Psophometer

Type 2429

Valid from serial no. 606893

037—0282

Consisting of:

Trouble Shooting

If any faults should occur please check the instrument according to the Checking Procedure.

When a fault has been traced and corrected, the voltages and adjustments influenced by the correction must be rechecked. The complete instrument should then be tested to make sure that all basic functions are operative.

The tolerances given in these notes are intended for use as guide for adjustments.

Before correcting any apparent deviation make sure that the measuring instrument has tolerances small enough not to affect the measurement.

Modifications

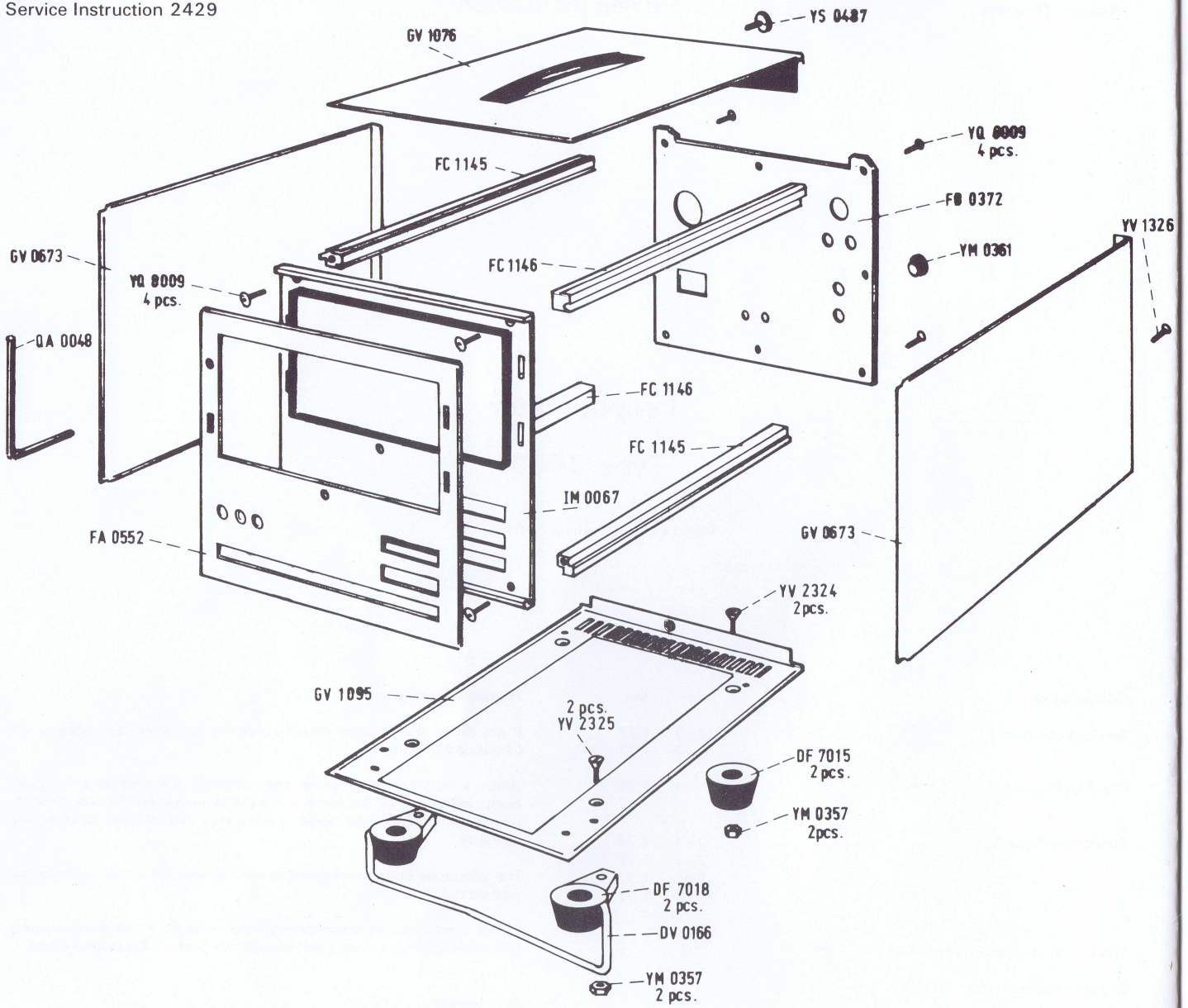
Due to the constant technical progress the instrument will be modified from time to time in order to provide continously improved performance.

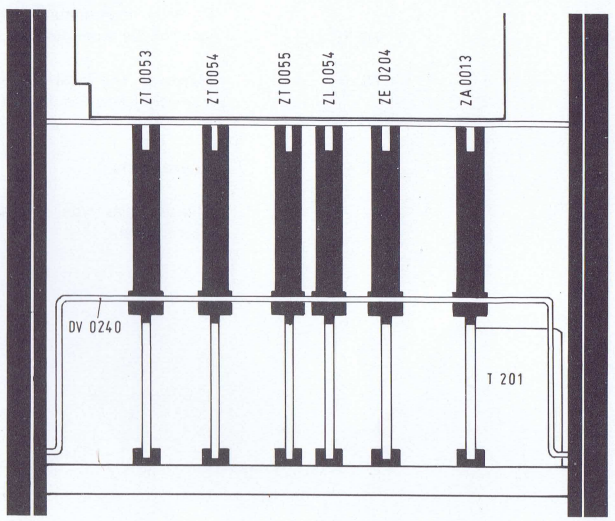
For this reason there may be small differencies between the instrument and the Service Instruction.

However, the local Representative Service is in possession of all information regarding the modifications that have been made.

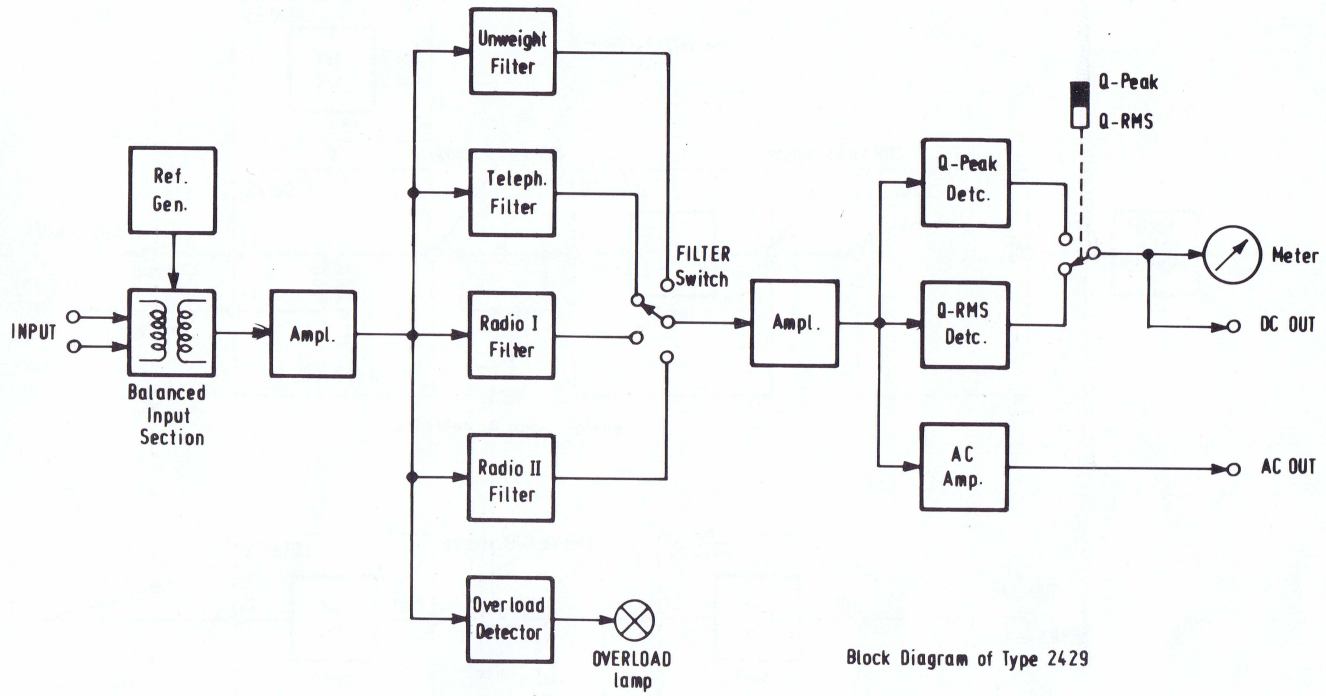
Spare Parts

Please state type and serial number of the instrument when ordering spare parts.





Checking Procedure



Block Diagram of Type 2429

front:
ATTENUATOR: "10 mV"
DETECTOR: "Q-RMS"
REF. OSC.: "Ref."
IMPERDANCE: "> 10 kΩ"
FILTER: "Unweight"
rear:
CHASSIS connected to SIGNAL GROUND

Check as follows:

Meter indication: "Ref."

"AC Out" voltage: 1,58 V RMS ± 10 mV
"DC Out" voltage: 1,58 V DC ± 10 mV

DETECTOR to "Q-Peak"

Meter indication: "Ref."

FILTER to "Teleph."-"Radio I"-"Radio II"

Meter indication: "Ref."

REF. OSC: to "Normal"
ATTENUATOR: "0,1 mV"

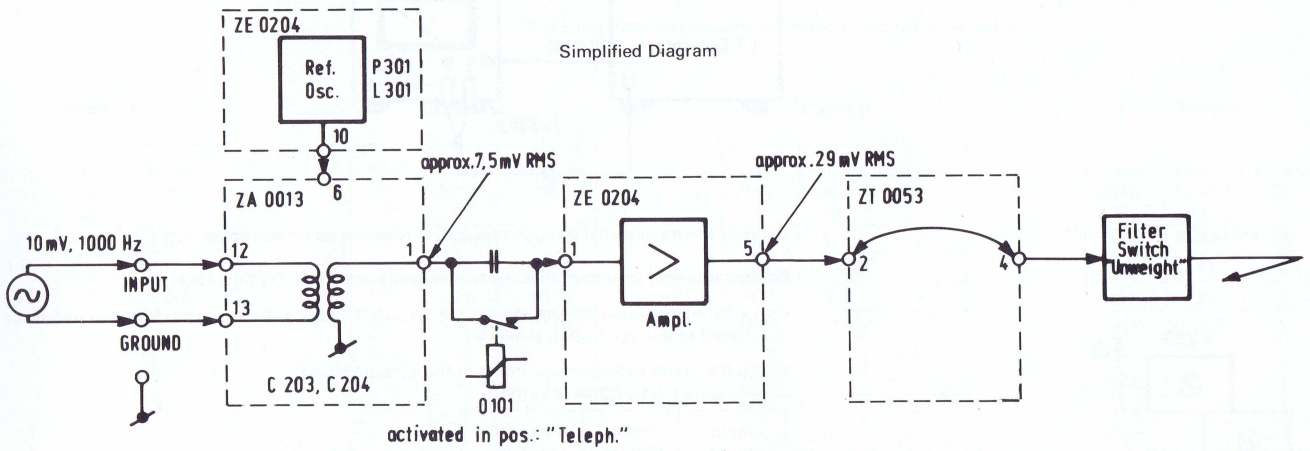
Check the noise according to below scheme:

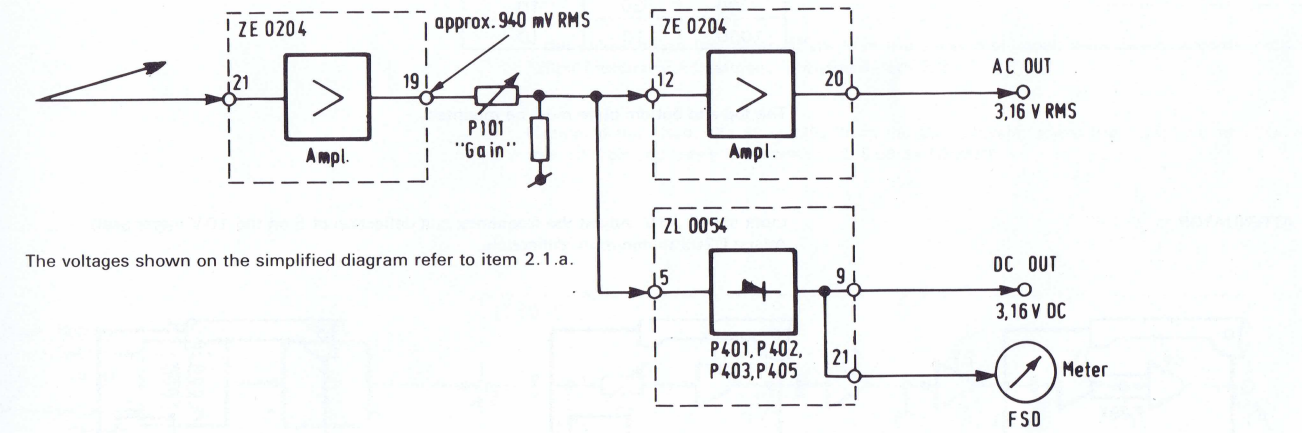
	Unweight Filter	Teleph. Filter	Radio I	Radio II
Max. Meter Deflec.	7 μV	6 μV	9 μV	13 μV

Notice! The top and bottom plates must be mounted.

ATTENUATOR: all released

"Overload" indication



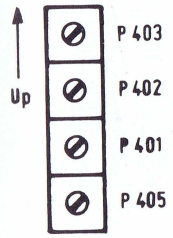


The voltages shown on the simplified diagram refer to item 2.1.a.

2.1. Amplifier-Meter

a. front:
ATTENUATOR: "10 mV"
DETECTOR: "Q-RMS"
REF. OSC.: "Normal"
IMPEDANCE: "> 10 kΩ"
FILTER: "Unweight"

rear:
CHASSIS connected to "SIGNAL GROUND"



Remove ZT 0053 and shortcircuit pin 2 and 4 in the socket on the Mother Board. (Input-Output signal).

Input signal 1000 Hz, 10 mV.
Check "AC OUT" voltage: 3,16 V RMS ± 10 mV.
If necessary adjust P101 "Gain" (from the rear plate).

Check "DC OUT" voltage: 3,16 V DC ± 10 mV
If necessary adjust P402 "RMS Gain" ZL 0054.

Attenuate the input signal 20 dB.
Check "DC OUT" voltage: 316 mV DC ± 3 mV.
If necessary adjust P405 "DC Off-Set"

Repeat the adjustments of P402 and P405 as they influence each others.

b. DETECTOR to "Q-Peak"

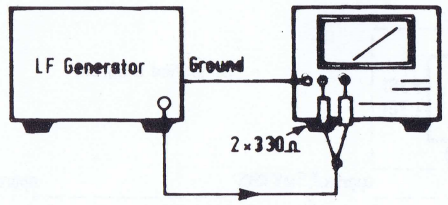
Increase the input signal by 20 dB.
Check "DC OUT" voltage: 3,16 V DC ± 10 mV.
If necessary adjust P401 "Peak Gain".

Check that the meter deflect to full scale.
If necessary adjust P403 "Meter Sensitivity".

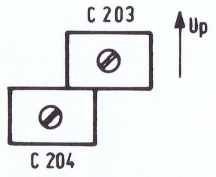
c. DETECTOR to "Q-RMS"
REF. OSC. to "Ref."

Check the frequency at "AC OUT": 1000 Hz ± 1 Hz.
If necessary adjust L301 "Osc. Frequency". ZE 0204.

Check that the meter indicate "Ref.".
If necessary adjust P301 "Ref. Level Adj.".



d. ATTENUATOR to "0,1 mV"



Connect the input signal through two 330 Ω resistors as shown above.

Notice! It is very important that the two resistors are equal. (Within 1%.)

Check by means of an oscilloscope at the "AC OUT" socket, that only the tuned-in frequency is supplied to the input. (Due to noise.)

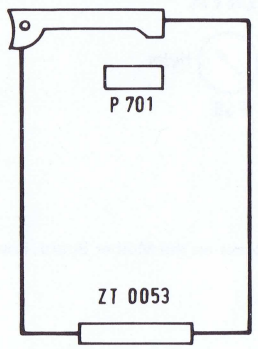
Check the meter deflection according to the scheme below:
If necessary adjust C204. ZA 0013.

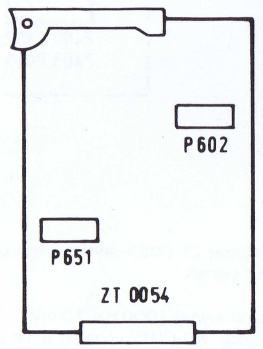
Input Frequency Hz	Input Voltage V RMS	Max. defl. on 10 V Meter Scale
50	100	5
300	30	10
1000	10	10

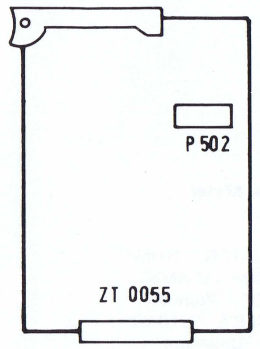
The top and bottom plate must be mounted.

e. ATTENUATOR to "0,1 V"

Input signal 30 V. Adjust the frequency to a deflection of 5 on the 10 V meter scale.
Adjust C203 to minimum deflection.







f. ATTENUATOR: "10 mV"
FILTER: "Unweight"

Input signal 1000 Hz adjusted to "0 dB" reading on the scale (approx. 8 mV).

Remove the short circuit and replace ZT 0053

Check "0 dB" deflection on the meter.
If necessary adjust P701 "Filter Gain".

g. FILTER to "Radio I"

Check "0 dB" deflection on the meter.
If necessary adjust P602 "Gain".

h. FILTER to "Radio II"

Check "0 dB" deflection on the meter.
If necessary adjust P651 "Gain".

i. FILTER to "Teleph."

Change the input frequency to 800 Hz.
Check "0 dB" on the meter.
If necessary adjust P502 "Gain".

k. Check the filter frequencies according to the schemes below:

Unweight

Input Freq. Hz	Filter Level dB	Tolerance dB
20	—1,5	± 0,5
1000	0	
20000	0	± 0,5

Radio I

Input Freq. Hz	Filter Level dB	Tolerance dB
20	< —40	∞
50	—34,3	± 1,5
100	—26,1	± 1,5
400	—8,8	± 1,5
1000	0	
2000	+ 5,3	± 1,5
4000	+ 8,2	± 1,5
8000	+ 5,1	± 1,5
10000	—9,7	± 3,0
20000	< —35	∞

Radio II

Input Freq. Hz	Filter Level dB	Tolerance dB
31,5	—29,9	± 2
100	—19,8	± 1
400	—7,8	± 0,7
1000	0	
2000	+ 5,6	± 0,5
4000	+ 10,5	± 0,5
8000	+ 11,4	± 0,4
10000	+ 8,1	± 0,8
20000	—22,2	± 2

Teleph.

Input Freq. Hz	Filter Level dB	Tolerance dB
50	—63	± 2
100	—41	± 2
200	—21	± 2
400	—,6,3	± 1
800	0	
1000	+ 1	± 1
1600	—1,7	± 1
2000	—3	± 1
3000	—5,5	± 1
4000	—15	± 2
5000	—36	± 3

If the indication on the meter differs from the above mentioned levels adjust according to the "Filter Frequency Adjustment" procedure item 2.2.

Notice! If the "Radio II" filter differ from the above levels, adjust the input level at 6300 Hz to + 12,2 dB and use a tolerance of ± 0,5 dB at 1000 Hz.

2.2. Filter Frequency Adjustment

a. ATTENUATOR: "30 mV"
DETECTOR: "Q-RMS"
REF. OSC. "Normal"
IMPEDANCE: "> 10 kΩ"
FILTER: "Teleph."

If troubles occur with a filter supply 1 kHz, 25 mV to the INPUT and check the amplification in each filter stage (TP1 to TP2, TP2 to TP3 etc.) in order to find a defective IC.
Amplification + 1 dB ± 2 dB.
When the defective component has been found and changed, check the instrument according to the Filter Table item 2.1.k.

If it is necessary to adjust the filter curves it will be necessary to use a Phasemeter.

After adjustment of a filter, check the gain according to item 2.1.f. to i and the filter curve according to item 2.1.k.

The filters can be adjusted as follows:

ZT 0055

Input signal: 3032 Hz ± 3 Hz adjusted to "0 dB" on the meter.
Check the phase shift between TP1 and TP2: 90° ± 0,2°.
If necessary adjust P501 "3081 Hz".

Change the input frequency to 3943 Hz ± 3 Hz.
Check the phase shift between TP3 and TP4: 90° ± 0,2°.
If necessary adjust P503 "3943 Hz".

Change the input frequency to 1500 Hz ± 1 Hz.
Check the phase shift between TP5 and output pin 4: 90° ± 0,2°.
If necessary adjust P504 "1599".

		ZT 0054
b.	FILTER to "Radio I"	Input signal 8424 Hz ± 4 Hz adjusted to "0 dB" on the meter. Check the phase shift between TP1 and TP2: 90° ± 0,2°. If necessary adjust P601 "8424 Hz".
c.	FILTER to "Radio II"	Change the input frequency to 10569 Hz ± 5 Hz. Check the phase shift between TP51 and TP52: 90° ± 0,2°. If necessary adjust P652 "10569 Hz". Change the input frequency to 6717 Hz ± 4 Hz. Check the phase shift between TP52 and the output pin 4: 90° ± 0,2°. If necessary adjust P653 "6717 Hz".

2.3. Attenuator-Overload

a.	ATTENUATOR: "30 mV" DETECTOR: "Q-RMS" REF. OSC.: "Normal" IMPEDANCE: "> 10 kΩ" FILTER: "Unweight"	Input signal 1000 Hz adjusted to "0 dB" on the meter. Check the ATTENUATOR steps in the following order: 30 mV to 0,1 V. Tolerance ± 0,2 dB. If necessary adjust P201 "Gain 0,1 — 30 V". ZA 0013.
b.	ATTENUATOR to "10 mV"	1 V to 3 V. Tolerance ± 0,2 dB. If necessary adjust P202.
c.		Input signal 1000 Hz adjusted to the level where the OVERLOAD lamp just flash. (Approx. 0,8 V). Decrease the input signal by 40 dB. Check that the meter read: + 1 dB ± 1 dB.

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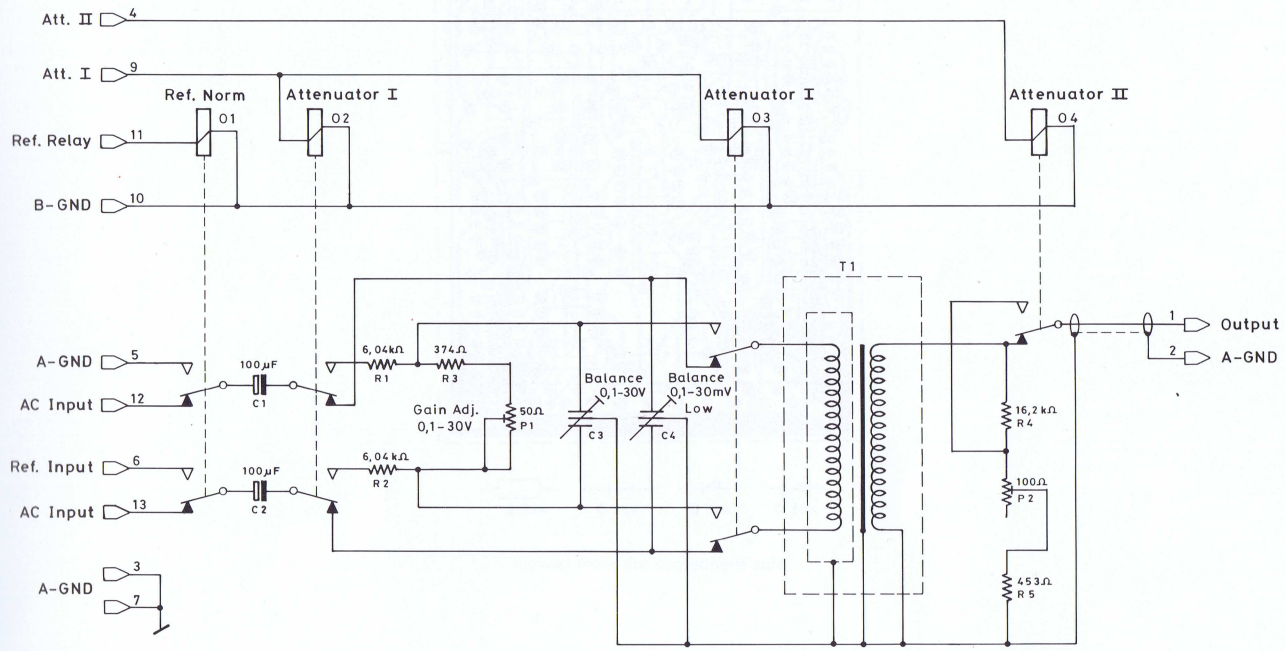
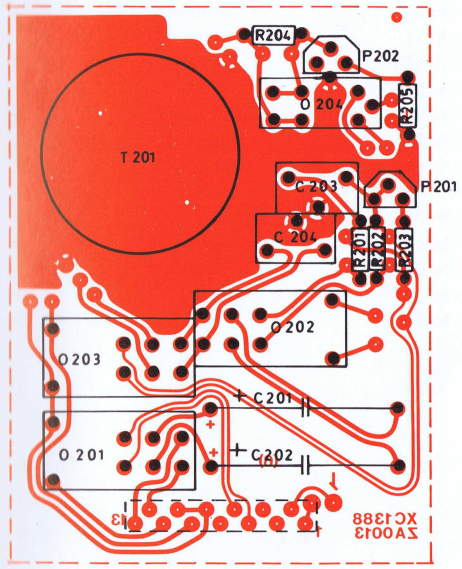
Circuit and Layout Diagrams with Parts List

ZA 0013

Balanced Input Section





Viewed from the component side

Remarks to position numbers: Add. 200 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
C 1,2	Electrolytic			100 µF/ 63 V	CE 0530
C 3,4	Trimmer			3,2 pF-31 pF/300 V	CV 0055
O 1-3	Relay			18 V	OC 0068
O 4	Reed Relay			12 V	OC 0059
P 1	Cermet	1/2 W		50 Ω	PG 0505
P 2	-	-		100 Ω	PG 1108
R 1,2	Metal	1/4 W	1%	6,04 kΩ	RF 3604
R 3	-	-	-	374 Ω	RF 2374
R 4	-	-	-	16,2 kΩ	RF 4162
R 5	-	-	-	453 Ω	RF 2453
T 1	Input Transformer				TI 0006
	Printed Circuit Board				XC 1388
	13-pin Plug for circuit board				JP 1301
	Lock for relay				SD 0014
	Locking Arm for circuit board				DZ 9015
	Retaining Rivet for locking arm				YN 0063

ZA 0013

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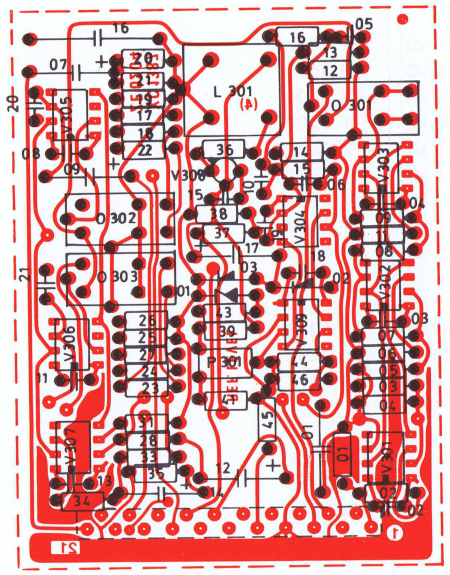
Circuit and Layout Diagrams with Parts List

ZE 0204
Amplifier and
Reference Oscillator

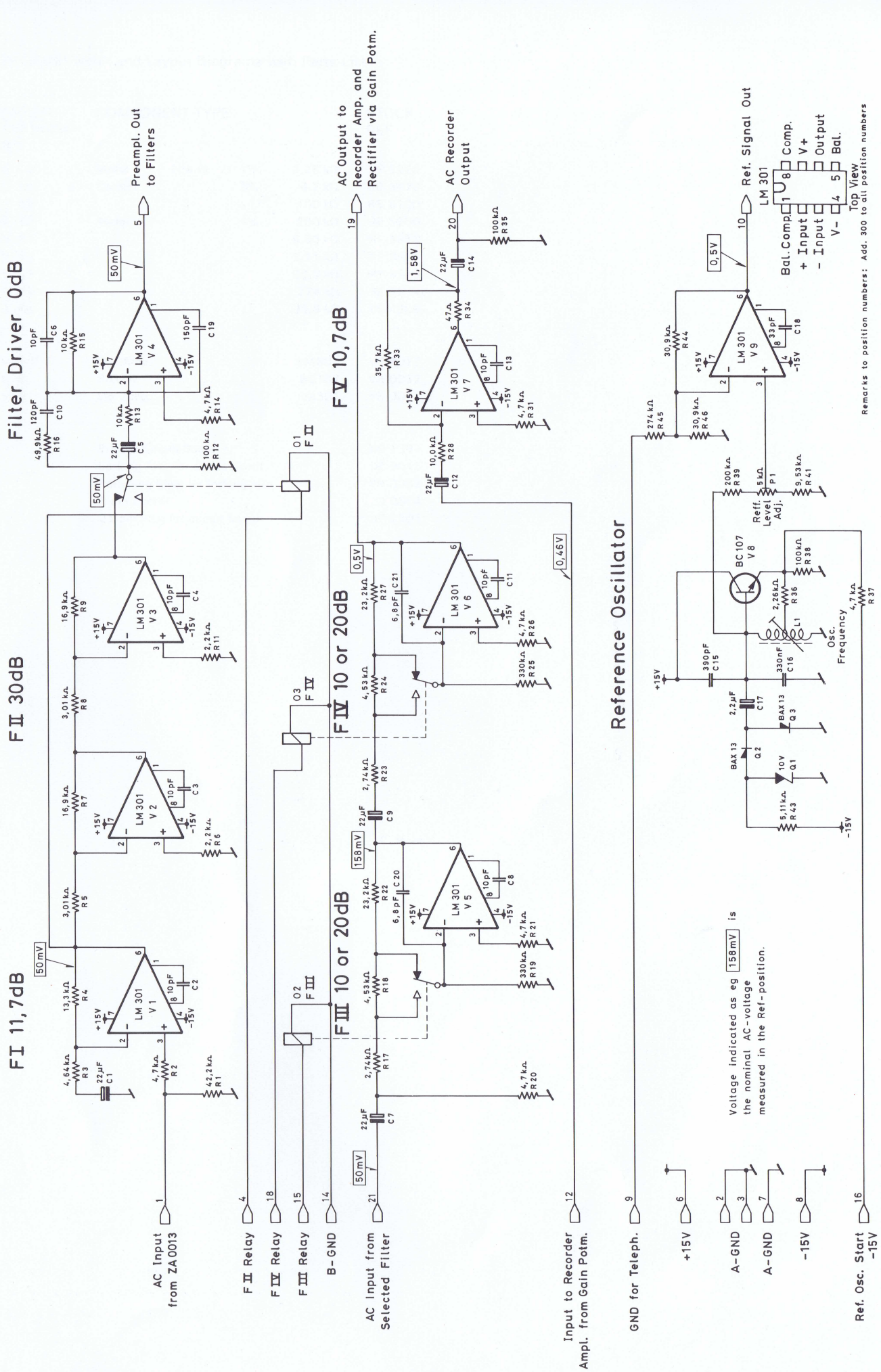


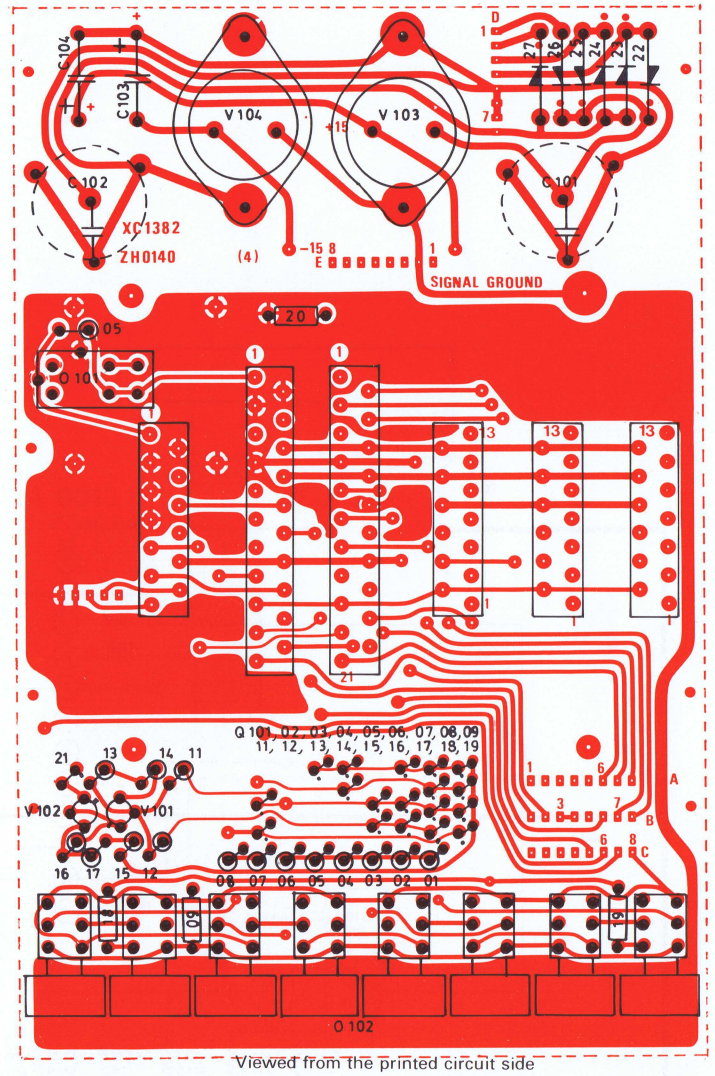
Viewed from the component side

Remarks to position numbers: Add. 300 to all position numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE			STOCK REF.
C 1	Electrolytic		22 µF/ 10 V	CE 0203
C 2-4	Ceramic		10 pF/400 V	CK 1100
C 5	Tantalum		22 µF/ 16 V	CF 0031
C 6	Ceramic		10 pF/400 V	CK 1100
C 7	Electrolytic		22 µF/ 10 V	CE 0203
C 8	Ceramic		10 pF/400 V	CK 1100
C 9	Electrolytic		22 µF/ 10 V	CE 0203
C 10	Ceramic		120 pF/400 V	CK 2122
C 11	-		10 pF/400 V	CK 1100
C 12	Electrolytic		22 µF/ 10 V	CE 0203
C 13	Ceramic		10 pF/400 V	CK 1100
C 14	Electrolytic		22 µF/ 10 V	CE 0203
C 15	Ceramic		390 pF/400 V	CK 2391
C 16	Polycarbonate		330 nF/100 V	CS 0340
C 17	Electrolytic		2,2 µF/ 63 V	CE 0401
C 18	Ceramic		33 pF/400 V	CK 1330
C 19	-		150 pF/400 V	CK 2151
C 20,21	-		6,8 pF/400 V	CK 0680
L 1	Osc. Frequency			LB 0660
O 1-3	Reed Relay		12 V	OC 0059
P 1	Cermet	1/2 W	5 kΩ	PG 2521
Q 1	Ze.	BZX83C10	9,5-10,5 V/5 mA	QV 1350
Q 2,3	Si.	BAX13	50 V/150 mA	QV 0223

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 1	Metal	1/4 W	1%	42,2 kΩ	RF 4422
R 2	Carbon	-	5%	4,7 kΩ	RB 3470
R 3	Metal	-	1%	4,64 kΩ	RF 3464
R 4	-	-	-	13,3 kΩ	RF 4133
R 5	-	-	-	3,01 kΩ	RF 3301
R 6	Carbon	-	5%	2,20 kΩ	RB 3220
R 7	Metal	-	1%	16,9 kΩ	RF 4169
R 8	-	-	-	3,01 kΩ	RF 3301
R 9	-	-	-	16,9 kΩ	RF 4169
R 11	Carbon	-	5%	2,20 kΩ	RB 3220
R 12	-	-	-	100 kΩ	RB 5100
R 13	Metal	-	1%	10 kΩ	RF 4100
R 14	Carbon	-	5%	4,7 kΩ	RB 3470
R 15	Metal	-	1%	10 kΩ	RF 4100
R 16	-	-	-	49,9 kΩ	RF 4499
R 17	-	-	-	2,74 kΩ	RF 3274
R 18	-	-	-	4,53 kΩ	RF 3453
R 19	Carbon	-	5%	330 kΩ	RB 5330
R 20,21	-	-	-	4,7 kΩ	RB 3470
R 22	Metal	-	1%	23,2 kΩ	RF 4232
R 23	-	-	-	2,74 kΩ	RF 3274
R 24	-	-	-	4,53 kΩ	RF 3453
R 25	Carbon	-	5%	330 kΩ	RB 5330
R 26	-	-	-	4,7 kΩ	RB 3470
R 27	Metal	-	1%	23,2 kΩ	RF 4232
R 28	-	-	-	10 kΩ	RF 4100
R 31	Carbon	-	5%	4,7 kΩ	RB 3470
R 33	Metal	-	1%	35,7 kΩ	RF 4357
R 34	Carbon	-	5%	47 Ω	RB 1470
R 35	-	-	-	100 kΩ	RB 5100





Viewed from the printed circuit side

Remarks to position numbers: Add. 100 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE			STOCK REF.
C 1,2	Electrolytic	2200 µF/ 40 V		CE 0433
C 3,4	-	22 µF/ 25 V		CE 2002
C 5	Polystyrene	2,2 nF/ 63 V		CT 1126
O 1	Reed Relay	12 V		OC 0059
Q 1-17	Silicon	BAX13	50 V/150 mA	QV 0223
Q 18,19	Germ.	OA47	25 V/110 mA	QV 0094
Q 20,21	Silicon	BAX13	50 V/150 mA	QV 0223
Q 22-27	-	1N4004	400 V/ 1 A	QV 0237
R 1-8	Metal	1/4 W	1% 8,06 kΩ	RF 3806
R 9	-	-	- 2 kΩ	RF 3200
R 11,12	-	-	- 13,3 kΩ	RF 4133
R 13	-	-	- 1 kΩ	RF 3100
R 14	-	-	- 221 Ω	RF 2221
R 15	-	-	- 2,55 kΩ	RF 3225
R 16	-	-	- 2,21 kΩ	RF 3221

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 17	Metal	1/4 W	1%	3,01 kΩ	RF 3301
R 18,19	-	-	-	14 kΩ	RF 4140
R 20	-	-	-	1 kΩ	RF 3100
V 1	Silicon	NPN		BC107	VB 0032
V 2	-	PNP		BC177	VB 0071
V 3	+ 15 V	Regulator		LM340	VE 0055
V 4	—15 V	-		LM320	VE 0056

Printed Circuit Board	XC 1382
Mica Washer for regulator	DU 0095
13-pin Socket for circuit board	JJ 1301
13-pin Socket for circuit board	JJ 1305
21-pin Socket for circuit board	JJ 2102
Metal Screen	GS 0331
Microsocket for metal Screen	JJ 0056
dB Selector	OJ 0068
Angular Connector for input signal	JP 0503
Wire-wrap pin for Multiconnector	JL 1001

ZH 0140

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 36	Metal	1/4 W	1%	2,26 kΩ	RF 3226
R 37	Carbon	-	5%	4,7 kΩ	RB 3470
R 38	-	-	-	100 kΩ	RB 5100
R 39	Metal	-	1%	200 kΩ	RF 5200
R 41	-	-	-	9,53 kΩ	RF 3953
R 43	-	-	-	5,11 kΩ	RF 3511
R 44	-	-	-	30,9 kΩ	RF 4309
R 45	-	-	-	274 kΩ	RF 5274
R 46	-	-	-	30,9 kΩ	RF 4309
V 1-7	Op. Amp.			LM301	VE 0017
V 8	Silicon			BC107	VB 0032
V 9	Op. Amp.			LM301	VE 0017
	Printed Circuit Board				XC 1387
	Locking Arm for circuit board				DZ 9015
	Retaining Rivet for locking arm				YN 0063
	8-pin Socket				JJ 0804
	21-pin Plug for circuit board				JP 2101

R 1xx

Q 1xx

CIRCUIT DIAGRAM REF.	COMPO
C 1,2	Electroly
C 3,4	-
C 5	Polystyr
O 1	Reed Re
Q 1-17	Silicon
Q 18,19	Germ.
Q 20,21	Silicon
Q 22-27	-
R 1-8	Metal
R 9	-
R 11,12	-
R 13	-
R 14	-
R 15	-
R 16	-

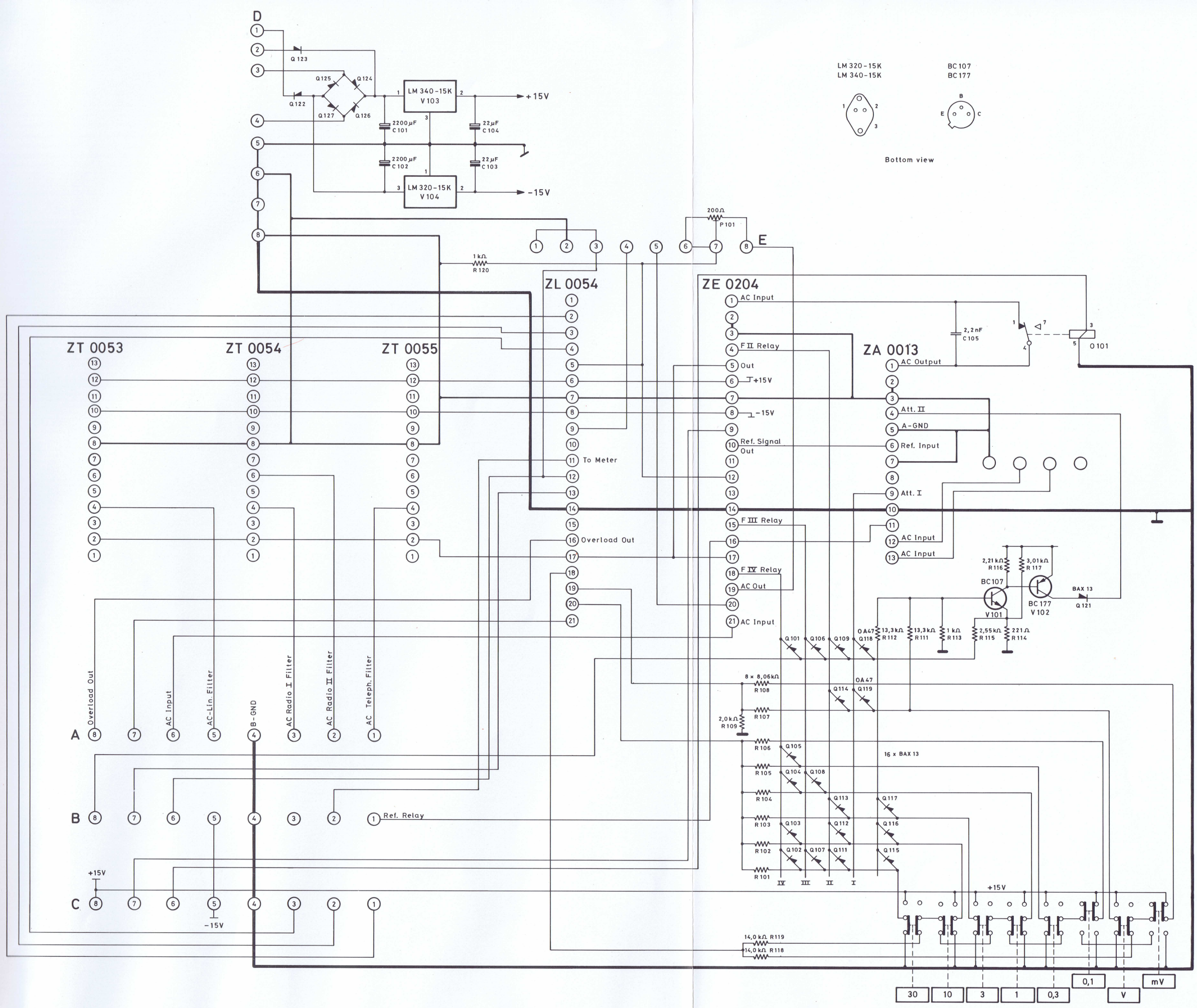
ist

ZH 0140

Mother Board

NENT TYPE

			STOCK REF.
1/4 W	1%	3,01 kΩ	RF 3301
-	-	14 kΩ	RF 4140
-	-	1 kΩ	RF 3100
NPN		BC107	VB 0032
PNP		BC177	VB 0071
Regulator		LM340	VE 0055
-		LM320	VE 0056
rcuit Board			XC 1382
her for regulator			DU 0095
cket for circuit board			JJ 1301
cket for circuit board			JJ 1305
cket for circuit board			JJ 2102
een			GS 0331
et for metal Screen			JJ 0056
or			OJ 0068
onnector for input signal			JP 0503
pin for Multiconnector			JL 1001



606893 - 14.4.76 - ZH 0140 - 2429

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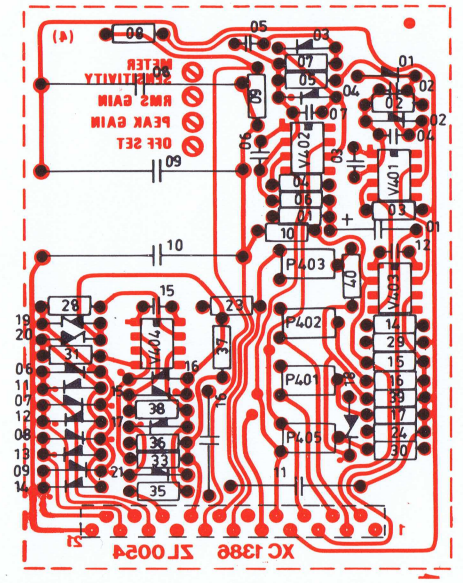
Circuit and Layout Diagrams with Parts List

ZL 0054

Meter Circuit and
Overload Detector



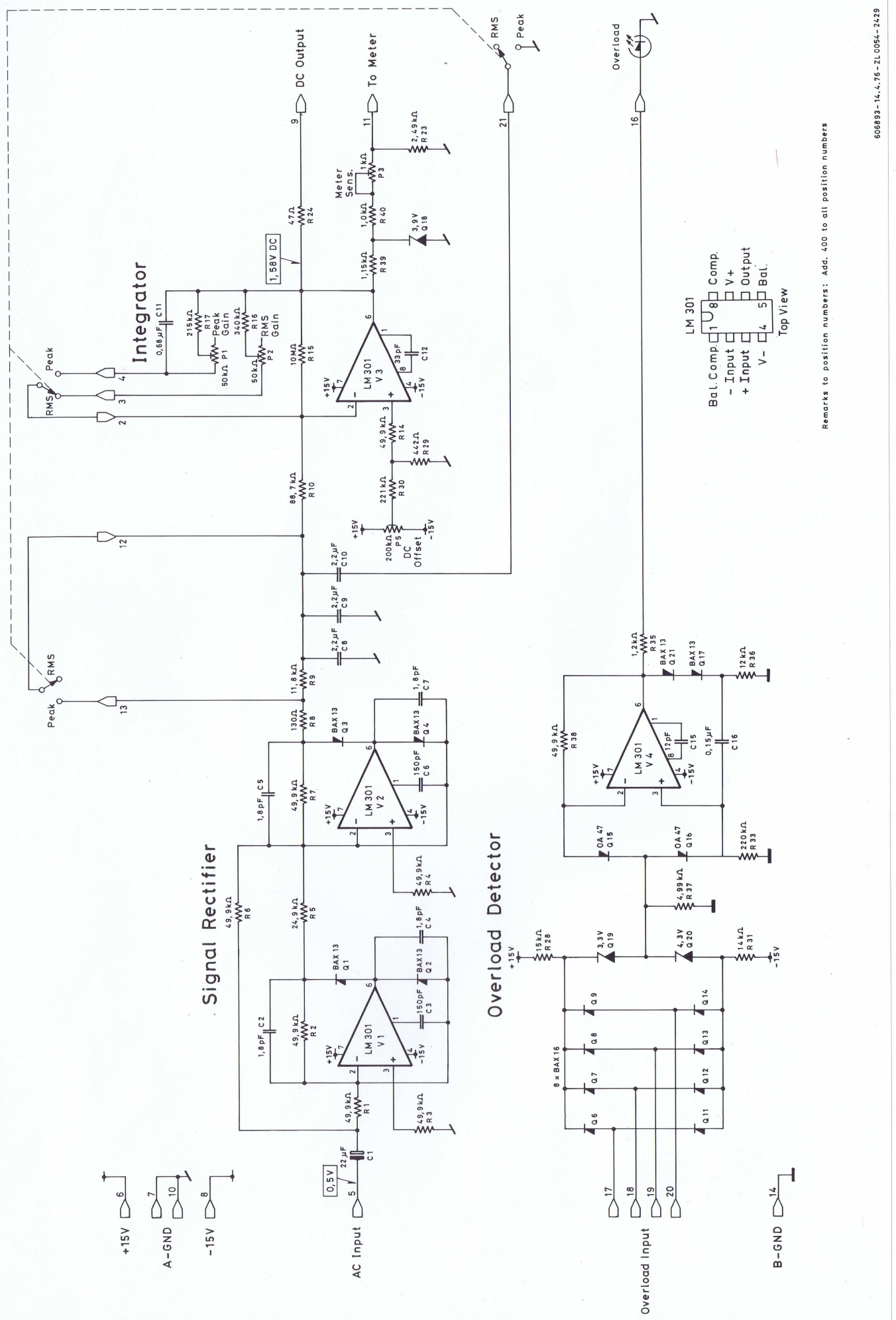
Viewed from the component side

Remarks to position numbers: Add. 400 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE		STOCK REF.
C 1	Electrolytic	22 µF/ 10 V	CE 0203
C 2	Ceramic	1,8 pF/400 V	CK 0180
C 3	-	150 pF/400 V	CK 2151
C 4,5	-	1,8 pF/400 V	CK 0180
C 6	-	150 pF/400 V	CK 2151
C 7	-	1,8 pF/400 V	CK 0180
C 8-10	Polycarbonate	2,2 µF/100 V	CS 0344
C 11	-	0,68 µF/100 V	CS 0342
C 12	Ceramic	33 pF/400 V	CK 1330
C 15	-	12 pF/400 V	CK 1120
C 16	Polycarbonate	150 nF/100 V	CS 0337
P 1,2	Cermet 1/2 W	50 kΩ	PG 3516
P 3	- -	1 kΩ	PG 2117
P 5	- -	200 kΩ	PG 4208
Q 1-4	Si. BAX13	50 V/150 mA	QV 0223
Q 6-14	- BAX16	150 V/300 mA	QV 0217
Q 15,16	Germ. OA47	25 V/110 mA	QV 0094
Q 17	Si. BAX13	50 V/150 mA	QV 0223
Q 18	Ze. BZX83	3,7-4,1 V/5 mA	QV 1357
Q 19	- BZX83	3,1-3,5 V/5 mA	QV 1361
Q 20	- ZF 4,3	4-4,6 V/5 mA	QV 1110
Q 21	Si. BAX13	50 V/150 mA	QV 0223

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 1-4	Metal	1/4 W	1%	49,9 kΩ	RF 4499
R 5	-	-	-	24,9 kΩ	RF 4249
R 6,7	-	-	-	49,9 kΩ	RF 4499
R 8	-	-	-	130 Ω	RF 2130
R 9	-	-	-	11,8 kΩ	RF 4118
R 10	-	-	-	88,7 kΩ	RF 4887
R 14	-	-	-	49,9 kΩ	RF 4499
R 15	Carbon	-	5%	10 MΩ	RB 7100
R 16	Metal	-	1%	340 kΩ	RF 5340
R 17	-	-	-	215 kΩ	RF 5215
R 23	-	-	-	2,49 kΩ	RF 3249
R 24	Carbon	-	5%	47 Ω	RB 1470
R 28	Metal	-	1%	15 kΩ	RF 4150
R 29	-	-	-	442 Ω	RF 2442
R 30	-	-	-	221 kΩ	RF 5221
R 31	-	-	-	14 kΩ	RF 4140
R 33	Carbon	-	5%	220 kΩ	RB 5220
R 35	-	-	-	1,2 kΩ	RB 3120
R 36	-	-	-	12 kΩ	RB 4120
R 37	Metal	-	1%	4,99 kΩ	RF 3499
R 38	-	-	-	49,9 kΩ	RF 4499
R 39	-	-	-	1,15 kΩ	RF 3115
R 40	-	-	-	1 kΩ	RF 3100
V 1-4	Op. Amp.			LM301	VE 0017

Printed Circuit Board	XC 1386
21-pin Plug for circuit board	JP 2101
Locking Arm for circuit board	DZ 9015
Retaining Rivet for circuit board	YN 0063



Remarks to position numbers: Add. 400 to all position numbers

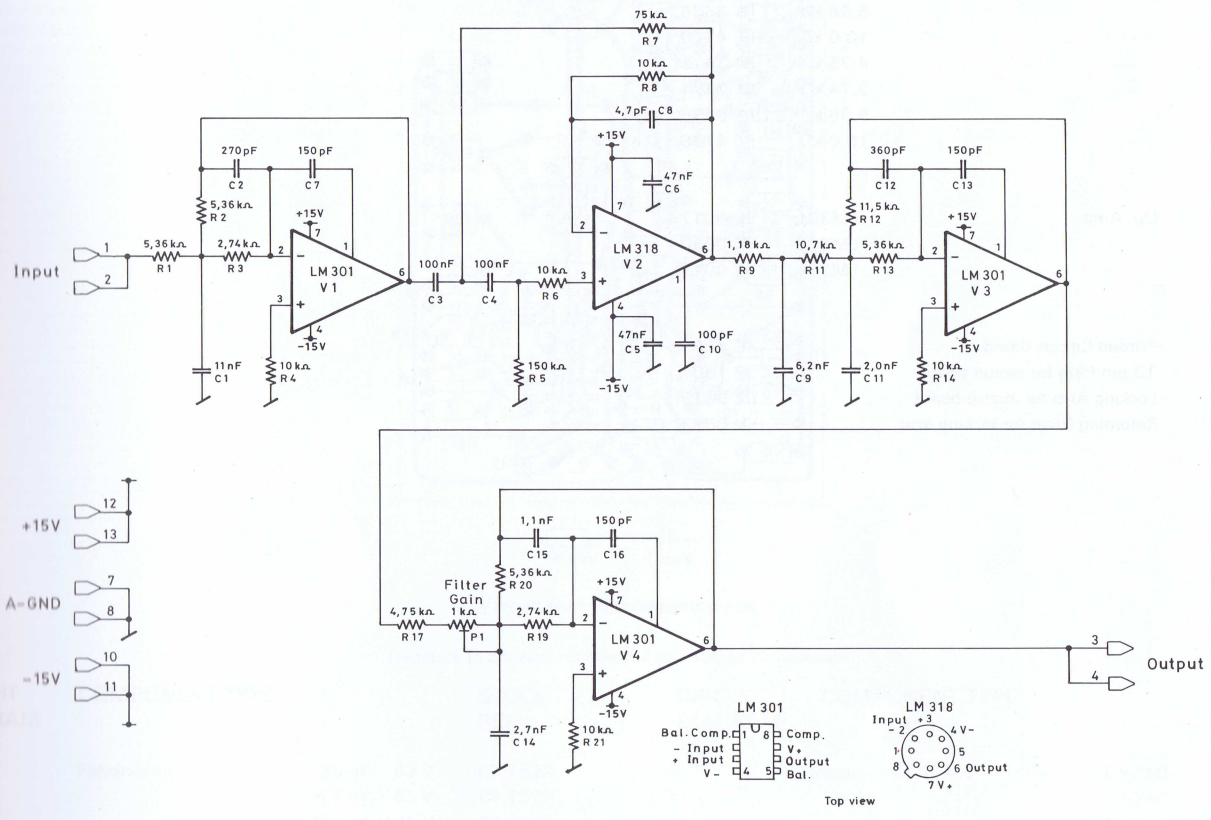
606893-14.4.76-2L0054-2429

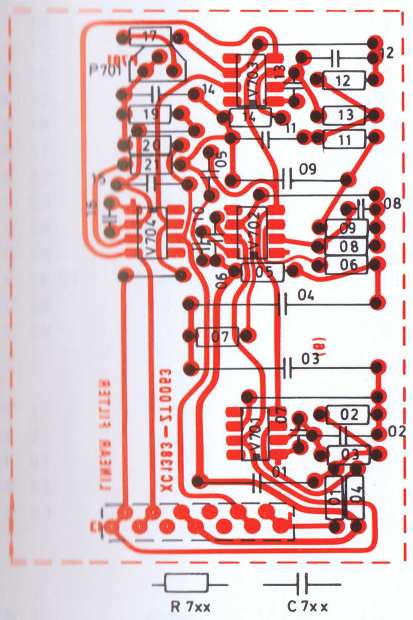
Circuit and Layout Diagrams with Parts List

ZT 0053

Unweighting Filter

Unweighting Filter





Viewed from the component side

Remarks to position numbers: Add. 700 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
C 1	Polystyrene			11 nF/ 63 V	CT 1551
C 2	-			270 pF/125 V	CT 1143
C 3,4	-			100 nF/ 63 V	CT 1543
C 5,6	Ceramic			47 nF/ 30 V	CK 4470
C 7	-			150 pF/400 V	CK 2151
C 8	-			4,7 pF/400 V	CK 0470
C 9	Polystyrene			6,2 nF/ 63 V	CT 1510
C 10	Ceramic			100 pF/400 V	CK 2103
C 11	Polystyrene			2 nF/ 63 V	CT 1123
C 12	-			360 pF/125 V	CT 1113
C 13	Ceramic			150 pF/400 V	CK 2151
C 14	Polystyrene			2,7 nF/ 63 V	CT 1158
C 15	-			1,1 nF/ 63 V	CT 1148
C 16	Ceramic			150 pF/400 V	CK 2151
P 1	Cermet	0,5 W		1 kΩ	PG 2114
R 1,2	Metal	1/4 W	1%	5,36 kΩ	RF 3536
R 3	-	-	-	2,74 kΩ	RF 3274
R 4	-	-	-	10,0 kΩ	RF 4100
R 5	-	-	-	150,0 kΩ	RF 5150
R 6	-	-	-	10,0 kΩ	RF 4100
R 7	-	-	-	75,0 kΩ	RF 4750
R 8	-	-	-	10,0 kΩ	RF 4100

ZT 0053

ZT 0053 Circuit and Layout Diagram with Parts List

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 9	Metal	1/4 W	1%	1,18 kΩ	RF 3118
R 11	-	-	-	10,7 kΩ	RF 4107
R 12	-	-	-	11,5 kΩ	RF 4115
R 13	-	-	-	5,36 kΩ	RF 3536
R 14	-	-	-	10,0 kΩ	RF 4100
R 17	-	-	-	4,75 kΩ	RF 3475
R 19	-	-	-	2,74 kΩ	RF 3274
R 20	-	-	-	5,36 kΩ	RF 3536
R 21	-	-	-	10,0 kΩ	RF 4100
V 1	Op. Amp.			LM301	VE 0017
V 2	- -			LM318	VE 0050
V 3,4	- -			LM301	VE 0017
	Printed Circuit Board				XC 1383
	13-pin Plug for circuit board				JP 1301
	Locking Arm for circuit board				DZ 9015
	Retaining Rivet for locking arm				YN 0063

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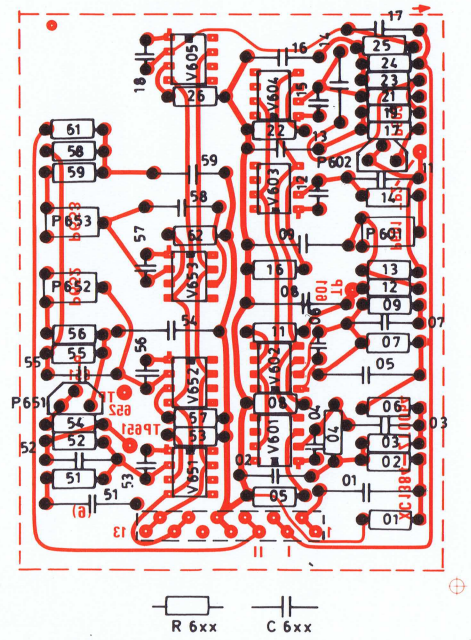
Circuit and Layout Diagrams with Parts List

ZT 0054

Radio Filter I & II



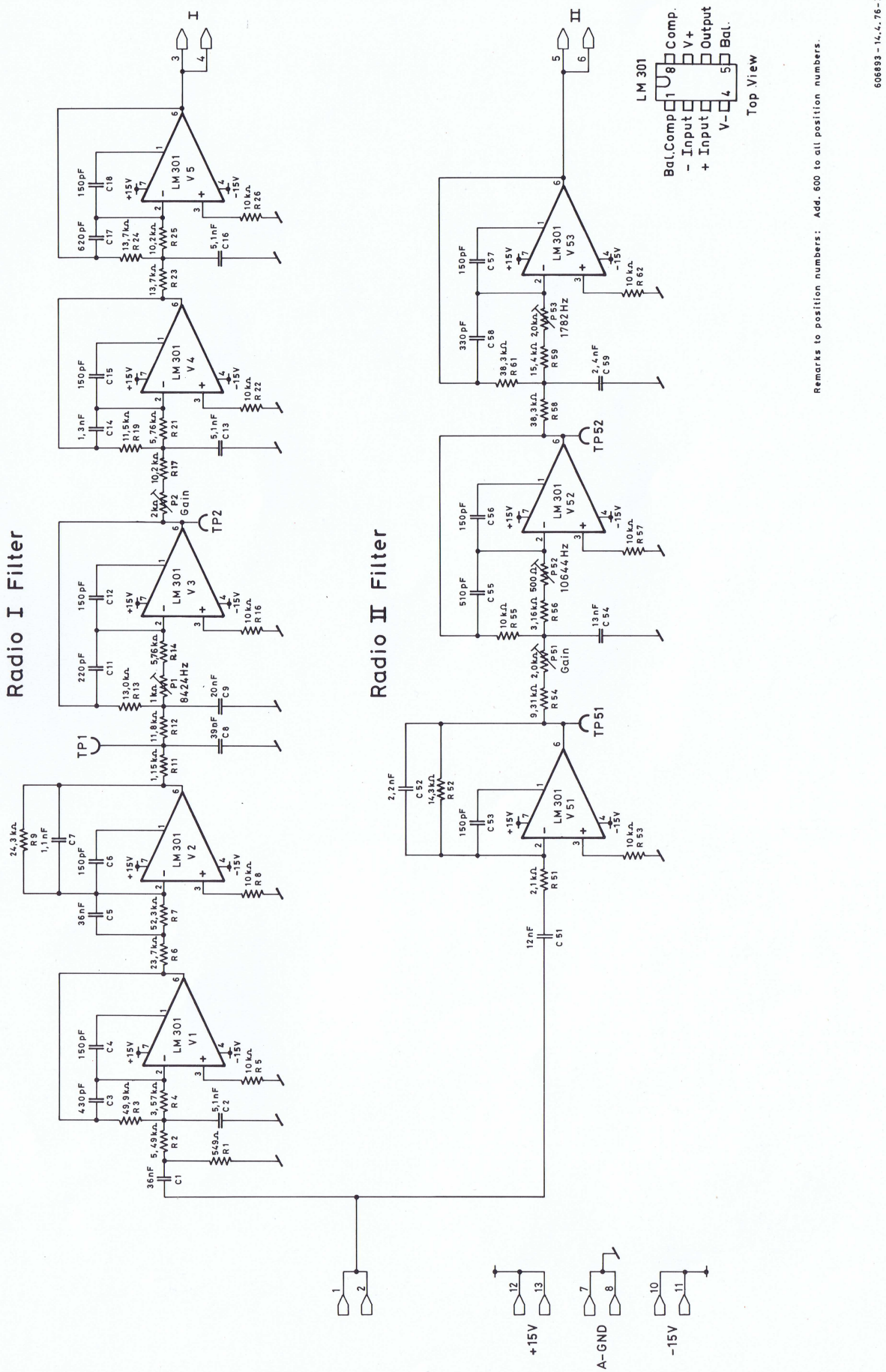
Viewed from the component side

Remarks to position numbers: Add. 600 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE			STOCK REF.
C 1	Polystyrene	36 nF/ 63 V	CT 1520	
C 2	-	5,1 nF/ 63 V	CT 1179	
C 3	-	430 pF/125 V	CT 1145	
C 4	Ceramic	150 pF/400 V	CK 2151	
C 5	Polystyrene	36 nF/ 63 V	CT 1520	
C 6	Ceramic	150 pF/400 V	CK 2151	
C 7	Polystyrene	1,1 nF/ 63 V	CT 1148	
C 8	-	39 nF/ 63 V	CT 1541	
C 9	-	20 nF/ 63 V	CT 1125	
C 11	-	220 pF/125 V	CT 1141	
C 12	Ceramic	150 pF/400 V	CK 2151	
C 13	Polystyrene	5,1 nF/ 63 V	CT 1179	
C 14	-	1,3 nF/ 63 V	CT 1150	
C 15	Ceramic	150 pF/400 V	CK 2151	
C 16	Polystyrene	5,1 nF/ 63 V	CT 1179	
C 17	-	620 pF/100 V	CT 1109	
C 18	Ceramic	150 pF/400 V	CK 2151	
C 51	Polystyrene	12 nF/ 63 V	CT 1514	
C 52	-	2,2 nF/ 63 V	CT 1126	
C 53	Ceramic	150 pF/400 V	CK 2151	
C 54	Polystyrene	13 nF/ 63 V	CT 1560	
C 55	-	510 pF/125 V	CT 1135	
C 56,57	Ceramic	150 pF/400 V	CK 2151	
C 58	Polystyrene	330 pF/125 V	CT 1144	
C 59	-	2,4 nF/ 63 V	CT 1129	
P 1	Cermet	1/2 W	1 kΩ	PG 2117
P 2	-	-	2 kΩ	PG 2212
P 51	-	-	2 kΩ	PG 2212
P 52	-	-	500 Ω	PG 1512
P 53	-	-	2 kΩ	PG 2214
R 1	Metal	1/4 W	1%	549 Ω	RF 2549
R 2	-	-	-	5,49 kΩ	RF 3549
R 3	-	-	-	49,9 kΩ	RF 4499

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 4	Metal	1/4 W	1%	3,57 kΩ	RF 3357
R 5	-	-	-	10 kΩ	RF 4100
R 6	-	-	-	23,7 kΩ	RF 4237
R 7	-	-	-	52,3 kΩ	RF 4523
R 8	-	-	-	10 kΩ	RF 4100
R 9	-	-	-	24,3 kΩ	RF 4243
R 11	-	-	-	1,15 kΩ	RF 3115
R 12	-	-	-	11,8 kΩ	RF 4118
R 13	-	-	-	13 kΩ	RF 4130
R 14	-	-	-	5,76 kΩ	RF 3576
R 16	-	-	-	10 kΩ	RF 4100
R 17	-	-	-	10,2 kΩ	RF 4102
R 19	-	-	-	11,5 kΩ	RF 4115
R 21	-	-	-	5,76 kΩ	RF 3576
R 22	-	-	-	10 kΩ	RF 4100
R 23,24	-	-	-	13,7 kΩ	RF 4137
R 25	-	-	-	10,2 kΩ	RF 4102
R 26	-	-	-	10 kΩ	RF 4100
R 51	-	-	-	2,10 kΩ	RF 3210
R 52	-	-	-	14,3 kΩ	RF 4143
R 53	-	-	-	10 kΩ	RF 4100
R 54	-	-	-	9,31 kΩ	RF 3931
R 55	-	-	-	10 kΩ	RF 4100
R 56	-	-	-	3,16 kΩ	RF 3316
R 57	-	-	-	10 kΩ	RF 4100
R 58	-	-	-	38,3 kΩ	RF 4383
R 59	-	-	-	15,4 kΩ	RF 4154
R 61	-	-	-	38,3 kΩ	RF 4383
R 62	-	-	-	10 kΩ	RF 4100
V 1-5	Op. Amp.			LM301	VE 0017
V 51-53	- -			LM301	VE 0017
	Printed Circuit Board				XC 1384
	13-pin Plug for circuit board				JP 1301
	Locking Arm for circuit board				DZ 9015
	Retaining Rivet for locking arm				YN 0063

2429 from serial no. 606893



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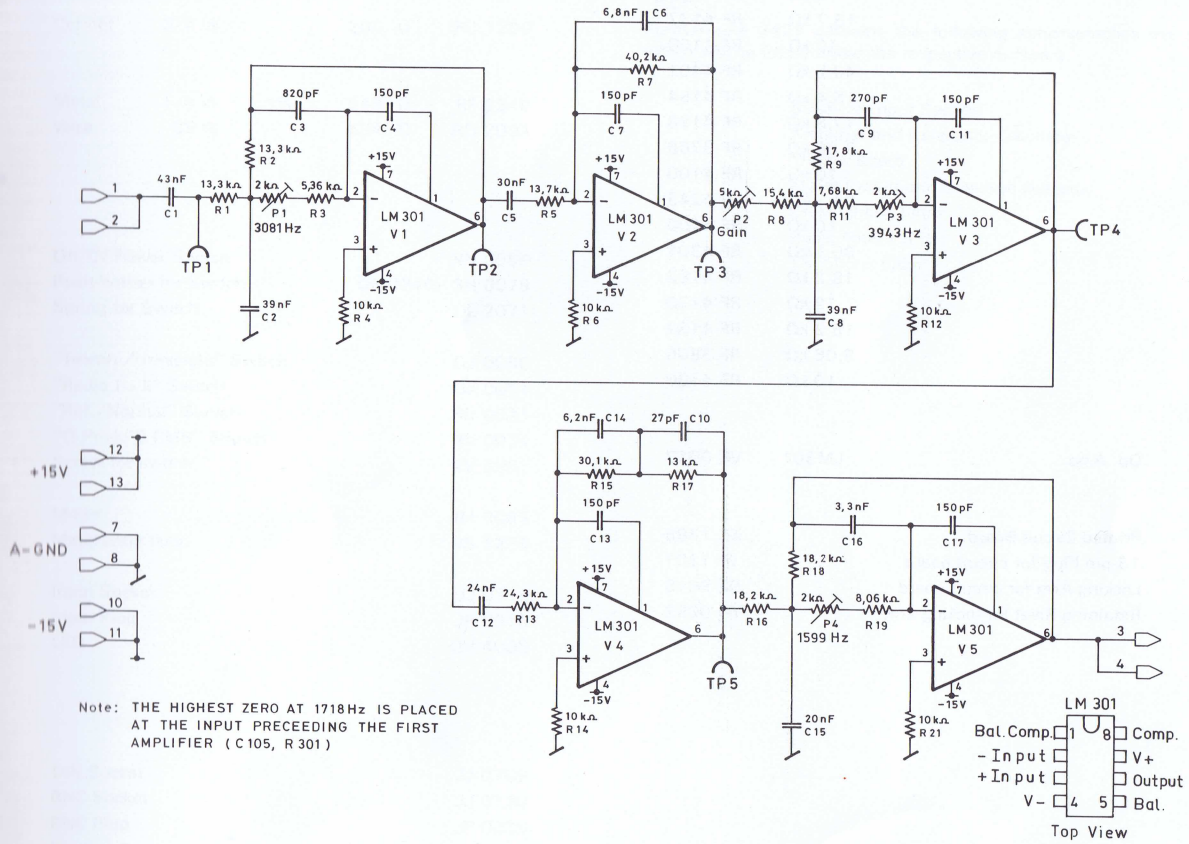
Circuit and Layout Diagrams with Parts List

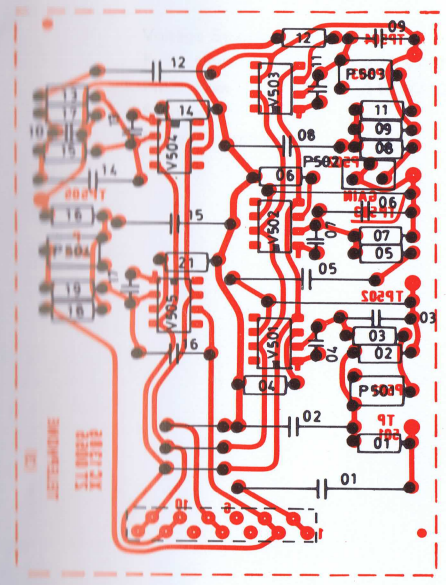
ZT 0055

Telephone Filter

Telephone Filter



Note: THE HIGHEST ZERO AT 1718Hz IS PLACED AT THE INPUT PRECEEDING THE FIRST AMPLIFIER (C105, R301)



Viewed from the component side

Remarks to position numbers: Add. 500 to all numbers

CIRCUIT DIAGRAM REF.	COMPONENT TYPE			STOCK REF.
C 1	Polystyrene		43 nF/ 63 V	CT 1567
C 2	-		39 nF/ 63 V	CT 1541
C 3	-		820 pF/ 63 V	CT 1532
C 4	Ceramic		150 pF/400 V	CK 2151
C 5	Polystyrene		30 nF/ 63 V	CT 1519
C 6	-		6,8 nF/ 63 V	CT 1511
C 7	Ceramic		150 pF/400 V	CK 2151
C 8	Polystyrene		39 nF/ 63 V	CT 1541
C 9	-		270 pF/125 V	CT 1143
C 10	Ceramic		27 pF/400 V	CK 1270
C 11	-		150 pF/400 V	CK 2151
C 12	Polystyrene		24 nF/ 63 V	CT 1540
C 13	Ceramic		150 pF/400 V	CK 2151
C 14	Polystyrene		6,2 nF/ 63 V	CT 1510
C 15	-		20 nF/ 63 V	CT 1125
C 16	-		3,3 nF/ 30 V.	CT 1544
C 17	Ceramic		150 pF/400 V	CK 2151
P 1	Cermet	1/2 W	2 kΩ	PG 2214
P 2	-	-	5 kΩ	PG 2520
P 3,4	-	-	2 kΩ	PG 2214

ZT 0055

2429 from serial no. 606893

ZT 0055 Circuit and Layout Diagrams with Parts List

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 1,2	Metal	1/4 W	1%	13,3 kΩ	RF 4133
R 3	-	-	-	5,36 kΩ	RF 3536
R 4	-	-	-	10 kΩ	RF 4100
R 5	-	-	-	13,7 kΩ	RF 4137
R 6	-	-	-	10 kΩ	RF 4100
R 7	-	-	-	40,2 kΩ	RF 4402
R 8	-	-	-	15,4 kΩ	RF 4154
R 9	-	-	-	17,8 kΩ	RF 4178
R 11	-	-	-	7,68 kΩ	RF 3768
R 12	-	-	-	10 kΩ	RF 4100
R 13	-	-	-	24,3 kΩ	RF 4243
R 14	-	-	-	10 kΩ	RF 4100
R 15	-	-	-	30,1 kΩ	RF 4301
R 16	-	-	-	18,2 kΩ	RF 4182
R 17	-	-	-	13 kΩ	RF 4130
R 18	-	-	-	18,2 kΩ	RF 4182
R 19	-	-	-	8,06 kΩ	RF 3806
R 21	-	-	-	10 kΩ	RF 4100
V 1-5	Op. Amp.			LM301	VE 0017
	Printed Circuit Board				XC 1385
	13-pin Plug for circuit board				JP 1301
	Locking Arm for circuit board				DZ 9015
	Retaining Rivet for locking arm				YN 0063

Block Diagram with Parts List

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
P 101	Cermet	3/4 W		200 Ω	PG 1205
R 121	Metal	1/4 W	1%	549 Ω	RF 2549
R 122	Wire	25 W	-	634 Ω	RO 2004
Front Plate					
	On/Of Power Switch				NN 0069
	Push button for Switch			DP 0240+	SN 0079
	Spring for Switch				DL 2071
	"Teleph./Unweight" Switch				OJ 0060
	"Radio I + II" Switch				OJ 0061
	"Ref./Normal" Switch				NN 0031
	"Q-Peak/Q RMS" Switch				NN 0035
	Screw for switch				YV 3081
	Meter				IM 0067
	Meterscale lamp				VS 1274
	Input Socket				JJ 0316
	Input Plug				JP 0316
	LED				QV 4000
Rear Plate					
	DIN Socket				JJ 0709
	BNC Socket				JJ 0130
	BNC Plug				JP 0035
	Binding Post				JK 6273
	Shorting Link				DK 0182
	Mains Socket				OA 0037
	Mains Cord				AN 0010
	Voltage Selector				JS 0001
	Fuse, slow	220 V/ 63 mA			VF 0047
	Fuse, slow	115 V/125 mA			VF 0030
	Stand-off				XL 0163
	Bridge Transformer				TN 1010

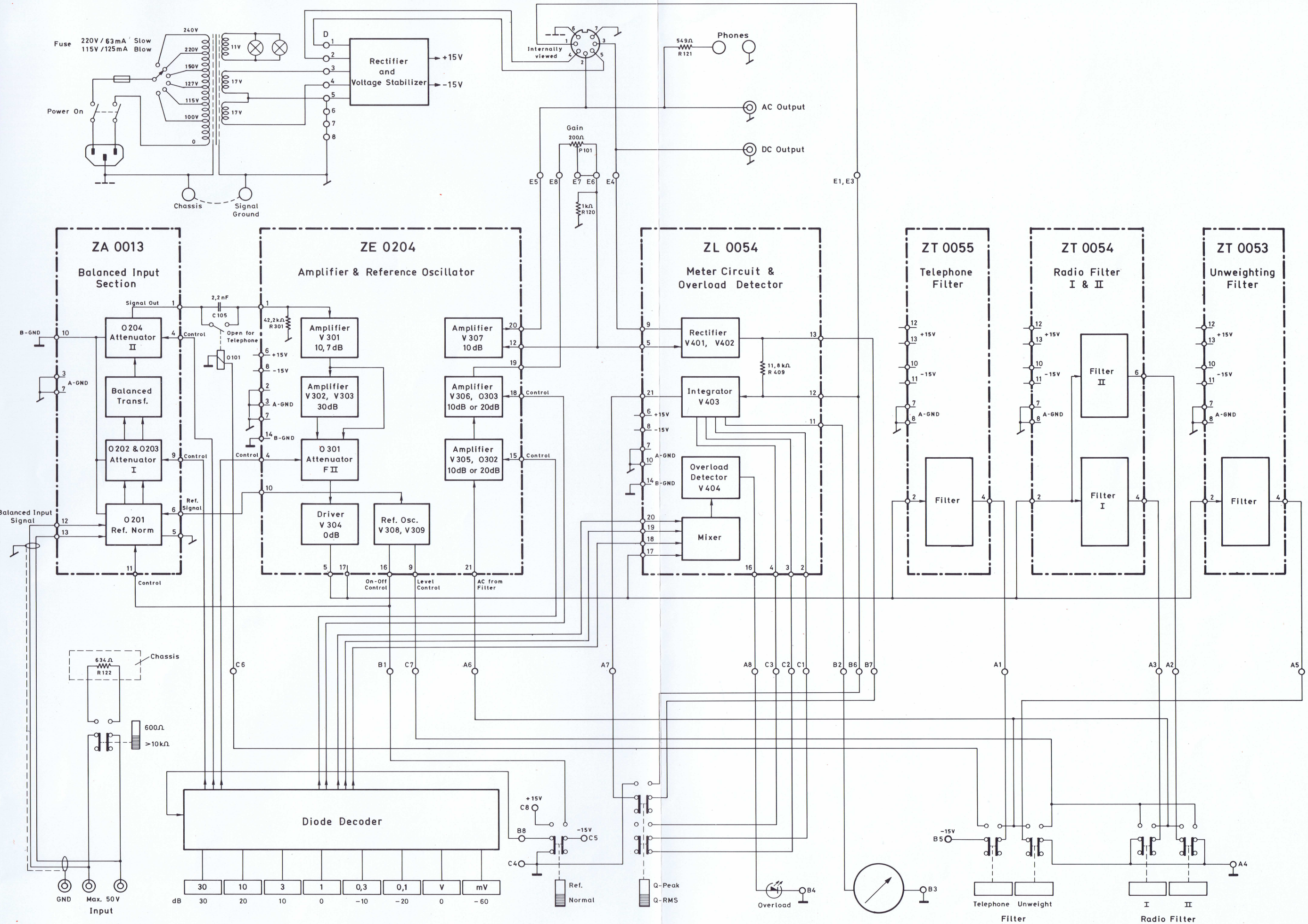
Furthermore 2429 contains the following subassemblies the details of which will be found under the respective numbers.

CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REF.
	Balanced Input Section	ZA 0013
	Amplifier and Reference Oscillator	ZE 0204
	Mother Board	ZH 0140
	Meter Circuit and Overload Detector	ZL 0054
	Unweighting Filter	ZT 0053
	Radio Filter I & II	ZT 0054
	Telephone Filter	ZT 0055

STOCK
REF.

assemblies the details of
rs.

	ZA 0013
ator	ZE 0204
	ZH 0140
ector	ZL 0054
	ZT 0053
	ZT 0054
	ZT 0055



606893-14.4.76-Block Diagram-2429