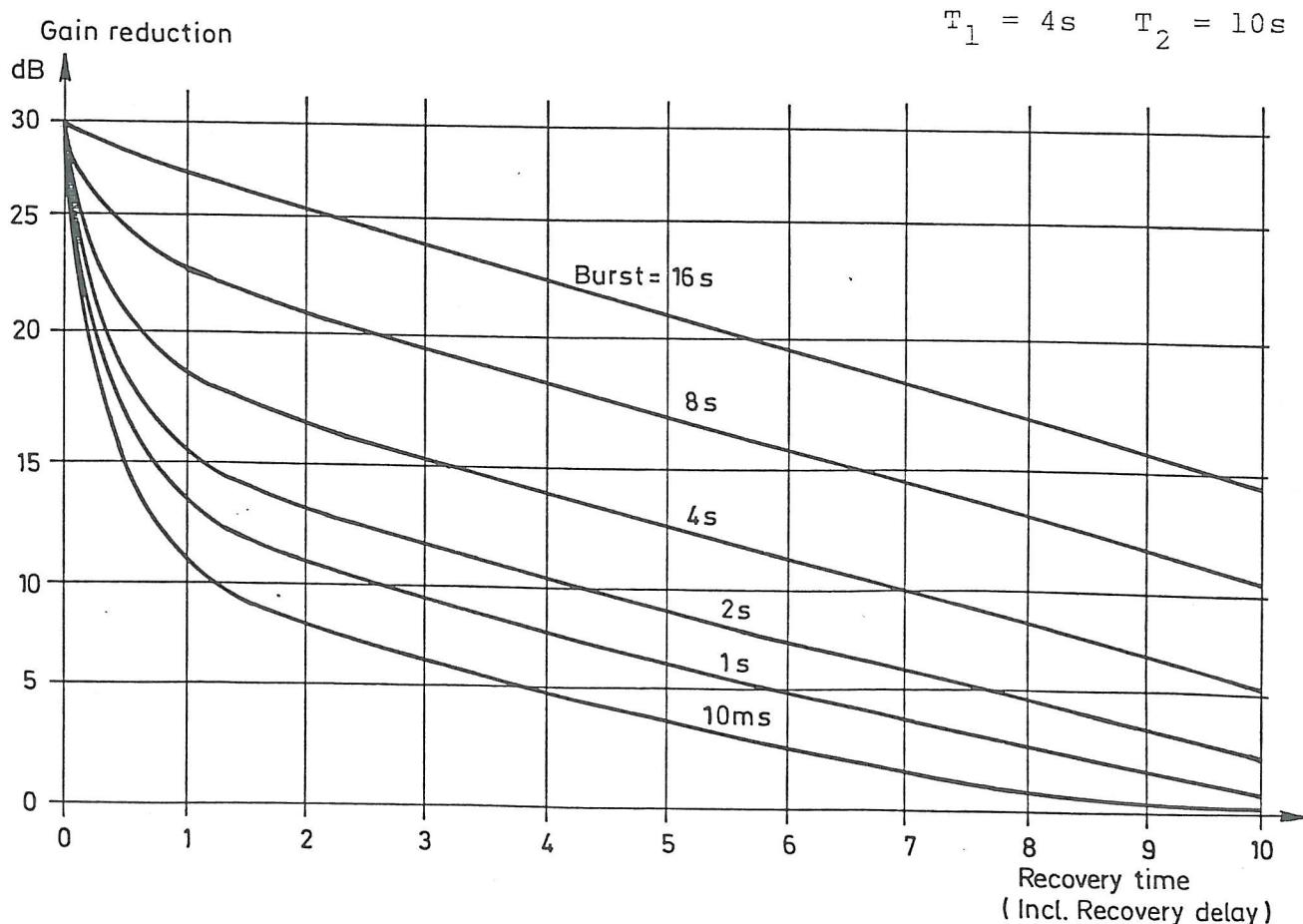


Fig. 6.

Output noise

dB_u rms

(bw 23 kHz)

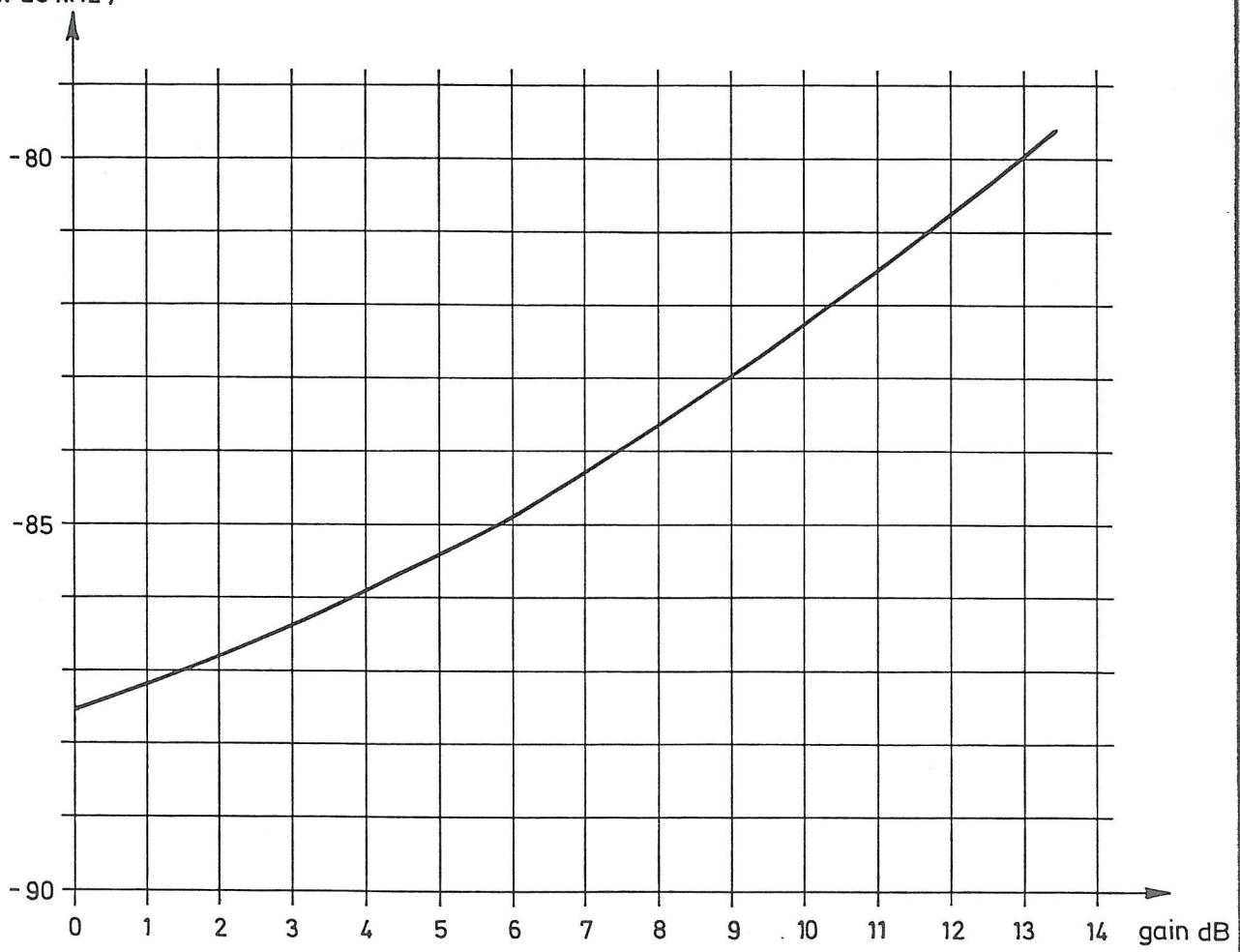
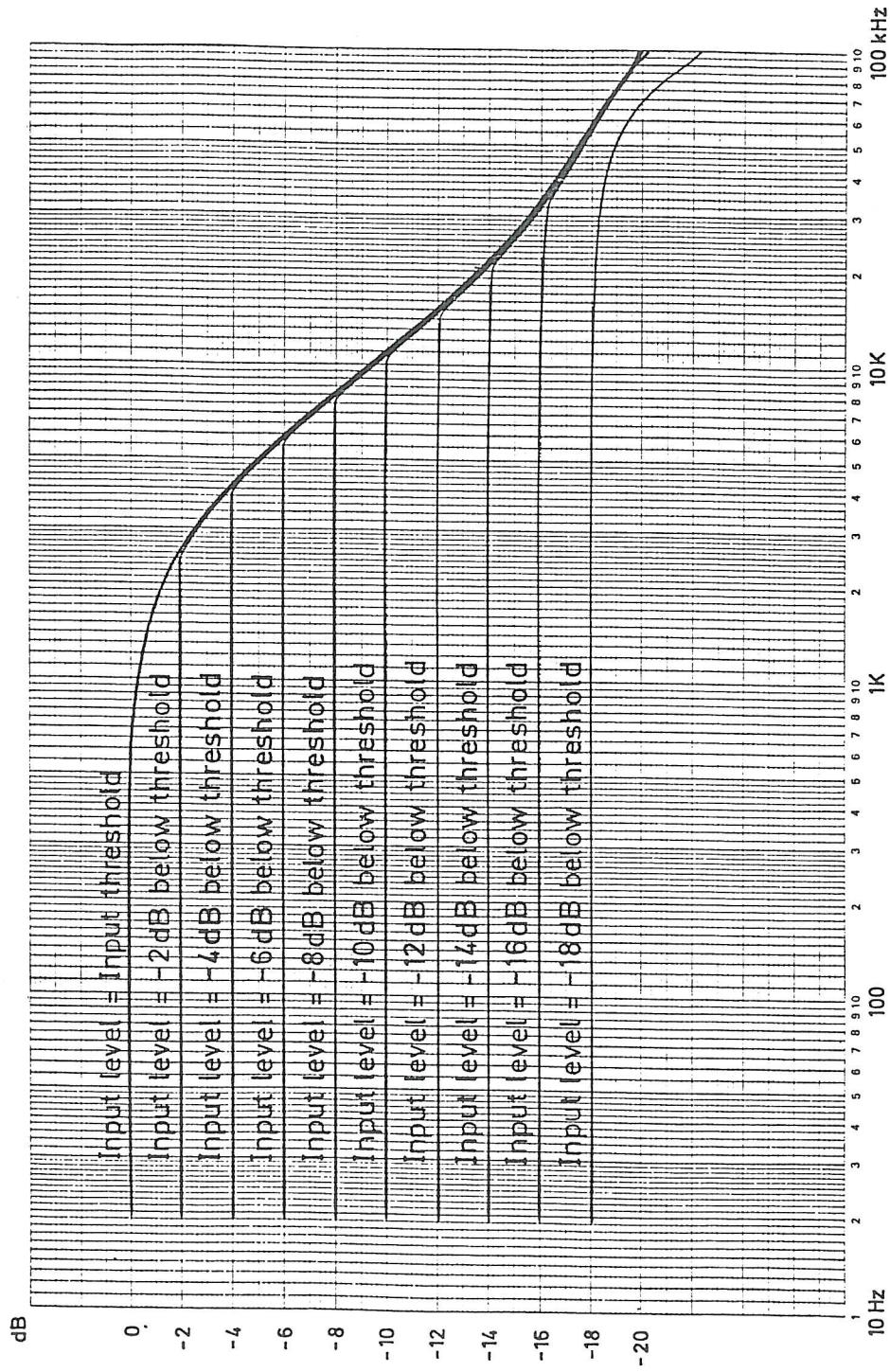


Fig. 7.
Output level (relativ to Ref. level)



Threshold level with 50 μ s pre-emphasis us. frequency and input level



LIMITER AMPLIFIER
179-400

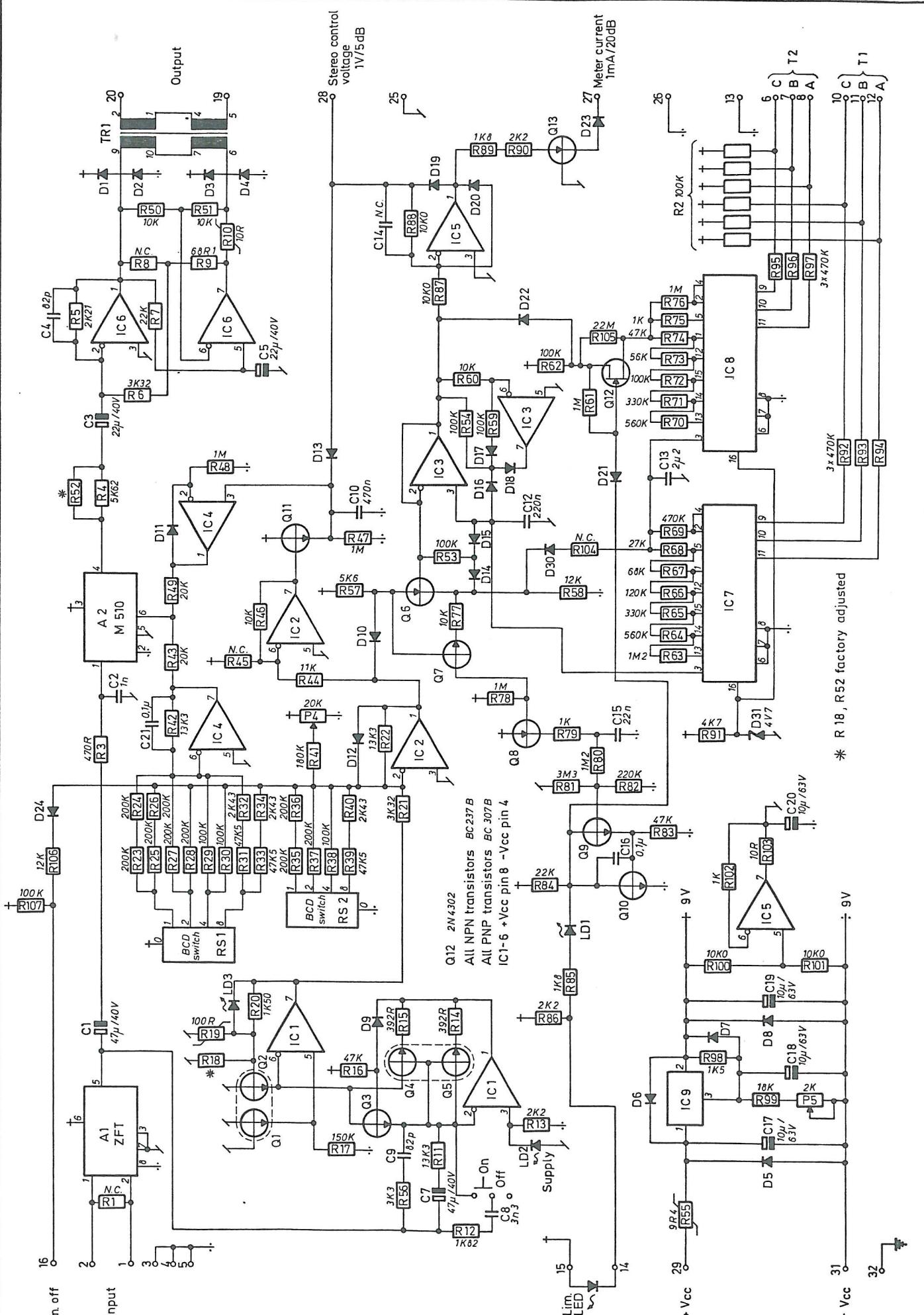
INSTRUCTION FOR ALIGNMENT

179-4022-A-4

Normally the limiter amplifier will stay correctly adjusted, except when component has failed and has been replaced; then it may be necessary to make certain adjustments.

P₅ adjusts the supply voltage, 18V ±0.1V

P₄ adjusts the limiting threshold



* R 18, R 552 factory adjusted

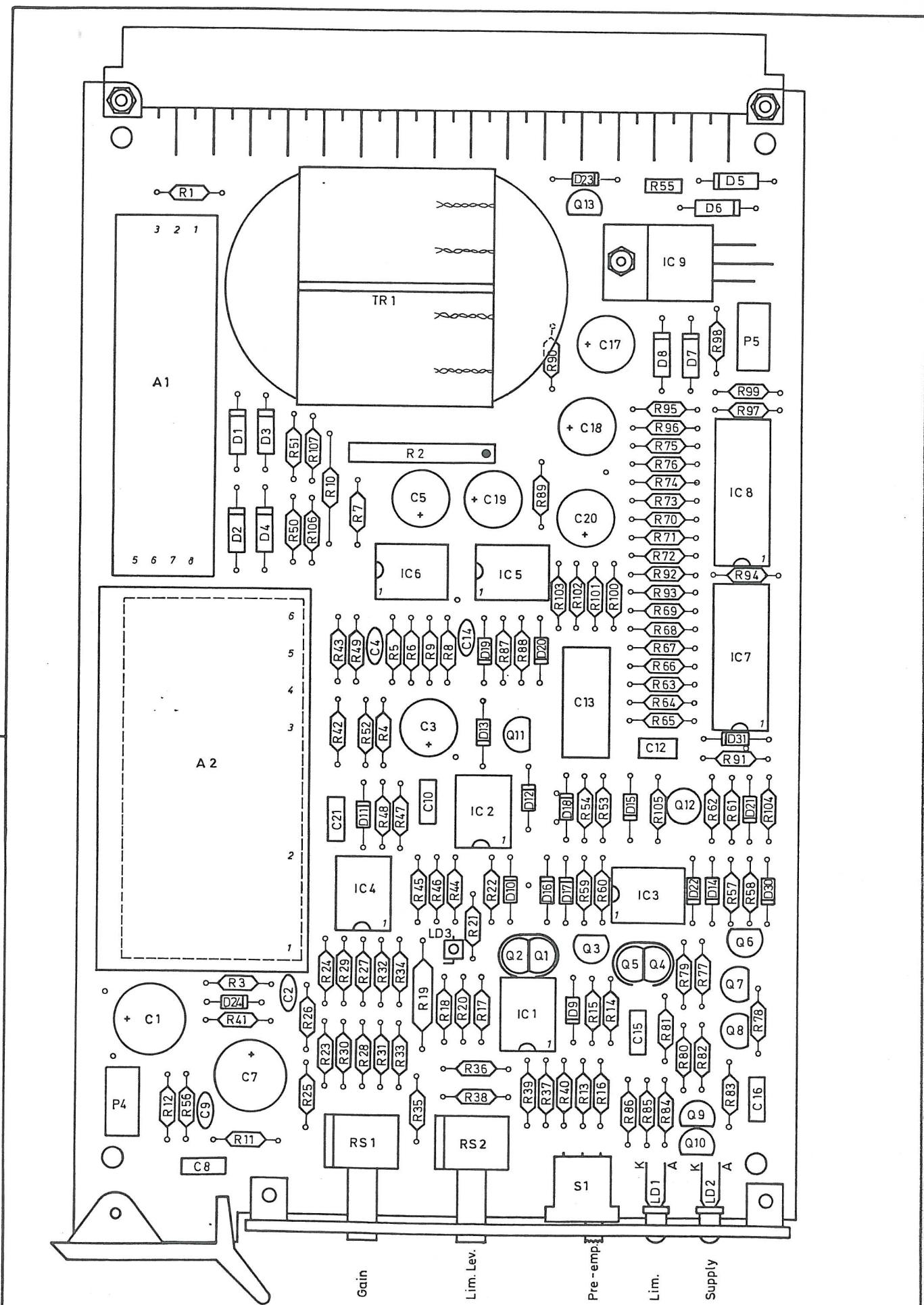
Mälestok :	
Konstruktör :	P. J.
Tegnet :	28.10.81.TL
Godkendt :	
Revidereret :	3/2.1189

Limiter Amplifier
Schematic diagram

179-400

NTP
NTP ELEKTRONIK A/B

179-4030-A-3



Mål :	100 x 160
Konstruktør:	P. J.
Tegnet :	30.10.81.T.L.
Godkendt :	
Revideret :	2

Limiter Amplifier 179-400

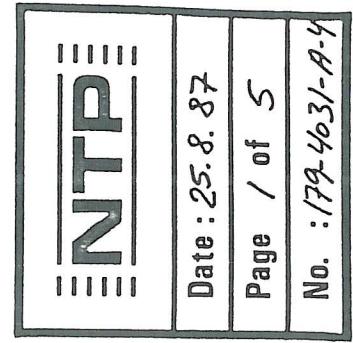
Components Lay-out



NTP ELEKTRONIK A/S

179-4041-A-3

REF. NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO. PART NO.
1	179-4040	P.C.BOARD FRONTPLATE	1	179-4040-A-3
2	179-4054	STAY FOR FRONTPLATE	1	179-4054-A-4
3	179-4051	SCREEN PLATE	2	179-4051-A-4
4	179-4053	ISOLATIONS PLATE	1	179-4053-A-4
5	179-4055	SCREENPLATE SOLDERING EOST	1	179-4055-A-4
6	179-4056	EUROCONNECTOR 64P ANGLE, MAL	1	179-4056-A-4
7	512-1151	NUT STEEL 2.5 MM	4	512-1151-A-4
8	KEM-6406-	MMA-0025	1	ELCO 8257
9		MMA-0030	2	HFC-9032
10		MSB-2003	2	HFC 9832
11		MSB-3006	4	BIX
12		MSC-2504	1	BIX
13		MSC-2510	1	SCREW 2,5 X 4 CHJ
14		MTU-2504	2	HFC 9033
15		MYA-0001	2	HFC 9040
16		ZFT-MODULE, 20K VCA MODULE	1	VERO 250-300J
A	1	CFG-0847	1	250-5241-B-4
A	2	CCA-0410	1	SIEMENS B41316
C	1	CFG-0822	1	FH 2222
C	2	CCB-0282	1	SIEMENS B41316
C	3	CFG-0822	1	SIEMENS B41316
C	4	CFG-0822	1	FH 2222
C	5	CFG-0847	1	SIEMENS B41316
C	6	CKK-0433	1	SIEMENS B41316
C	7	CCB-0282	1	FH 2222
C	8	CKK-0510	1	SIEMENS B32560
C	9	CKH-0622	1	SIEMENS B32560
C	10	CKQ-0722	1	SIEMENS B32560
C	11	CKI-0522	1	SIEMENS B32560
C	12	CFH-0810	1	SIEMENS B32560
C	13	CFH-0810	1	SIEMENS B32560
C	14	CFH-0810	1	SIEMENS B32560
C	15	CFH-0810	1	SIEMENS B32560
C	16	CFH-0810	1	SIEMENS B32560
C	17	QDS-4002	1	SIEMENS B32560
C	18	QDS-4002	1	SIEMENS B32560
C	19	QDS-4002	1	SIEMENS B32560
C	20	QDS-4002	1	SIEMENS B32560
C	21	QDS-4002	1	SIEMENS B32560
D	1	QDS-4002	1	F-126
D	2	QDS-4002	1	QDS-4002
D	3	QDS-4002	1	QDS-4002
D	4	QDS-4002	1	QDS-4002



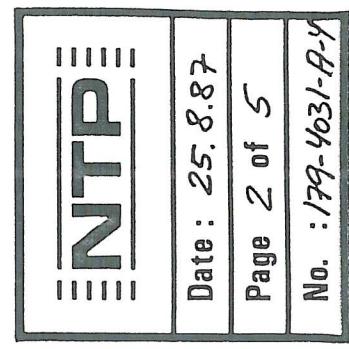
Date : 25.8.87

Page / of 5

No. : 179-4031-A-4

IN 4002
IN 4002
IN 4002
IN 4002

REF. NO.	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO. PART NO.
D 5	QDS-4002	DIODE, SILICIUM	1	F-126
D 6	QDS-4002	DIODE, SILICIUM	1	F-126
D 7	QDS-4002	DIODE, SILICIUM	1	F-126
D 8	QDS-4002	DIODE, SILICIUM	1	F-126
D 9	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 10	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 11	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 12	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 13	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 14	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 15	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 16	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 17	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 18	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 19	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 20	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 21	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 22	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 23	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 24	QDS-4148	DIODE, SILICIUM	1	QDS-4148
D 31	QZD-0047	ZENERDIODE 4,7V	1	DO-35
IC 1	ILA-412	OP-AMP	1	NAT. LF412
IC 2	ILA-412	OP-AMP	1	NAT. LF412
IC 3	ILA-353	OP-AMP	1	NAT. LF353
IC 4	ILA-353	OP-AMP	1	NAT. LF353
IC 5	ILA-353	OP-AMP	1	NAT. LF353
IC 6	ILA-5532	OP-AMP	1	TEX. NE5532P
IC 7	ICA-4051	8-CHANNEL ANALOG MULTIPLEX.	1	RCA CD4051BE
IC 8	ICA-4051	8-CHANNEL ANALOG MULTIPLEX.	1	RCA CD4051BE
IC 9	ILR-317T	SPANDINGS REGULATOR	1	TEX. TO-220
LD 1	OES-0106	LED RED	1x1	SIEMENS CQV 11
LD 2	OES-0108	LED GREEN	1x1	SIEMENS CQV 15
LD 3	OES-0116	LED GREEN	1x1	SIEMENS LD 471
P 4	RFD-5200	TRIM POTENTIOMETER	20K	BOURNS 3386
P 5	RFD-4200	TRIM POTENTIOMETER	2K	BOURNS 3386
Q 3	QEN-0237	TRANSISTOR, NPN	1	TO-92
Q 6	QBP-0307	TRANSISTOR, PNP	1	TO-92
Q 7	QBN-0237	TRANSISTOR, NPN	1	BC237 B
Q 8	QBF-0307	TRANSISTOR, PNP	1	BC237 B
Q 9	QBN-0237	TRANSISTOR, NPN	1	BC237 B

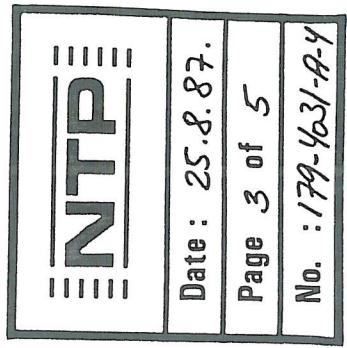


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REF.NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO. PART NO.
Q 10	QEN-0237	TRANSISTOR, NPN	1	TO-92 BC237 E
Q 11	QEN-0237	TRANSISTOR, NPN	1	TO-92 BC237 B
Q 12	QEN-4302	TRANSISTOR, PNP	1	QFN-4302 2N 4302
Q 13	QBP-0307	TRANSISTORPAIR, NPN FET	1	BC307 BC307
Q 1/2	QBM-0237-2	TRANSISTORPAIR, NPN	1	TO-92 BC 237 PAR
Q 4/5	QBM-0237-2	TRANSISTORPAIR, NPN	1	TO-92 BC 237 PAR
R 2	RAB-6100	RESISTOR NETWORK 100K 2%	1	SIL 8PIN RAK
R 3	RCA-3470	RESISTOR CARBON 470R 0.6W 5	1	SBB 0207 4308R 101 104
R 4	RMA-4562	RESISTOR METAL 5K62 0.4W 1%	1	PHILIPS MR25 SBB 0207 470R
R 5	RMA-4221	RESISTOR METAL 2K21 0.4W 1%	1	PHILIPS MR25 2322 151 55622
R 6	RMA-4332	RESISTOR METAL 3K32 0.4W 1%	1	PHILIPS MR25 2322 151 52212
R 7	RCA-5220	RESISTOR CARBON 22K 0.66W 5%	1	PHILIPS MR25 2322 151 53322
R 8	RMA-2681	RESISTOR METAL 68R1 0.4W 1%	1	SBB 0207 22K
R 9	RTA-2100	RESISTOR FTC 10R 0.13W 2%	1	PHILIPS MR25 2322 151 56819
R 10	RMA-5133	RESISTOR METAL 13K3 0.4W 1%	1	PTC GT-55 LP 1/8 10R
R 11	RMA-4182	RESISTOR METAL 1K82 0.4W 1%	1	PHILIPS MR25 2322 151 51333
R 12	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	PHILIPS MR25 2322 151 51822
R 13	RCA-4220	RESISTOR METAL 3K2R 0.4W 1%	1	SBB 0207 2K2
R 14	RMA-3392	RESISTOR METAL 3K2R 0.4W 1%	1	PHILIPS MR25 2322 151 53921
R 15	RMA-3392	RESISTOR WIRE-WOUND 10QR 1W	1	PHILIPS MR25 2322 151 53921
R 16	RCA-5470	RESISTOR CARBON 47K 0.66W 5%	1	PHILIPS MR25 2322 151 53921
R 17	RMA-6150	RESISTOR METAL 150K 0.4W 1%	1	SBB 0207 47K
R 18	RWB-3100	RESISTOR WIRE-WOUND 10QR 1W	1	PHILIPS MR25 2322 151 51504
R 19	RMA-4150	RESISTOR METAL 1K5 0.4W 1%	1	VITROHM 253-9 253-9
R 20	RMA-4332	RESISTOR METAL 3K32 0.4W 1%	1	PHILIPS MR25 2322 151 51502
R 21	RMA-5133	RESISTOR METAL 13K3 0.4W 1%	1	PHILIPS MR25 2322 151 53322
R 22	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 51333
R 23	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 24	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 25	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 26	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 27	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 28	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 29	RMA-6100	RESISTOR METAL 100K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 30	RMA-6100	RESISTOR METAL 100K 0.4W 1%	1	PHILIPS MR25 2322 151 51004
R 31	RMA-5475	RESISTOR METAL 47K5 0.4W 1%	1	PHILIPS MR25 2322 151 51004
R 32	RMA-4243	RESISTOR METAL 2K43 0.4W 1%	1	PHILIPS MR25 2322 151 54753
R 33	RMA-5475	RESISTOR METAL 47K5 0.4W 1%	1	PHILIPS MR25 2322 151 52432
R 34	RMA-4243	RESISTOR METAL 2K43 0.4W 1%	1	PHILIPS MR25 2322 151 54753
R 35	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52432
R 36	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004
R 37	RMA-6200	RESISTOR METAL 200K 0.4W 1%	1	PHILIPS MR25 2322 151 52004

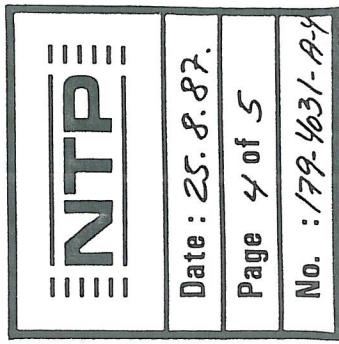


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REF.NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO. PART NO.
R 38	RMA-6100	RESISTOR METAL 100K 0.4W 1%	1	PHILLIPS MR25
R 39	RMA-5475	RESISTOR METAL 47K5 0.4W 1%	1	PHILLIPS MR25
R 40	RMA-4243	RESISTOR METAL 2K43 0.4W 1%	1	PHILLIPS MR25
R 41	RCA-6180	RESISTOR CARBON 180K 0.66W 5	1	SBB 0207
R 42	RMA-5133	RESISTOR METAL 13K3 0.4W 1%	1	PHILLIPS MR25
R 43	RMA-5200	RESISTOR METAL 20K 0.4W 1%	1	PHILLIPS MR25
R 44	RMA-5110	RESISTOR METAL 11K 0.4W 1%	1	PHILLIPS MR25
R 46	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25
R 47	RCA-7100	RESISTOR CARBON 1M 0.66W 5%	1	SBB 0207
R 48	RCA-7100	RESISTOR CARBON 1M 0.66W 5%	1	SBB 0207
R 49	RMA-5200	RESISTOR METAL 20K 0.4W 1%	1	PHILLIPS MR25
R 50	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25
R 51	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25
R 53	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207
R 54	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207
R 55	RTC-1940	RESISTOR PTC 9R4	1	PTC Q63100
R 56	RCA-4330	RESISTOR CARBON 3K3 0.66W 5%	1	SBB 0207
R 57	RCA-4560	RESISTOR CARBON 5K6 0.66W 5%	1	SBB 0207
R 58	RCA-5120	RESISTOR CARBON 12K 0.66W 5%	1	SBB 0207
R 59	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207
R 60	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	SBB 0207
R 61	RCA-7100	RESISTOR CARBON 1M 0.66W 5%	1	SBB 0207
R 62	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207
R 63	RCA-7120	RESISTOR CARBON 1M2 0.66W 5%	1	SBB 0207
R 64	RCA-6560	RESISTOR CARBON 560K 0.66W 5	1	SBB 0207
R 65	RCA-6330	RESISTOR CARBON 330K 0.66W 5	1	SBB 0207
R 66	RCA-6120	RESISTOR CARBON 120K 0.66W 5	1	SBB 0207
R 67	RCA-5680	RESISTOR CARBON 68K 0.66W 5%	1	SBB 0207
R 68	RCA-5270	RESISTOR CARBON 27K 0.66W 5%	1	SBB 0207
R 69	RCA-6470	RESISTOR CARBON 470K 0.66W 5	1	SBB 0207
R 70	RCA-6560	RESISTOR CARBON 560K 0.66W 5	1	SBB 0207
R 71	RCA-6330	RESISTOR CARBON 330K 0.66W 5	1	SBB 0207
R 72	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207
R 73	RCA-5560	RESISTOR CARBON 56K 0.66W 5%	1	SBB 0207
R 74	RCA-5470	RESISTOR CARBON 47K 0.66W 5%	1	SBB 0207
R 75	RCA-4100	RESISTOR CARBON 1K 0.66W 5%	1	SBB 0207
R 76	RCA-7100	RESISTOR CARBON 1M 0.66W 5%	1	SBB 0207
R 77	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	SBB 0207
R 78	RCA-7100	RESISTOR CARBON 1M 0.66W 5%	1	SBB 0207
R 79	RCA-4100	RESISTOR CARBON 1K 0.66W 5%	1	SBB 0207

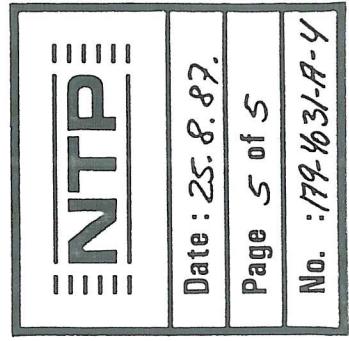


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REF. NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT / DRW. NO. PART NO.
R 80	RCA-7120	RESISTOR CARBON 1M2 0.66W 5%	1	SBB 0207 1M2
R 81	RCA-7330	RESISTOR CARBON 3M3 0.66W 5%	1	SBB 0207 3M3
R 82	RCA-6220	RESISTOR CARBON 220K 0.66W 5%	1	SBB 0207 220K
R 83	RCA-5470	RESISTOR CARBON 47K 0.66W 5%	1	SBB 0207 47K
R 84	RCA-5220	RESISTOR CARBON 22K 0.66W 5%	1	SBB 0207 22K
R 85	RCA-4180	RESISTOR CARBON 1K8 0.66W 5%	1	SBB 0207 1K8
R 86	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	SBB 0207 2K2
R 87	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25 2322 151 51003
R 88	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25 2322 151 51003
R 89	RCA-4180	RESISTOR CARBON 1K8 0.66W 5%	1	SBB 0207 1K8
R 90	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	SBB 0207 2K2
R 91	RCA-4470	RESISTOR CARBON 4K7 0.66W 5%	1	SBB 0207 4K7
R 92	RCA-6470	RESISTOR CARBON 470K 0.66W 5%	1	SBB 0207 470K
R 93	RCA-6470	RESISTOR CARBON 470K 0.56W 5%	1	SBB 0207 470K
R 94	RCA-6470	RESISTOR CARBON 470K 0.66W 5%	1	SBB 0207 470K
R 95	RCA-6470	RESISTOR CARBON 470K 0.66W 5%	1	SBB 0207 470K
R 96	RCA-6470	RESISTOR CARBON 470K 0.66W 5%	1	SBB 0207 470K
R 97	RCA-6470	RESISTOR CARBON 470K 0.66W 5%	1	SBB 0207 470K
R 98	RCA-4150	RESISTOR CARBON 1K5 0.66W 5%	1	SBB 0207 1K5
R 99	RCA-5180	RESISTOR CARBON 18K 0.66W 5%	1	SBB 0207 18K
R 100	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25 2322 151 51003
R 101	RMA-5100	RESISTOR METAL 10K 0.4W 1%	1	PHILLIPS MR25 2322 151 51003
R 102	RCA-4100	RESISTOR CARBON 1K 0.66W 5%	1	SBB 0207 1K
R 103	RCA-2100	RESISTOR CARBON 10R 0.66W 5%	1	SBB 0207 10R
R 105	RXA-8220	RESISTOR HIGHVOLT 22M 0.25W	1	PHILLIPS VR25 2322 241 13226
R 106	RCA-5120	RESISTOR CARBON 12K 0.66W 5%	1	SBB 0207 12K
R 107	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	SBB 0207 100K
RS 1	SRB-0004	ROTARY SWITCH 9 POS YELLOW	1	HOPT & S. 422 020
RS 2	SRB-0004	ROTARY SWITCH 9 POS YELLOW	1	HOPT & S. 422 020
S 1	SSE-0112	SLIDE SWITCH SPDT	1	ALCO TSS 11 DG RA
TR 1	LTL-0008	OUTPUTTRANSFORMER	1.2	LL 5011



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No. : 179-463-A-4