NTP	Instruction Manual for LIMITER AMPLIFIER 179-300-C	179-3010-C-4

LIMITER AMPLIFIER

— 179-300-C —

Contents:	Draw No.:
Technical specifications	179-3011-A-4
Terminals, input-output terminations	179-3002-A-4
Special Applications	179-3018-A-4
Recovery time-and delay curves	179-3019-C-4
Instruction for Alignment	179-3022-A-4
Diagram	179-3030-C-3
Component Lay-out	179-3041-C-4
Electrical partslist	179-3031-C-4

Supply Voltage symmetrical	: ± 15 V dc ± 10% 0V common
Maximum Ripple Voltage	: 0.1 V pp
Current Consumption steady state	: 60 mA
Current Consumption during heat-up	: approx. 225 mA in 45 sec.
Current Consumption without oven	: 35 mA
Temperature Range	: -20°C to +60°C (-4 to +140°F)
Frequency Range within o,5 dB	: 20 Hz to 20kHz
Input Impedance high level input	: 22 kohms in series with 100µF
Input Impedance low level input	: 460 ohms in series with 100µF
Output Impedance	: less than 1 ohm in series with 100µF
Minimum Load Impedance	: 100 ohms
Basic Amplification high level input	: 0dB ± 0.5
Basic Amplification low level input	: +34 dB ± 0.75
Limitation Level ref. to output Note 1	: +6 dB
Limitation Range	: more than 35 dB
Distortion under steady conditions	
1 kHz 0 to 20 dB limitation	: less than 0.2 %
40 Hz 0 to 20 dB limitation	: less than 0.2 %
Signal to Noise Ratio at Limitation Threshold flat respons RMS (Δf 23kHz)	: 73 dBu
Control Voltage output (Instrument etc.) Note 2	: 1 Volt per 5 dB ref. to 0V
Indicator Output (LED indicator)	: 14 mA
Attack Time Note 1	: 1.5 millisecond combined with a full-wave logarithmic clipping circuit
Recovery Time Note 3	: Dual time constants 200 msec. upon 15 seconds

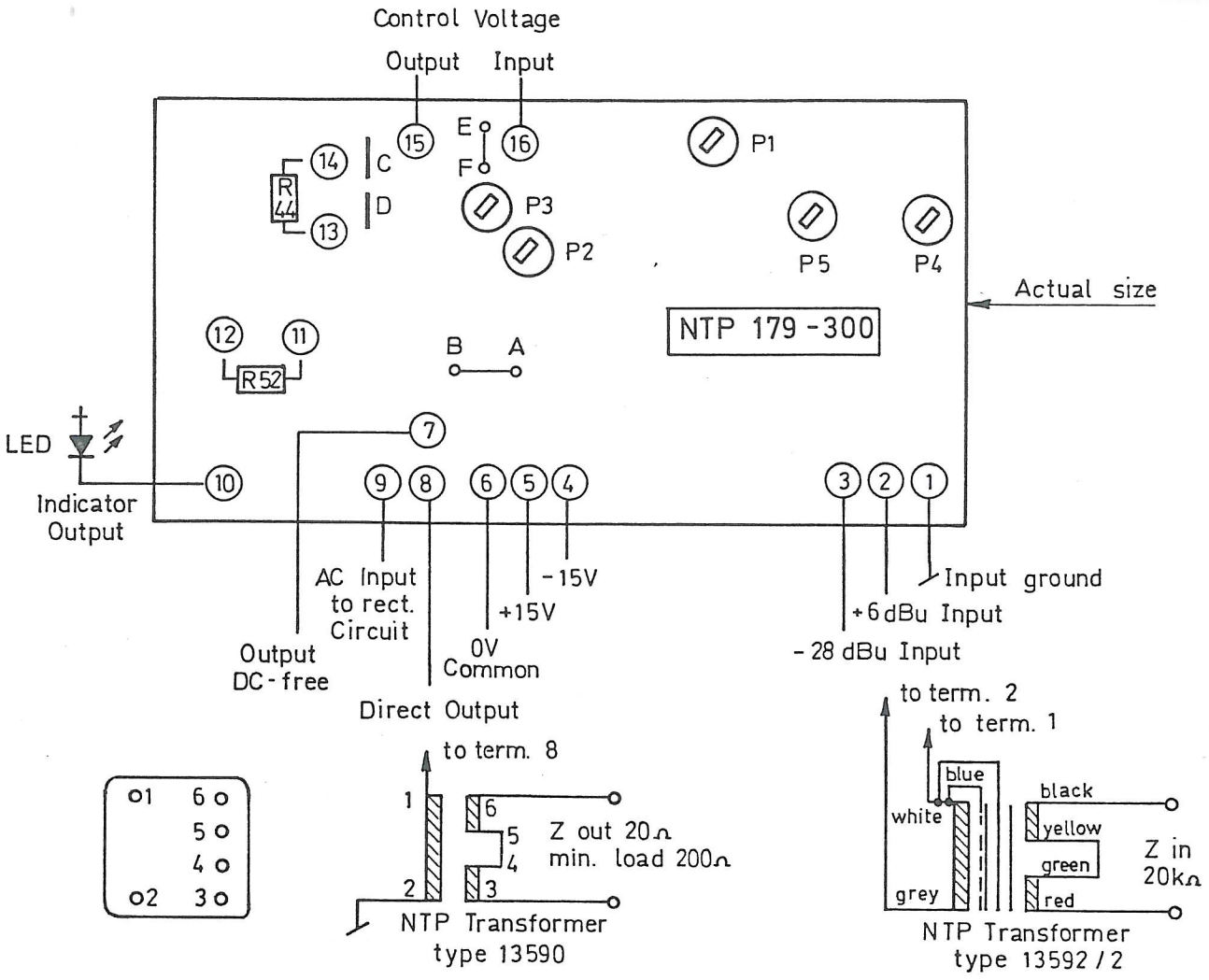
Note 1: The limitation level stated above applies to steady state conditions. Peaks shorter than 1.5 msec. will be limited at a level max. 3 dB above steady state conditions.

Note 2: Stereo Operation:

The Control Voltage of two units may be linked so as to obtain equal gain-reduction in the two stereo channels.

By cutting the connection between the two terminals it is possible to apply an external control voltage giving a gain reduction of 5 dB per Volt up to 30 dB reduction.

Note 3: It is not recommended to charge recovery-and delay.times when the card is used as a limiter. For override and other special functions, various time constants can be obtained by changing R 32 and R 44, and by changing R 52, See curves on 179-3019-A-4.



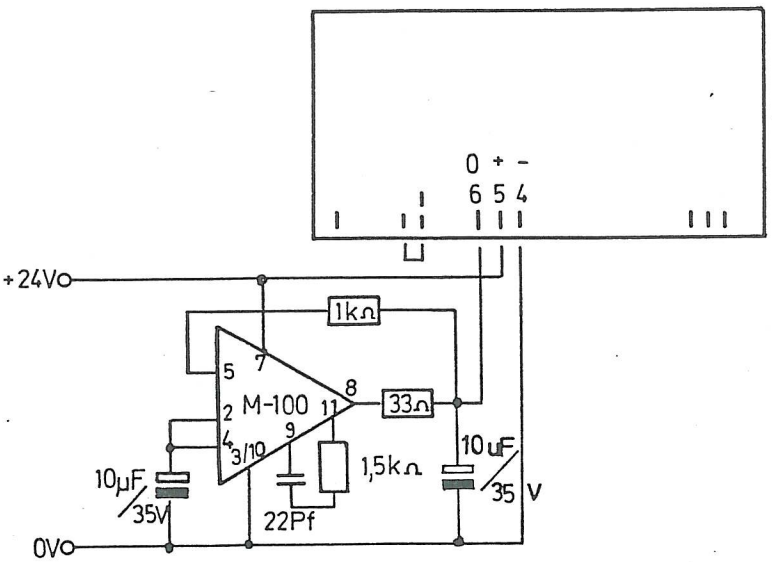
Terminal 1 : Input ground
" 2 : +6dBu input, Zin 10kΩ
" 3 : -28dBu input, zin 400Ω
" 4 : -15V supply voltage
" 5 : +15V supply voltage
" 6 : 0V common
" 7 : Output through 100µF cap.(DC-free)
" 8 : Direct output normally connected to rect.circuit.
" 9 : Input to rect. circuit, Zin 27kΩ
" 10 : Indicator output
" 11 : } Recovery delay (R52) see curve I
" 12 : }
" 13 : } Recovery time (R44) see curve II
" 14 : }
" 15 : DC control voltage output.
" 16 : DC control voltage input.

NOTE. If the Limiter card is used with NTP input and output transformers for balanced floating operation, the limitation level will be raised by 3dB, unless R24 is decreased untill the Limitation level is +6dB. For transformers with 1:1 ratio, no modifications are needed.

Målestok		INGENIØRFIRMA N. TØNNES PEDERSEN A/s	Tegn. 1-9-71. IW
Tolerance	± mm ± 0	Limiter Amplifier 179-300	Godk.
Materiale			
Behandl.		Terminals, Input - output terminations	TEGNING NR. 179-3002-A-4
Del af			
Antal			

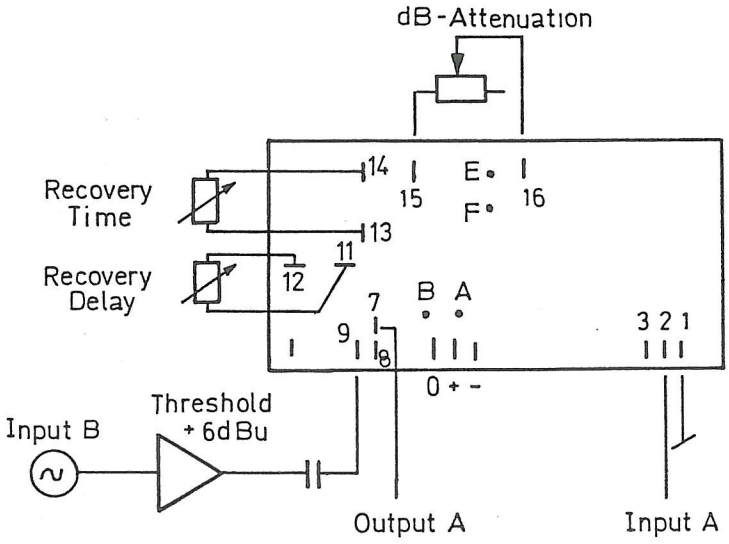
Rett

NTP	Limiter Amplifier 179 - 300 Special Applications.	179 - 3018 - A - 4



Unsymetrical supply voltage

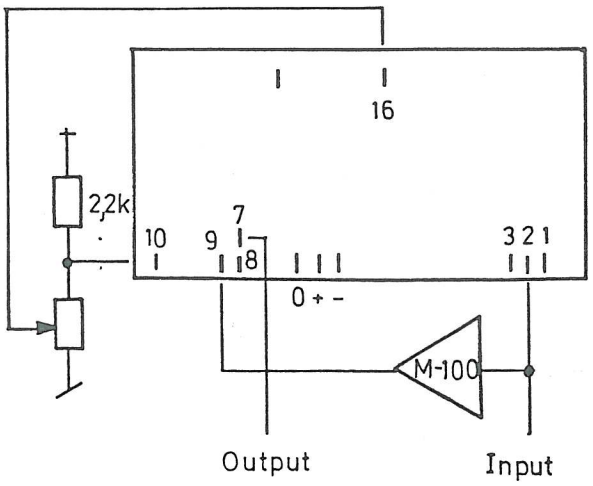
If the Limiter Amplifier is supplied from an unsymmetrical power supply, an external voltage splitter must be provided.
For instance an M-100 Op. amp. connected as shown to the left.



Override function

Break the connections
E - F and A - B and 8 - 9

An override function is accomplished by letting one sound channel control another sound channel. In the example to the left the sound channel B will override the channel A as soon as the level to term. 9 exceeds +6dBu. The attenuation of channel A is determined by the potentiometer P.
For desired recovery time and recovery delay, see the curves on draw No. 179-3019-A-4.



Squelch function

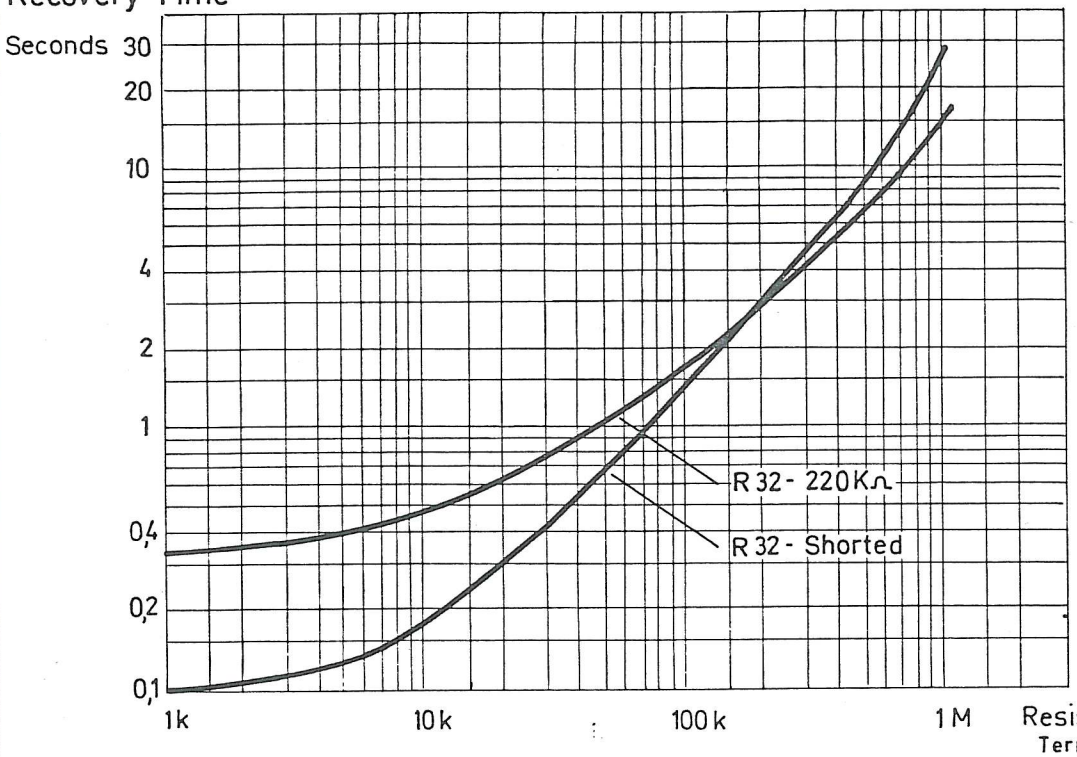
Break the connections
E - F and A - B and 8 - 9

The squelch threshold is determined by the gain of the external M-100 Amplifier. The potentiometer P determines the range that is squelched (max. appr. 30dB)

NOTE. For further information of Limiter Amplifier 179-300 please contact the factory,

1-9-71 BM/IW.

Recovery Time

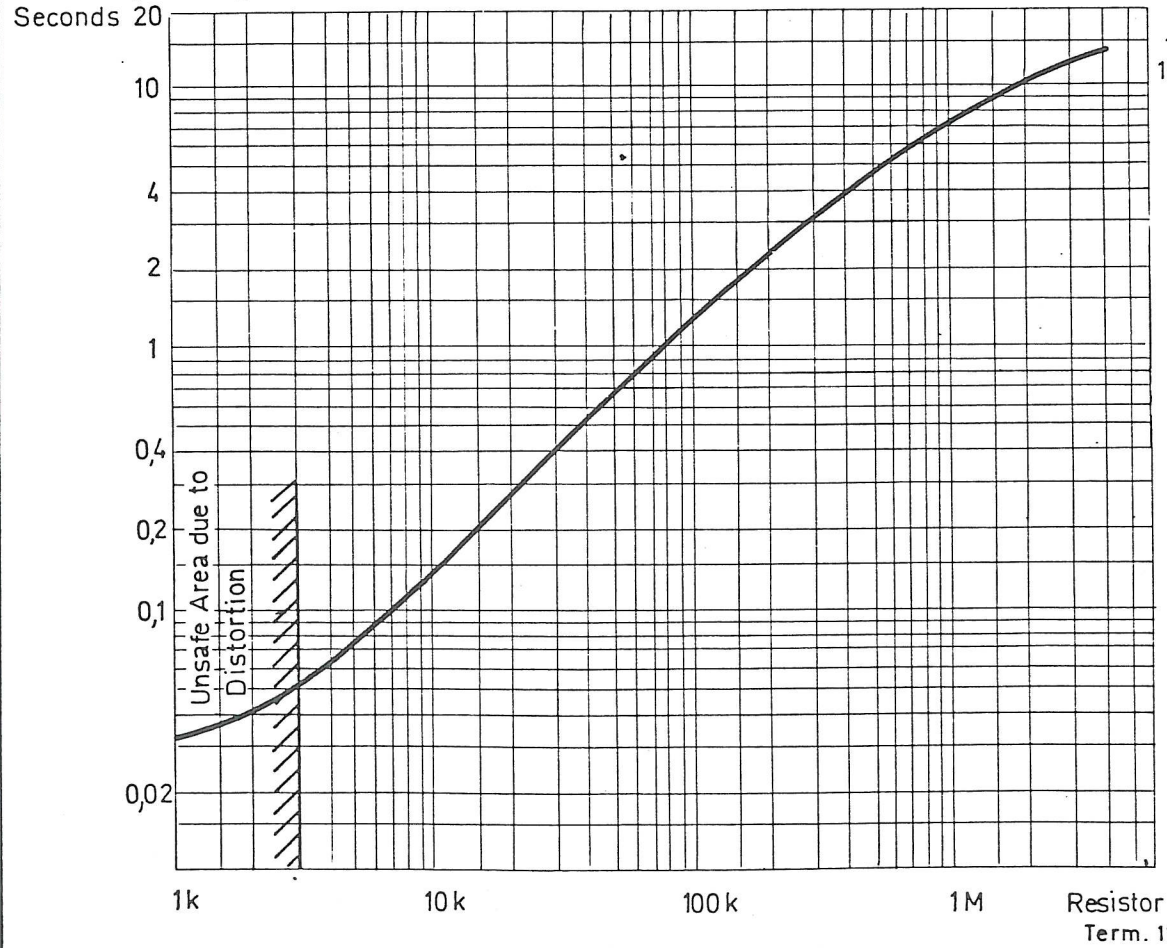


Curve II
15 dB Limiting

NOTE !

The time constants are factory adjusted to correct Limiter function.
Do not change the times unless a special function is wanted.

Recovery Delay



Curve I
15 dB Limiting

Målestok		INGENIØRFIRMA N. TØNNES PEDERSEN A/s	Tegn. 27.2.75 IW
Tolerance	± mm ± 0	Limiter Amplifier 179-300-C	Godk. B.M.
Materiale			
Behandl.		Recovery time & -delay curves	TEGNING NR. 179-3019-C-4
Del af			
Antal			

Retteur

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 untill the current consumption has fallen to a steady level approx. 50 mA after 60 sec. Correct sequence of adjustments is as follows:

a. Bias adjustment of P1

Conditions: No input signal.

Connect a DC voltmeter (or DC-oscilloscope sens. approx. 20mV/div.) between terminal 8 and terminal 6.
P1 is adjusted until the voltage measured is the same whether TP is connected to terminal 6 or not.

b. Pinch-off adjustment of P2

Conditions: Input signal +6dBu 1kHz on terminal 2.

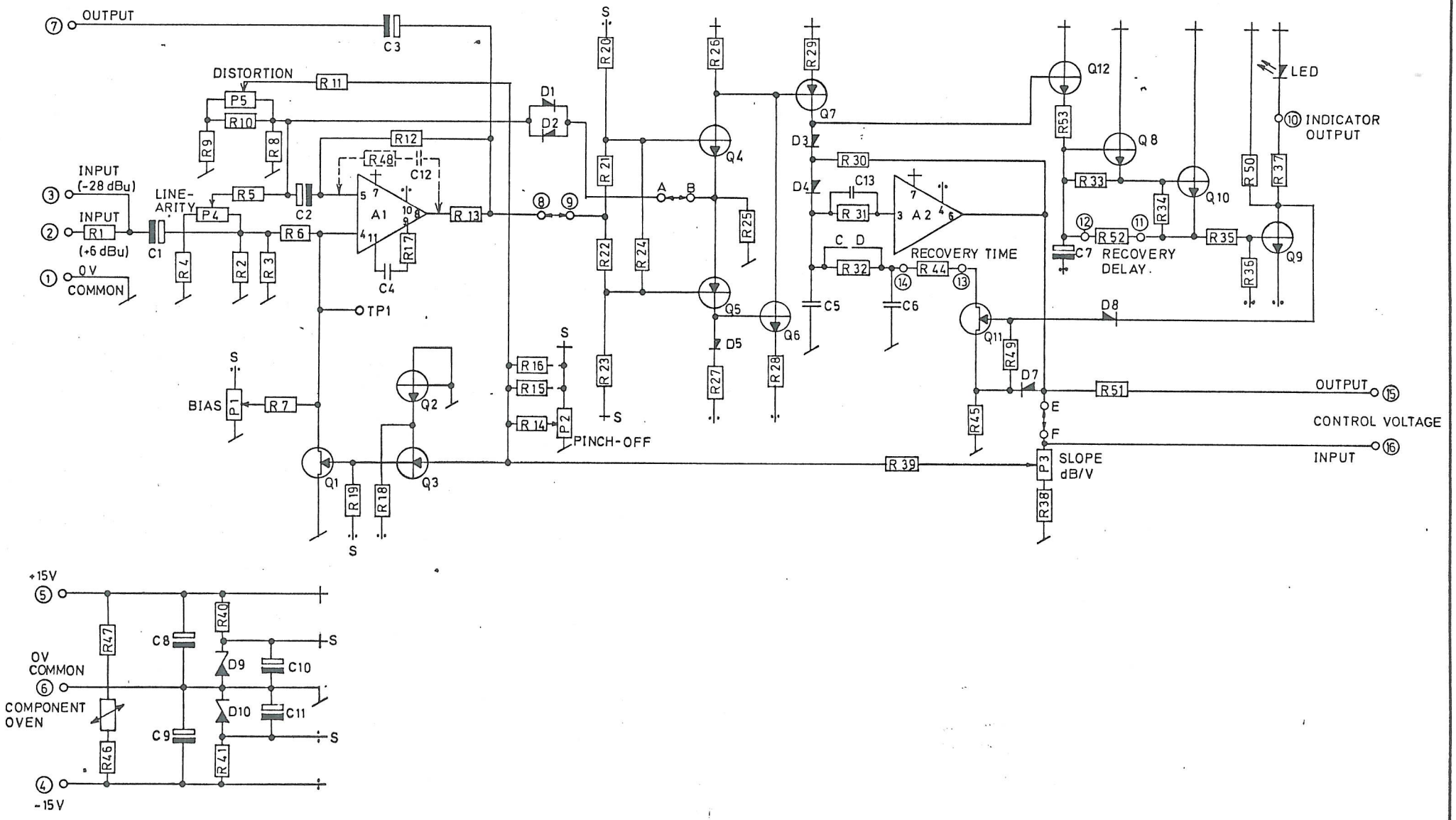
P2 is adjusted until the output voltage is +6dBu (0dB amplification).
The adjustment range can be altered by connecting or disconnecting R15 and / or R16.

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

Conditions: Like referred under pos. b.

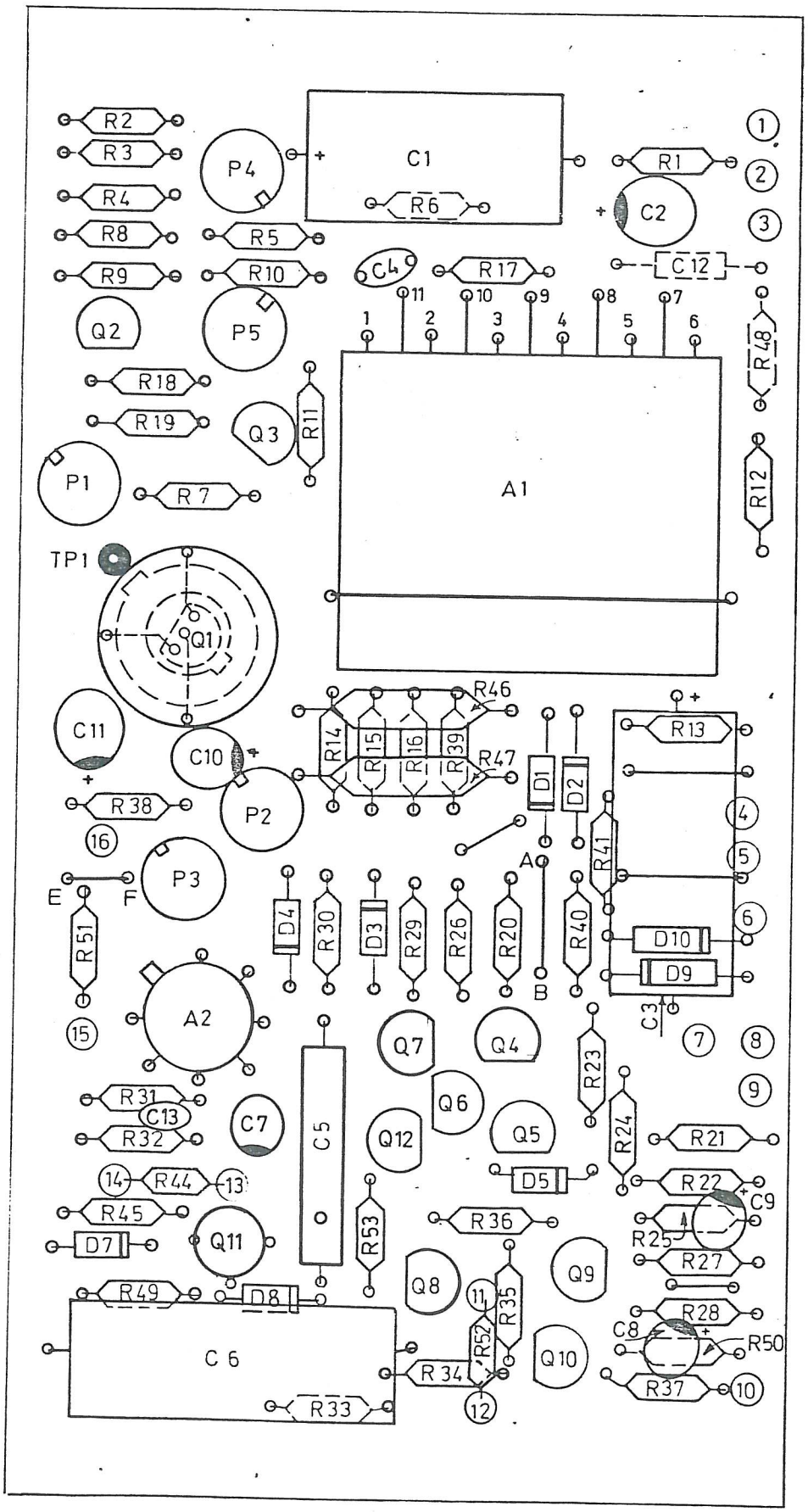
A floating external DC-source 0-6 V is connected between terminal 6 and 16, terminal 16 positive. The DC voltage is set to 3.0 Volt, and P3 is adjusted so that the output level is -9dBu (15 dB attenuation). Now the DC voltage is set to 6.0 Volt, and P4 is adjusted until the output level is -24 dBu (30 dβ 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: +16dBu 1KHz on term. 2.
P5 is adjustede to minimum distortion.
Because of interaction between P5 and P2, the adjustment mentioned under pos. b might be carried out once more.



Målestok		INGENIØRFIRMA N. TØNNES PEDERSEN A/S	Tegn. 27.2.75 IW
Tolerance	+ mm + 0	LIMITER AMPLIFIER 179-300-C	Godk. 27/2-75 B.M.
Materiale			TEGNING NR.
Behandl.		DIAGRAM	179-3030-C-3
Del af			
Antal			

Kettelser



Rett r 1/12-71 BM/IW (R42 & R43 erst. m. strap) 18/12-8 Ændret
26/4-72 IW
25/5-72 IW / R53 og C13 monteret. 27/2-75 BM/IW

Målestok 2:1	INGENIØRFIRMA N. TØNNES PEDERSEN A/S	Tegn. 31-8-71 I.W.
Tolerance + mm +	Limiter Amplifier 179-300-C	Godk.
Materiale		
Behandl.	Component Layout	TEGNING NR. 179-3041-C-4
Del af		
Antal		

NTP 179-300C LIM. AMPLIFIER, BASIC VERSION PARTS LIST

REF.NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO.	PART NO.
R 42	RAA-9999	RESISTOR, NOT USED	1	RAA-9999	RAA-9999
R 43	RAA-9999	RESISTOR, NOT USED	1	RAA-9999	RAA-9999
R 48	RAA-9999	RESISTOR, NOT USED	1	RAA-9999	RAA-9999
R 13	RCA-2220	RESISTOR CARBON 22R 0.66W 5%	1	MBB 0207	MBB 0207 22R
R 53	RCA-2680	RESISTOR CARBON 68R 0.66W 5%	1	MBB 0207	MBB 0207 68R
R 10	RCA-3220	RESISTOR CARBON 220R 0.66W 5	1	MBB 0207	MBB 0207 220R
R 38	RCA-3330	RESISTOR CARBON 330R 0.66W 5	1	MBB 0207	MBB 0207 330R
R 4	RCA-3470	RESISTOR CARBON 470R 0.66W 5	1	MBB 0207	MBB 0207 470R
R 9	RCA-3470	RESISTOR CARBON 470R 0.66W 5	1	MBB 0207	MBB 0207 470R
R 25	RCA-3470	RESISTOR CARBON 470R 0.66W 5	1	MBB 0207	MBB 0207 470R
R 2	RCA-3680	RESISTOR CARBON 680R 0.66W 5	1	MBB 0207	MBB 0207 680R
R 40	RCA-3820	RESISTOR CARBON 820R 0.66W 5	1	MBB 0207	MBB 0207 820R
R 41	RCA-3820	RESISTOR CARBON 820R 0.66W 5	1	MBB 0207	MBB 0207 820R
R 17	RCA-4100	RESISTOR CARBON 1K 0.66W 5%	1	MBB 0207	MBB 0207 1K
R 51	RCA-4100	RESISTOR CARBON 1K 0.66W 5%	1	MBB 0207	MBB 0207 1K
R 45	RCA-4150	RESISTOR CARBON 1K5 0.66W 5%	1	MBB 0207	MBB 0207 1K5
R 26	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	MBB 0207	MBB 0207 2K2
R 27	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	MBB 0207	MBB 0207 2K2
R 28	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	MBB 0207	MBB 0207 2K2
R 37	RCA-4220	RESISTOR CARBON 2K2 0.66W 5%	1	MBB 0207	MBB 0207 2K2
R 29	RCA-4270	RESISTOR CARBON 2K7 0.66W 5%	1	MBB 0207	MBB 0207 2K7
R 52	RCA-4270	RESISTOR CARBON 2K7 0.66W 5%	1	MBB 0207	MBB 0207 2K7
R 6	RCA-4330	RESISTOR CARBON 3K3 0.66W 5%	1	MBB 0207	MBB 0207 3K3
R 5	RCA-4390	RESISTOR CARBON 3K9 0.66W 5%	1	MBB 0207	MBB 0207 3K9
R 7	RCA-4390	RESISTOR CARBON 3K9 0.66W 5%	1	MBB 0207	MBB 0207 3K9
R 8	RCA-4390	RESISTOR CARBON 3K9 0.66W 5%	1	MBB 0207	MBB 0207 3K9
R 18	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 19	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 31	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 35	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 36	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 50	RCA-5100	RESISTOR CARBON 10K 0.66W 5%	1	MBB 0207	MBB 0207 10K
R 3	RCA-5120	RESISTOR CARBON 12K 0.66W 5%	1	MBB 0207	MBB 0207 12K

NTP

Date : 29.5.90.

Page 1 of 3

No. :179-3031-C-4

NTP 179-300C LIM. AMPLIFIER, BASIC VERSION PARTS LIST

REF.NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO.	PART NO.
R 21	RCA-5150	RESISTOR CARBON 15K 0.66W 5%	1	MBB 0207	MBB 0207 15K
R 22	RCA-5150	RESISTOR CARBON 15K 0.66W 5%	1	MBB 0207	MBB 0207 15K
R 39	RCA-5150	RESISTOR CARBON 15K 0.66W 5%	1	MBB 0207	MBB 0207 15K
R 11	RCA-5180	RESISTOR CARBON 18K 0.66W 5%	1	MBB 0207	MBB 0207 18K
R 1	RCA-5220	RESISTOR CARBON 22K 0.66W 5%	1	MBB 0207	MBB 0207 22K
R 16	RCA-5220	RESISTOR CARBON 22K 0.66W 5%	1	MBB 0207	MBB 0207 22K
R 15	RCA-5330	RESISTOR CARBON 33K 0.66W 5%	1	MBB 0207	MBB 0207 33K
R 14	RCA-5560	RESISTOR CARBON 56K 0.66W 5%	1	MBB 0207	MBB 0207 56K
R 20	RCA-5560	RESISTOR CARBON 56K 0.66W 5%	1	MBB 0207	MBB 0207 56K
R 23	RCA-5560	RESISTOR CARBON 56K 0.66W 5%	1	MBB 0207	MBB 0207 56K
R 24	RCA-5820	RESISTOR CARBON 82K 0.66W 5%	1	MBB 0207	MBB 0207 2K
R 34	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	MBB 0207	MBB 0207 100K
R 49	RCA-6100	RESISTOR CARBON 100K 0.66W 5	1	MBB 0207	MBB 0207 100K
R 32	RCA-6220	RESISTOR CARBON 220K 0.66W 5	1	MBB 0207	MBB 0207 220K
R 30	RCA-6470	RESISTOR CARBON 470K 0.66W 5	1	MBB 0207	MBB 0207 470K
R 33	RCA-6470	RESISTOR CARBON 470K 0.66W 5	1	MBB 0207	MBB 0207 470K
R 44	RCA-6820	RESISTOR CARBON 820K 0.66W 5	1	MBB 0207	MBB 0207 820K
R 46	RCC-2470	RESISTOR CARBON 47R 0.50W 5%	1	SBD 0411	SBD 0411 47R
R 47	RCC-2470	RESISTOR CARBON 47R 0.50W 5%	1	SBD 0411	SBD 0411 47R
R 12	RMA-5619	RESISTOR METAL 61K9 0.4W 1%	1	PHILIPS MR25	2322 151 56193
P 1	RFA-9999	POTENTIOMETER, NOT USED	1	RFA-9999	RFA-9999
P 3	RFB-4100	TRIMPOTENTIOMETER 1K	1	BOURNS 3329	3329H-1-102
P 4	RFB-4100	TRIMPOTENTIOMETER 1K	1	BOURNS 3329	3329H-1-102
P 5	RFB-4100	TRIMPOTENTIOMETER 1K	1	BOURNS 3329	3329H-1-102
P 2	RFB-5100	TRIMPOTENTIOMETER 10K	1	BOURNS 3329	3329H-1-103
C 12	CAA-0000	CAPACITOR, NOT USED	1	CAA-0000	CAA-0000
C 4	CCB-0147	CAP CERAMIC 4.7PF/100V	1	PH 2222 632	2222 632 57478
C 13	CCB-0222	CAP CERAMIC 22PF/100V	1	PH 2222 632	2222 632 58229
C 1	CFD-0910	CAP ELECTROLYTIC 100UF/40V	1	ROE EB	ROE EB 100 UF
C 3	CFD-0910	CAP ELECTROLYTIC 100UF/40V	1	ROE EB	ROE EB 100 UF
C 6	CLB-0722	CAP POLYESTER 2.2UF/100V	1	ROE MKT 1813	1813 522/015
C 5	CLF-0622	CAP POLYESTER 220NF/250V	1	SIEMENS B32234	B32234 A3224 M
C 2	CTA-0922	CAP TANTALUM 220UF/3V	1	ERO ETQ	ETQ 5 220UF

NTP

Date : 29.5.90.

Page 2 of 3

No. :179-3031-C-4

NTP 179-300C LIM. AMPLIFIER, BASIC VERSION PARTS LIST

REF.NO	NTP-ID.	DESCRIPTION	QTY	MANUFACT/DRW.NO.	PART NO.
C 10	CTC-0833	CAP TANTALUM 33UF/10V	1	ERO ETP	ETP 3G 33UF
C 11	CTC-0910	CAP TANTALUM 100UF/10V	1	ERO ETQ	ETQ 5 100UF
C 7	CTF-0710	CAP TANTALUM 1UF/35V	1	ERO ETP	ETP 1A 1UF
C 8	CGA-0810	CAP ELECTROLYTIC 10UF/35V	1	MATSUSHITA ESM	ESM R2 10UF
C 9	CGA-0810	CAP ELECTROLYTIC 10UF/35V	1	MATSUSHITA ESM	ESM R2 10UF
D 6	QDA-0000	DIODE, NOT USED	1	QDA-0000	QDA-0000
D 1	QDS-0013	DIODE, SILICIUM	1	DO-35	BAX 13
D 2	QDS-0013	DIODE, SILICIUM	1	DO-35	BAX 13
D 3	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148
D 4	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148
D 5	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148
D 7	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148
D 8	QDS-4148	DIODE, SILICIUM	1	QDS-4148	1N 4148
D 9	QZR-0062	REFERENCEDIODE	1	DO-34	1N 821
D 10	QZR-0062	REFERENCEDIODE	1	DO-34	1N 821
Q 2	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 4	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 6	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 8	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 9	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 10	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 12	QBN-0237	TRANSISTOR, NPN	1	TO-92	BC237 B
Q 3	QBP-0307	TRANSISTOR, PNP	1	TO-92	BC307
Q 5	QBP-0307	TRANSISTOR, PNP	1	TO-92	BC307
Q 7	QBP-0307	TRANSISTOR, PNP	1	TO-92	BC307
Q 11	QFN-4302	FET	1	QFN-4302	2N 4302
Q 1	QFN-5486	FET TRANSISTOR	1	QFN-5486	2N 5486
A 1	250-100C	LINEAR AMPLIFIER	1	250-100C	250-100C
A 2	ILA-310F	OP-AMP	1	NAT. TO-5	LM 310H
1	MHT-0002	TESTPOINT	16	ASSMANN	ALP 65
2	QBA-0016	TRANSISTOR OVEN	1	QBA-0016	5 ST 1-2
3	179-3040	P.C.BOARD	1	179-3040-C-4	179-3040

NTP

Date : 29.5.90.

Page 3 of 3

No. : 179-3031-C-4