
Operating Manual
Service Manual

Peakmeter 1227B

RTW

RADIO-TECHNISCHE
WERKSTÄTTEN

INSTRUMENTS FOR
STUDIO APPLICATIONS

Serial Number:

Catalogue Number:

RTW

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Hinweis

WARNUNG!



Das Öffnen des Gerätes birgt eine potenziell gefährliche Situation, denn es kann eine gefährliche Spannung mit dem Risiko eines elektrischen Schlags anliegen!

WEEE-Reg.-Nr.: DE 90666819

Kategorie: 9

Geräteart: Diese Geräte erfüllen als
ÜBERWACHUNGS- UND KONTROLLINSTRUMENTE
in der Kategorie 9, Anhang 1B,
die Vorschriften des Elektro- und Elektronikgesetzes
vom 16. März 2005 und der RoHS-Directive 2002/95/EC.

Note

WARNING!



Opening the unit bears a potentially hazardous condition. A dangerous voltage that could pose a risk of electrical shock can be present!

WEEE-Reg.-No.: DE 90666819

Category: 9

Device type: These instruments comply with
and fall under category 9
MONITORING AND CONTROL EQUIPMENT
of Annex 1B of the RoHS-Directive 2002/95/EC.

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TECHNICAL SPECIFICATIONS

Supply voltage:	220V / 240V / AC or 24V DC or $\pm 15V DC \pm 10\%$
Fuse:	240V AC 100 mA slow blow 120V AC 200 mA slow blow
Current drain:	max. 60 mA at 115V AC max. 120 mA at 230V AC max. 300 mA at 24V DC
Ambient temperature:	0 to + 45 degrees Celsius
Scale range:	-12dB to +12dB ("1" to "7")
Scale graduation:	accord to British Scale Type IIa
Brighter scale marks at:	"1, 2, 3, 4, 5"
Additional brighter scale marks:	1 dB step from "6" to end of scale
Brighter scale range:	"6" to "7" (+8 dB to +12dB)
Scale length:	254 mm (10 inch)
Number of display segments:	201 segments / channel
Type of display:	neon plasma bar graph display
Colour of display:	amber up "6", red up to "7"
Indication without signal input: (termination 30 Ohm)	2 luminous segments
Measuring error under following conditions:	tolerance:
a. at mark "6": difference in reading between both channels:	within ± 0.2 dB within ± 0.2 dB
b. at mark "4":	within ± 0.5 dB
c. at mark "2":	within ± 1.3 dB
d. variation in supply voltage of 10 %:	$< \pm 0.5$ dB
e. frequency range 30 Hz to 20 kHz:	within ± 0.3 dB
response at 40 kHz:	- 6 dB ± 0.5 dB
response at 12 Hz:	- 1.5 dB ± 0.5 dB
f. full temperature range:	< 0.2 dB drift at all scale points
Input sensitivity for "6" reading:	+ 8 dBu (1.95V rms)
Overload input level:	more than 20 dB above reference level (20V rms)
Adjustable range of reference levels:	+ 1 dBu to + 20 dBu
Switchable increase in input gain:	40 dB ± 0.5 dB
Inputs:	balanced, floating, input transformers
Rejection factor:	min. 60 dB
input impedance between 30 Hz and 20 kHz:	min. 10 kOhm
Integration time:	10ms ± 1 ms

Dynamic response:	<table border="0"> <thead> <tr> <th style="text-align: left;">Burst</th> <th style="text-align: left;">Indic.</th> <th style="text-align: left;">max. Tol.</th> </tr> </thead> <tbody> <tr> <td>100 ms</td> <td>"6"</td> <td>± 0.5 dB</td> </tr> <tr> <td>10 ms</td> <td>"5.5"</td> <td>± 0.5 dB</td> </tr> <tr> <td>5 ms</td> <td>"5"</td> <td>± 0.75 dB</td> </tr> <tr> <td>1.5 ms</td> <td>"3.75"</td> <td>± 1.0 dB</td> </tr> <tr> <td>0.5 ms</td> <td>"1.75"</td> <td>± 2.0 dB</td> </tr> </tbody> </table>	Burst	Indic.	max. Tol.	100 ms	"6"	± 0.5 dB	10 ms	"5.5"	± 0.5 dB	5 ms	"5"	± 0.75 dB	1.5 ms	"3.75"	± 1.0 dB	0.5 ms	"1.75"	± 2.0 dB	
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Overload characteristic: voltage	Isolated tone-burst at level 10 dB above reference result increasing of indication of 10 dB																			
Delay time:	< 15 ms																			
Overswing:	no overswing																			
Polarity error:	max. 0.5 dB																			
Distortion introduced by the peak programme meter:	< 0.1 %																			
Fall back time:	2.8 sec. ± 0.3 sec. for mark "7" to mark "1"																			
Difference between both channels:	< 0.1 sec.																			
Memory accuracy:	± 1 segment *)																			
Controls:	<ul style="list-style-type: none"> - button for changing integration time - memory reset button - button for 40 dB, increase of sensitivity - button for displaying the stored peak value 																			
Remote switching:	<ul style="list-style-type: none"> - 40 dB gain increase - display of stored maximum values - memory reset - brighter marks in 1 dB increments 																			
LED display:	<ul style="list-style-type: none"> red LED showing - 40 dB gain increase - memory - memory reset - pcm 																			
Weight:	approx. 1200 g (2.7 lbs) net																			
Dimensions:	350 x 100 x 100 mm XLR female for inputs 8 pin DIN remote control socket rubber connector for mains power																			
Items delivered:	<ol style="list-style-type: none"> 1. Peakmeter 1227B fitted with horizontal scale 2. connector (counter plug) 3. operating- and service instructions 																			

Technical changes reserved !

*) Note for the user

Keep attention to the fact that memory accuracy can be affected by interferenced signals (ESD- or BURST). This may cause misreadings from the memory or meter if you are using the instrument in an interferenced environment. A specific measurement of the maximal level should be repeated if interference is suspected.

CONSTRUCTION AND DESCRIPTION OF OPERATION PEAKMETER 1227B

The RTW Peakmeter uses gas plasma bar graph display units. The entire electronics including the displays is housed in a metal casing. The display unit with its front frame, scale and keyboard is a plug-in module. The following is a description of the different electrical funktion groups.

POWER SUPPLY

The set is equipped for two different kinds of power supply. Selection of either kind is by connecting the supply voltage to the corresponding connectors.

a. Mains power supply:

The mains voltage reaches the mains transformer via the mains cable, mains connector, mains fuse and voltage selector. The transformer transforms the mainsvoltage of 240 (120) V to 22V. After rectifying and ripple rejection it is fed via a decoupling diode to the basic pcb.

b. DC power supply (22V or $\pm 15V$):

The DC supply voltage is fed via the 8 pin DIN socket and a decoupling diode to the regulator IC315.

Input voltages higher than 26 volt are fixed to a value of about 24 volts. An active filter circuit stops interference pulses generated inside the unit from entering the power supply circuitry.

The regulator IC316 delivers the positive supply voltage to the analog ICs. IC317 generates the internal ground. The difference voltage between this potential and the negative input voltage pol is the negative op am supply voltage. A 5 volt fix regulator, IC318, finally stabilizes the supply voltage for the HCMOS logic ICs.

INPUT AMPLIFIRES, FILTERS, FULL-WAVE RECTIFIERS

The audio signals enter the operating amplifiers IC101 (IC201) via the input transformers. Potentiometer P3 and P4 control the input sensitivity (level control). On pushing the "+ 40 dB" button the gain increased by exactly 40 dB. Signals down to - 54 dB can then be measured. In the subsequent low-pass filter consisting of an active part IC102 (IC202) as well as passive R-C circuit the frequency response is restricted according to "British Standards".

The rectifier stages are followed by to timing / charging stages. In conjunction with C114 (C214) the pulse indicator as required by "British Standards 78 / 31235" is archived. The charge on the capacitor C114 (C214) depends on the level of the rectified audio signal and the integration time. The fall back time of the luminous bar is determined P5 (P6) is used to adjust this discharge time. When corectly setted, the fall back characteristics comply with the values given in "British Standards".

SAW TOOTH GENERATION AND PULSE DURATION MODULATION

For driving the display a sequence of 200 single pulses, a reset pulse and a square wave the width of which is modulated by the audio signal is required. The master clock generator IC301 generates pulses 23µs wide which drive a 12-bit binary counter. Its output address two CMOS-EPROMs (IC303, IC304). The data stored here is used for generating "RAMP"-data and control pulses. The data for generation of "RAMP"-signals is available in 12-bit format. The composition of the data is such that the "RAMP"-pulses from the D / A converter correspond to the scale graduation. This "RAMP"-voltage is compared with the rectified audio signals in subsequent comparators. At the comparator outputs appear square wave pulses with pulse width dependent on the audio input voltage and the instantaneous "RAMP"-voltage. The shape of the "RAMP"-voltage therefore determines the scale graduation of the meter. The amplitude of the "RAMP"-voltage is 2.5 V_{pp}. Offset errors of the rectifiers, "RAMP"-generator and comparators are compensated by the feeding a DC voltage of opposing polarity, proportional to the errors, into the inverting comparator inputs. This offset compensation is adjusted by means of potentiometers P1 and P2. Further data from the EPROMs is used to increase the pulse width to 140µs for displaying the brighter scale marks and highlighting the overload range. Greater pulse width means longer "ON"-time and brighter segments. The reset pulse resets the display as well as the counter IC. The frequency of the display cycle (time from first clock pulse to end of reset pulse to end of reset pulse) is 75 Hz.

DISPLAY DRIVERS AND HIGH VOLTAGE SUPPLY

The display driver board contains the display driver stages and high voltage power supply. In IC403 the clock pulses are turned into a 5-stroke signal. This signal drives the cathodes of the display via a driver IC404. In order that an individual display segment can strike and light up, voltage must be applied to the anode and appropriate cathode (cathodes 1, 2, 3, 4 or 5). Also, the individual segments only strike when they have been preionized by the preceding segment. The luminous band is built up by the five-phase driving of the cathodes as long as the anodes remain switched on. In order that the luminous band can give a reading on the scale, the anode and thus the luminous band must be switched off the duration of the pulse, a width-modulated square wave. The width of this pulse is proportional to the audio input voltage. The anode driver transistors T412 / T413 are switched by this square wave.

A high voltage is necessary for striking the luminous segments - approx. 210V. A multivibrator (T401-T406) generates a square wave with a frequency of approximately 10 kHz the voltage of which is multiplied to approximately 250V (open circuit) or 220V (full load). The subsequent stage stabilizes this down to the operating voltage of the display.

CAUTION

While servicing please note that some components carry high voltages. Wrong connections may lead to the immediate destruction of the voltage sensitive CMOS components.

MEMORY UNIT

Maximum levels are stored in the memory section. A master counter (IC307) delivers clock pulses to one slave counter per channel (IC308, IC309). The slave counter only registers when the number of illuminated segments exceeds that of a previous cycle. The slave count consequently corresponds to the maximum level. IC314 converts the counts into a pulse with a width that is proportional to the number of counted clock pulses. The stored maximum value represented by this pulse can be displayed, as already explained above. The slave counter can be reset using either the built-in reset using button or an external switching contact. On releasing the reset button storage is resumed.

CONNECTION AND OPERATION

The RTW Peakmeter is equipped with 4 connectors which are wired as follows:

XLR connector L + R	Pin 2 + 3 Pin 1	balanced, floating inputs (a+ b) case
DIN connector 8 pin	Pin 1	ext. scale switch
	Pin 5	ext. pcm button
	Pin 6	ext. + 40 dB button
	Pin 7	ext. memory reset button
	Pin 8	ext. memory display button
	Pin 4	+ 24V for single voltage supply
	Pin 2	0V for single voltage supply
		alternative
	Pin 4	+ 15V for symmetrical power supply
	Pin 2	- 15V for symmetrical power supply
European-type mains socket		240V / 50 Hz (Option 120V / 60 Hz)

POWER SUPPLY

The set is equipped for two different kinds of power supply. Selection of either kind is by connecting the supply voltage to the corresponding connector.

- AC supply voltage is connected to the built-in mains connector by means of the mains cable supplied with the set.
- 24V DC power supply is connected to pins 4 (positive) and 2 (negative) of the 8 pin DIN connector. Maximum permissible supply voltage is 36V.
- Symmetrical DC powering may be connected to pins 4 (+ 15V) and 2 (- 15V). The 0V-Line need not be connected. Maximum permissible supply voltage is $\pm 18V$.

AF INPUTS

The XLR connectors are wired according to standard. Pin 1 of the connector is connected to chassis ground.

GROUND OF THE CASING

Chassis ground is connected to pin 1 at the XLR connectors.

MODE SWITCHING ON THE METER

The RTW Peakmeter1227B features 4 keys with corresponding LEDs. The keys have the following functions:

- a. The "PPM" button changes the integration time of the meter.
- b. The "40 dB" button increases the sensitivity of the input amplifier by exactly 40 dB
- c. When the "MEMORY" button is pushed, the stored maximum levels appear on the display. If the "40 dB" indicator lights up then these maximum levels have been stored in the "+ 40 dB" mode.
- d. "RESET" button: this resets the memory allowing it to store new maximum values.
- e. A switch, located inside the unit, changes the scale resolution in the range "6" to end of scale by adding 1 dB step marks.

REMOTE MODE SWITCHING

External function selectors may be connected to pins 1, 5, 6, 7 and 8 of the DIN connector. These pins have to be switched against pin 2 of the DIN connector by means of ON-OFF keys or switches.

CALIBRATION

The Peakmeter 1227B maintains a constant accuracy. The zero setting, integration time and fall back characteristics will remain the same for years. If a readjustment is necessary, the following procedures have to be carried out.

A. 0 dB adjustment

Apply a 1 kHz sine wave at the desired reference level (usually + 8 dBu / 1.95 V) and adjust the potentiometers P3 and P4 so that both display columns show "6".

B. Zero setting

With no signal applied and the input terminated adjust potentiometers P1 and P2 so that the first two segments light up. Major adjustments in the zero setting may mean that the "6" adjustment will have to be repeated (repeat A).

C. Checking scale graduation

For checking scale calibration apply the reference level to the input. Scale calibration in the entire measuring range is determined by the data contained in the EPROMs. Readjustment or correction of this calibration is not foreseen.

Adjustment in the lower scale region ("1") can be made by changing the zero setting (P1, P2). Step "A" should be repeated. To check the "RAMP"-voltage apply an oscilloscope to pin 1 of IC305. The displayed voltage should amount to 2.5 Vpp.

D. Fall back adjustment

After removing a level of 1 kHz / + 8 dB the display reading should drop to "1" within 2.8 seconds. Adjust potentiometer P5 and P6 if necessary.

E. Response time

Checking of the response time will only be necessary if components have been replaced which determine time constants. This only applies to the IC103 (IC203) / IC104 (IC204) and the R-C circuits an appropriate pulse generator is required.

E.1. Pulses for measuring the response characteristic given in IRT specification 3 / 6 dated 1.77.

E.1.1.	Full-wave level	+ 8 dBu	
E.1.2.	Frequency	5 kHz	
E.1.3.	Pulse duration	100 ms, 10 ms, 5 ms, 1.5 ms, 0.5 ms	
E.1.4.	Pulse spacing	2.8 s	
E.1.5.	Pulse duration	Rated value	Tolerance
	100 ms	"6"	± 0.5 dB
	10 ms	"5.5"	± 0.5 dB
	5 ms	"5"	± 0.75 dB
	1.5 ms	"3.75"	± 1.0 dB
	0.5 ms	"1.75"	± 2.0 dB

E.2. If readings higher than those permitted by the tolerance range are displayed at longer pulses (5 ms to 100 ms) then the charging resistor R119, (R219) determining the time constant of the R-C-circuit has to be increased. If the readings obtained are less than those permitted, the resistance should be reduced. Use only metal film resistors.

E.3. If readings higher than those permitted by the tolerance range are displayed at shorter pulses (0.5 ms to 1.5 ms) then the charging resistors R121 (R221) determining the time constant of the R-C circuit has to be increased. If the readings obtained are less than those permitted, then the resistance should be reduced.

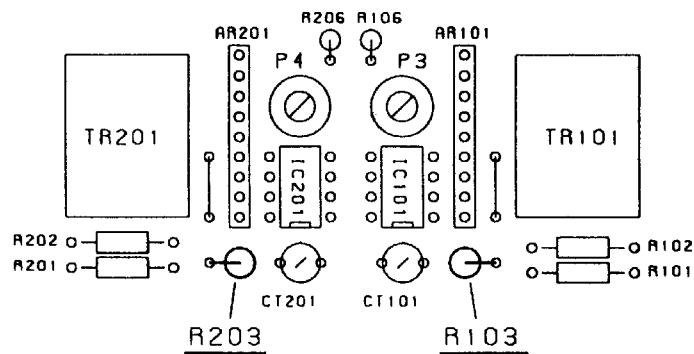
E.4. After changing values of the R /C combination for long (short) pulses, the response to short (long) pulses has to be checked and readjusted, if required. Continue to adjust alternately until values are within the specified tolerances.

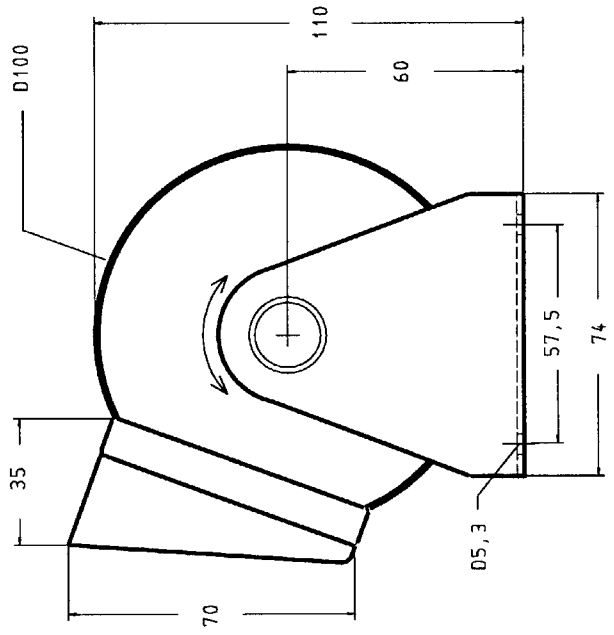
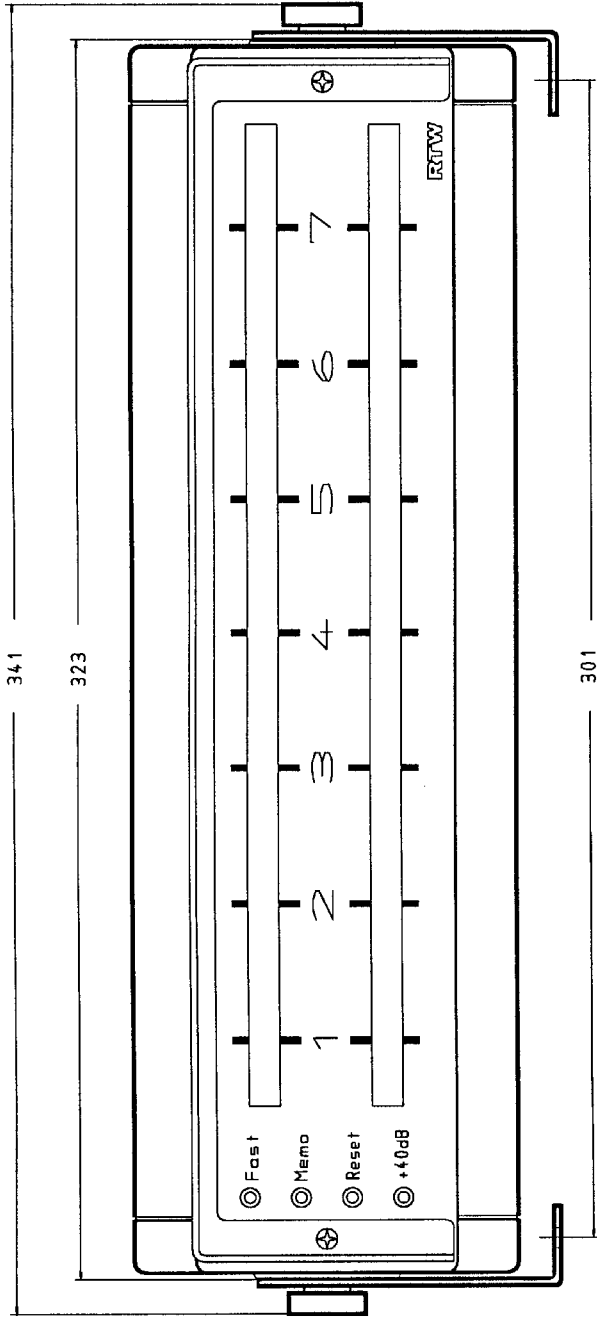
F. REFERENCE LEVELS OTHER THAN 1.95 V:

If the meter is to be used in installations with reference levels other than that set in the factory, then following modifications recommended:

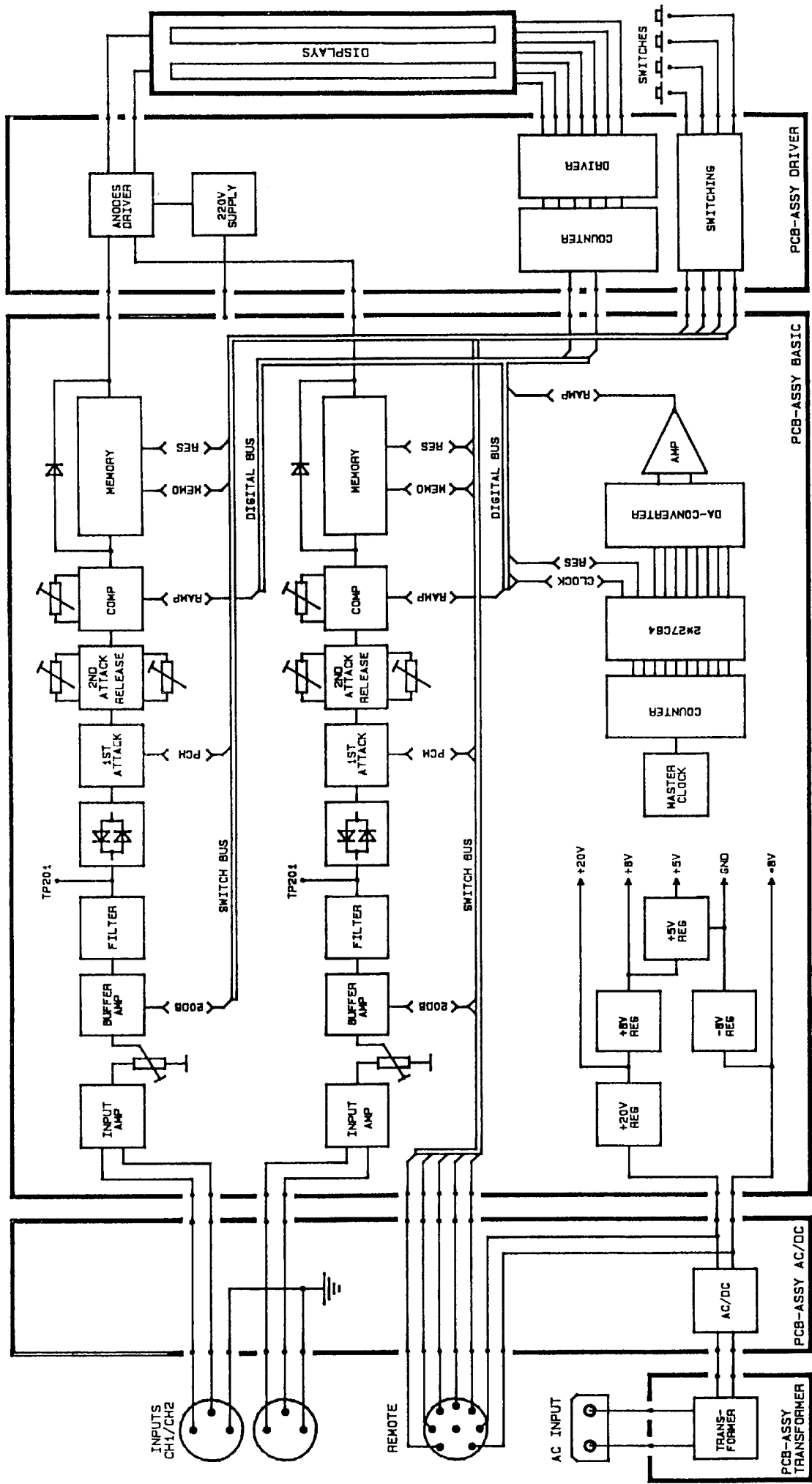
F.1. For levels ranging from + 2 dBu to +10 dBu:
 Adjust potentiometers P3 and P4.

F.2. For levels ranging from + 10 dBu to + 18 dBu:
 The attenuation must be increased so as not impair the overload capacity of the meter This can be done by inserting resistors R103 and R203 as voltage dividers. For fine adjustment use potentiometers P3 and P4. The maximums input level is then raised to + 30 dBu.





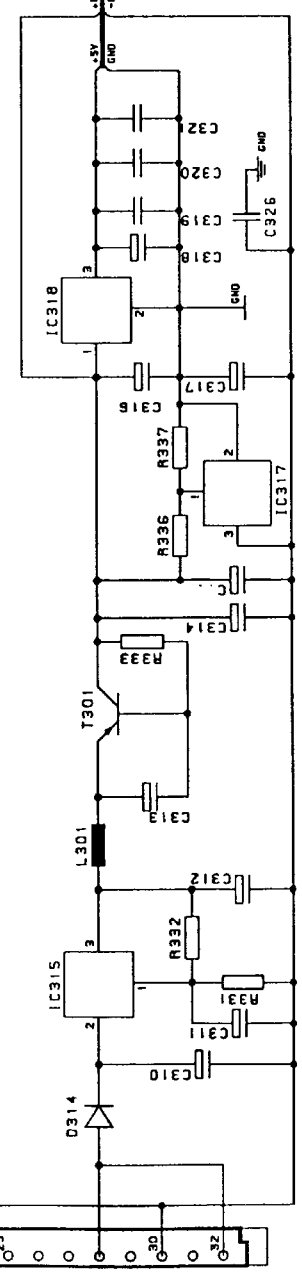
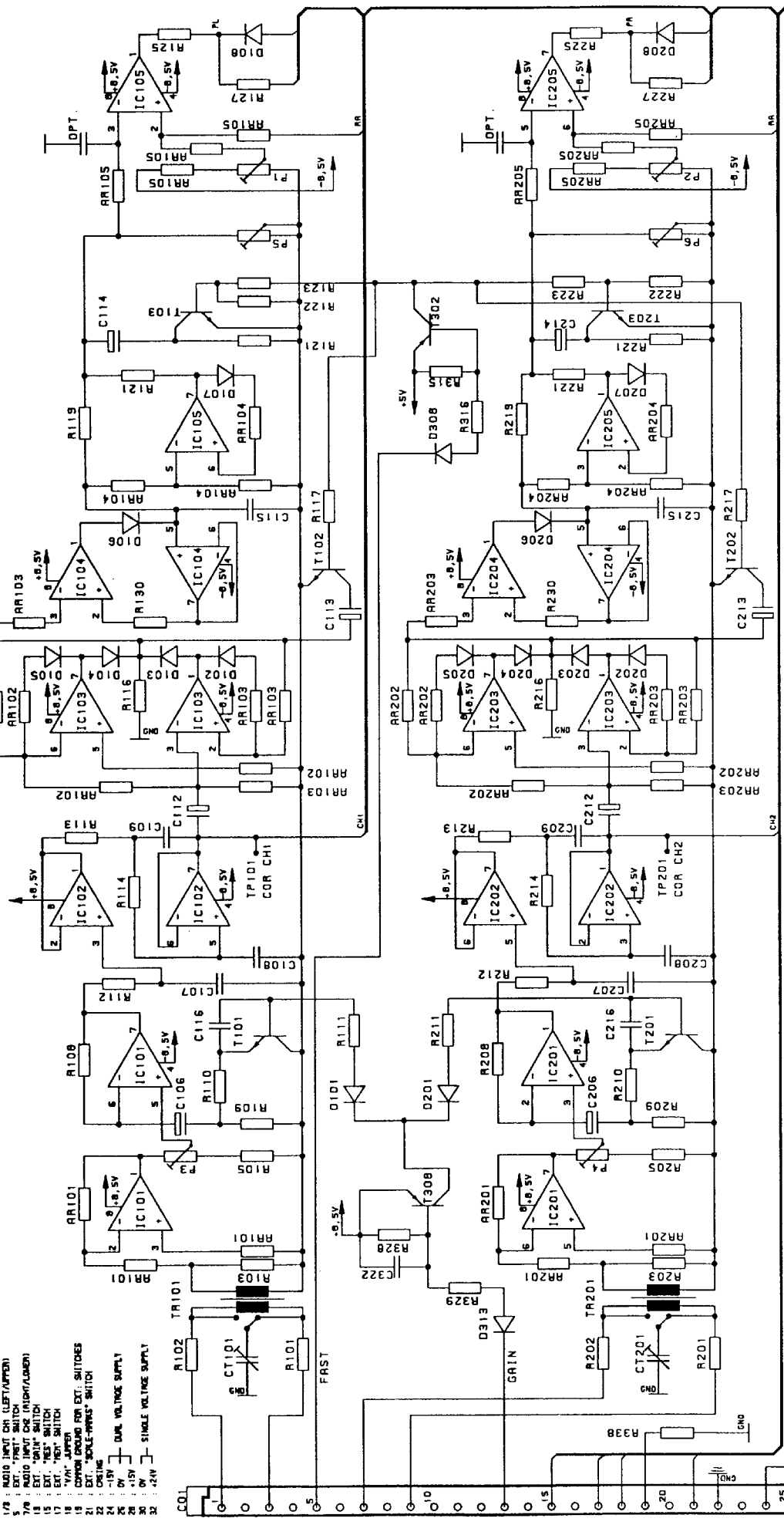
Name	Datum	MECHANICAL OUTLINES 1227B
Bo	10 95	
		millimeters
RTW		RADIO-TECHNISCHE WERKSTÄTTEN GMBH



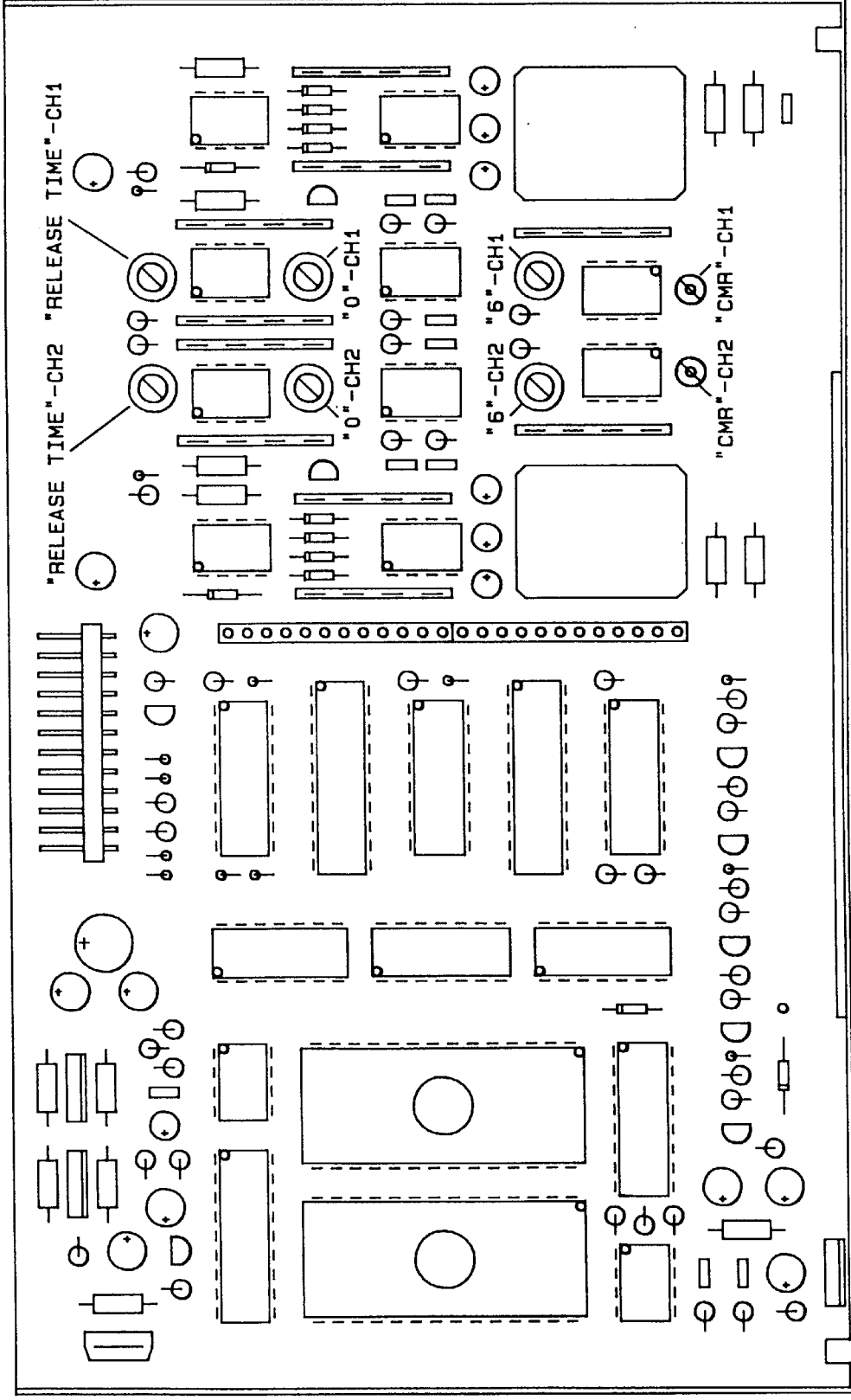
RTW PEAKMETER 12278
BLOCKDIAGRAM

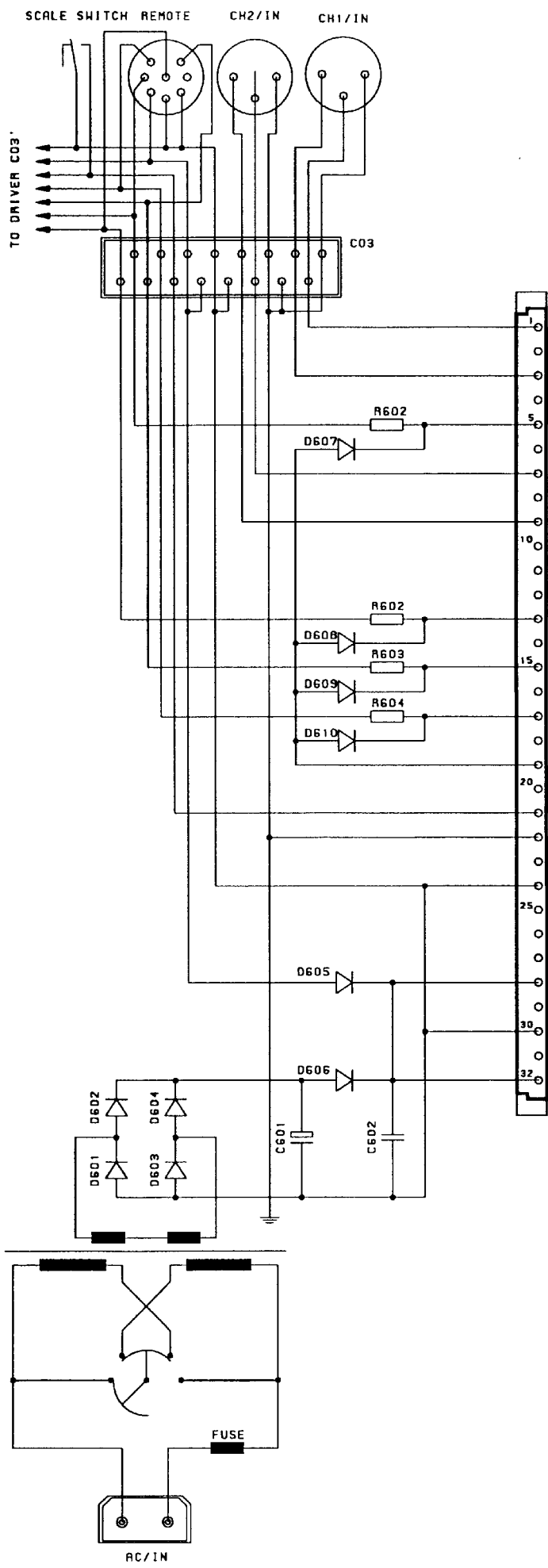
CONNECTOR WIRING CO1 (DIN 41612)

- 1/2 : AUDIO INPUT CH (LEFT/RIGHT)
- 5 : EXT. "PUSH" SWITCH
- 7 : EXT. "PUSH" SWITCH (RIGHT/COMMON)
- 10 : EXT. "PUSH" SWITCH
- 15 : EXT. "PUSH" SWITCH
- 17 : EXT. "PUSH" SWITCH
- 18 : "V/M" JUMPER
- 19 : COMMON GROUND FOR EXT. SWITCHES
- 21 : EXT. "SOLE-HEXES" SWITCH
- 22 : GND
- 23 : DUAL VOLTAGE SUPPLY
- 24 : 0V
- 25 : +15V
- 26 : 0V
- 27 : -15V
- 28 : 0V
- 29 : -15V
- 30 : 0V
- 31 : -15V
- 32 : -15V

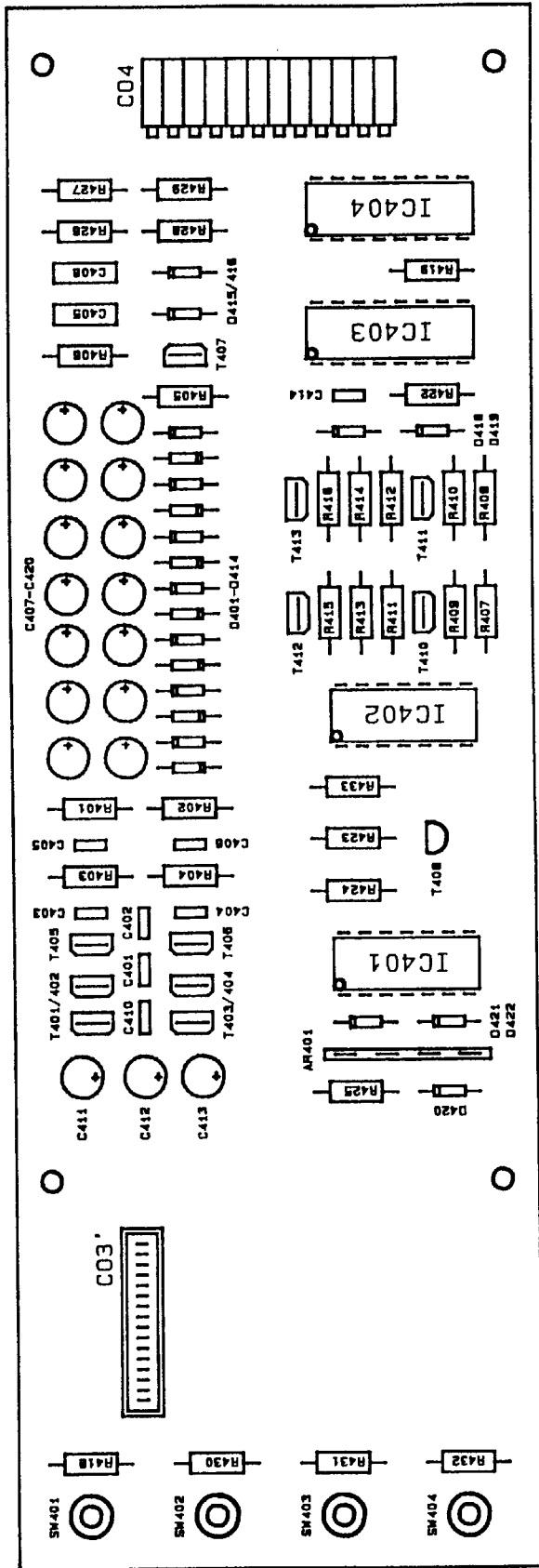
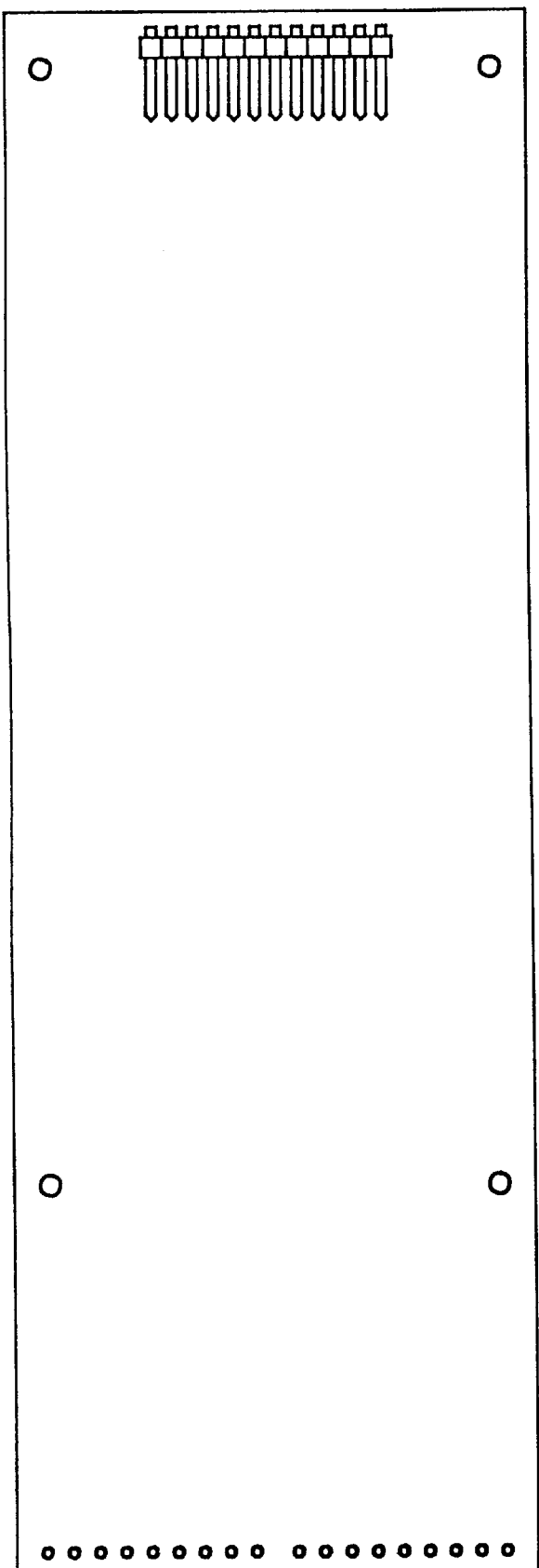


Prelimi		RTW Peakmeter	
Date	06.95	Basic Assy Ana	
Name	SKU	RADIO-TECHNISCHE WERKSTÄTTEN GMBH	
RTW			

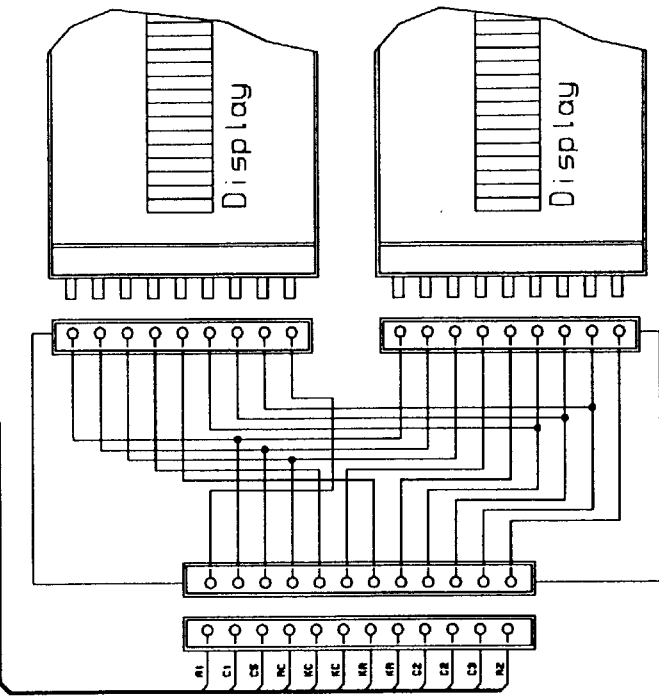
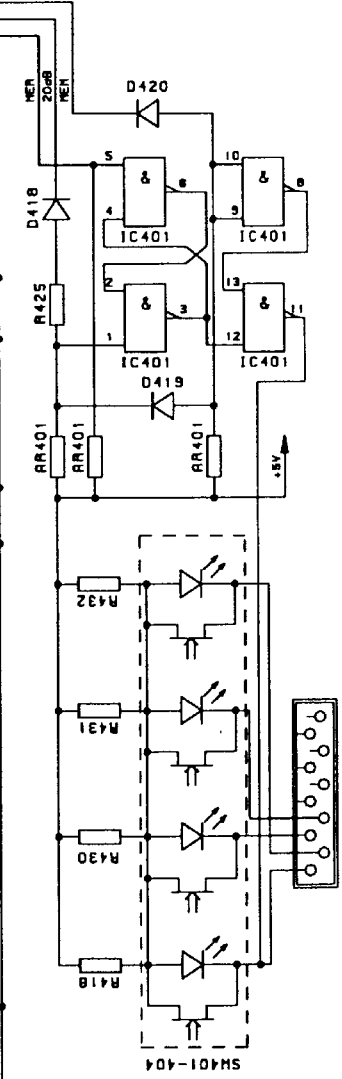
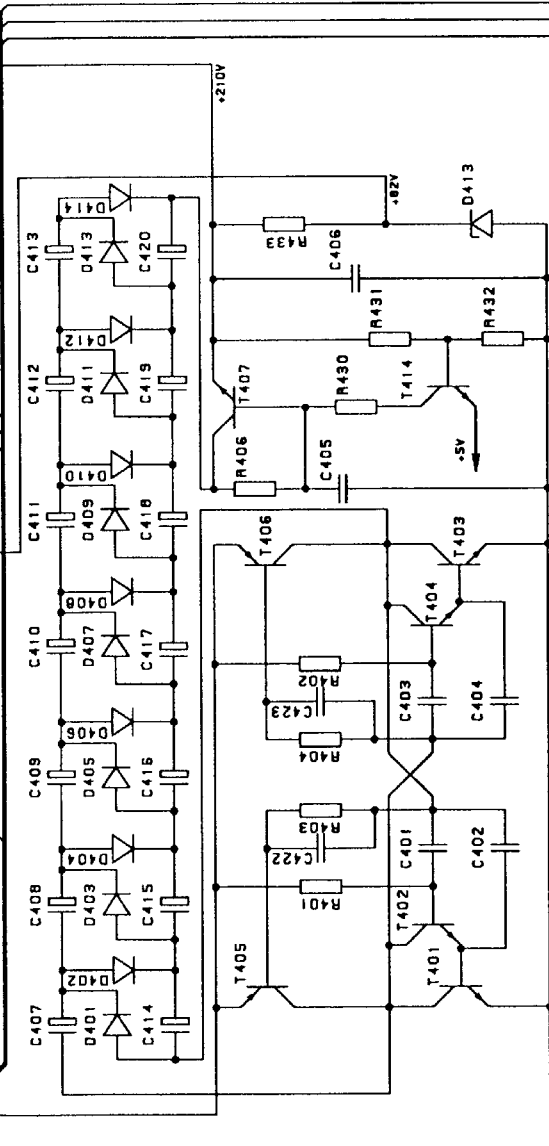
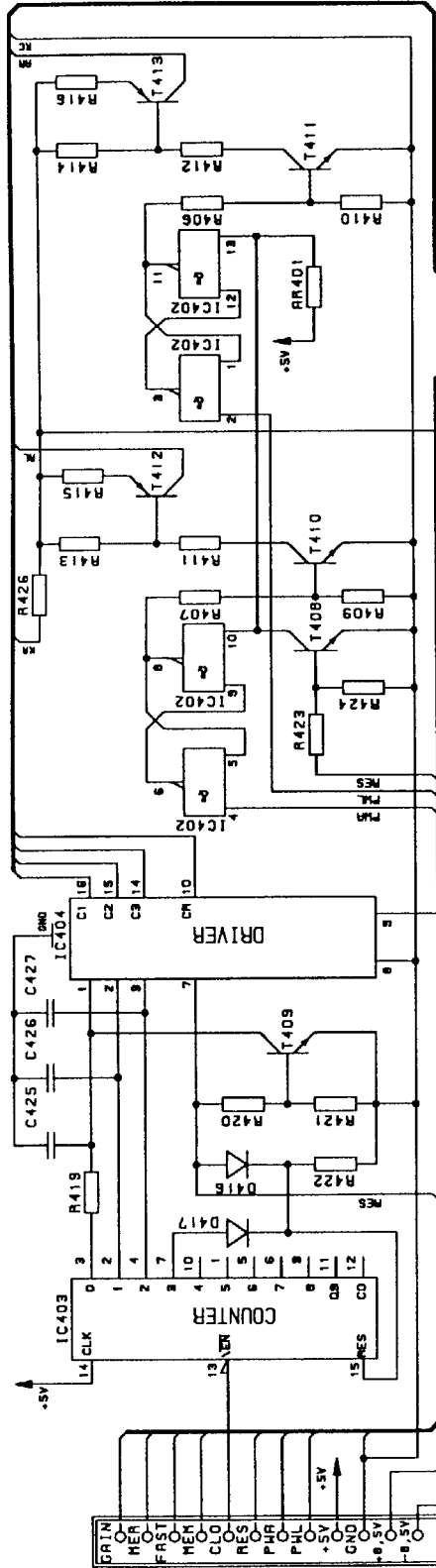




Prelim		RTW Peakmeter 1227B	
Date	08.95	POWER SUPPLY	
Name	SKU	RADIO-TECHNISCHE WERKSTÄTTEN GMBH	
RTW		RADIO-TECHNISCHE WERKSTÄTTEN GMBH	



RTW PEAKMETER 1227B
 COMPONENTS LAY OUT DRIVER ASSY
 07.88



Prelimi	RTW Peakmeter 1227B
Date	07 95
Name	KU
	Display Driver
	RADIO-TECHNISCHE WERKSTÄTTEN GMBH

RTW

PARTLISTS

Description	ASSY No.	Page
PCB ASSY Basic	13473	2 - 5
PCB ASSY Connector/Rectifier	13454	6
PCB ASSY Display/Driver	13468	7
ASSY Panel/Display	13727	8
ASSY Transformer	13455	9
ASSY Audio/Remote Con. Section	13457	10

POS	BESCHREIBUNG	WERT	TYPE	HERSTELLER	ARTIKEL
CO2	Connector		2,5 MS 12 AU	Lumberg	17664
CO5	Connector	3p	BL1/1/Z	RTW	14346
CO5	Connector	12p	BL1/12/Z	RTW	14350
TR101	Transformer		ÜP 3209 M	Pikatron	14604
TR201	Transformer		ÜP 3209 M	Pikatron	14604
IC101	OP-AMP		NE5532	Texas-Instruments	17529
IC102	OP-AMP		TL062CP	Texas-Instruments	18016
IC103	OP-AMP		LF442	Motorola	18080
IC104	OP-AMP		NE5532	Texas-Instruments	17529
IC105	OP-AMP		LF442	Motorola	18080
IC201	OP-AMP		NE5532	Texas-Instruments	17529
IC202	OP-AMP		TL062CP	Texas-Instruments	18016
IC203	OP-AMP		LF442	Motorola	18080
IC204	OP-AMP		NE5532	Texas-Instruments	17529
IC205	OP-AMP		LF442	Motorola	18080
IC301	Timer		ICM7555	National	17514
IC302	IC-HC		74HC4040	National	18065
IC303 , IC304	EPROM-CMOS		MM27C64	RTW	18012.130
IC305	OP-AMP		LF442	Motorola	18080
IC306	DA-Converter		AD7541JN	Harris	18013A
IC307 - IC309	IC-HC		74HC4040	National	18065
IC310 , IC311	IC-HC		74HC688	National	18066
IC312	IC-HC		74HC08	Motorola	18042
IC313	IC-HC		74HC86	National	18033
IC314	IC-HC		74HC00	National	18021
IC315	Voltage, Regulator		LM317T	National	17527
IC316	Voltage, Regulator		LM317LZ	National	18112
IC317	Voltage, Regulator		LM337LZ	National	18113
IC318	Voltage, Regulator		LM78L05	National	18015
T101 - T103	Transistor		BC239C	Intermetall	17450
T201 - T203	Transistor		BC239C	Intermetall	17450
T301	Transistor		BC327-40	Intermetall	17461
T302 , T303	Transistor		BC559C	Intermetall	17452
T304	Transistor		BC559C	Intermetall	17452
T305	Transistor		BC239C	Intermetall	17450
T306	Transistor		BC559C	Intermetall	17452
T307	Transistor		BC239C	Intermetall	17450
T308	Transistor		BC559C	Intermetall	17452
T309	Transistor		BC559C	Intermetall	17452
D101 - D108	Diode, Silicon		1N4148	ITT	17492
D201 - D208	Diode, Silicon		1N4148	ITT	17492
D301 , D303	Diode, Silicon		1N4148	ITT	17492
D305 - D313	Diode, Silicon		1N4148	ITT	17492
D315	Diode, Reference	2,5V	LM336Z	National	18538
AR101	Resistor, Array	4,7K	4608X-102-4,7K	Bourns	17090
AR102 , AR103	Resistor, Array	10K	4608X-102-10K	Bourns	17091
AR104	Resistor, Array	220K	4608X-102-220K	Bourns	17088

POS	BESCHREIBUNG	WERT				TYPE	HERSTELLER	ARTIKEL
AR105	Resistor,Array	10K				4608X-102-10K	Bourns	17091
AR201	Resistor,Array	4,7K				4608X-102-4,7K	Bourns	17090
AR202 , AR203	Resistor,Array	10K				4608X-102-10K	Bourns	17091
AR204	Resistor,Array	220K				4608X-102-220K	Bourns	17088
AR205	Resistor,Array	10K				4608X-102-10K	Bourns	17091
R101 , R102	Resistor,Metalfilm	4,7K	50ppm	1%		0207 MK2	Resista	17074
R106	Resistor,Metalfilm	1,1K	50ppm	1%		0207 MK2	Resista	17051
R108	Resistor,Metalfilm	82K	50ppm	1%		0207 MK2	Resista	17048
R109	Resistor,Metalfilm	82K	50ppm	1%		0207 MK2	Resista	17048
R110	Resistor,Metalfilm	402E	50ppm	1%		0207 MK2	Resista	17085
R111	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R112	Resistor,Metalfilm	22K	50ppm	1%		0207 MK2	Resista	17053
R113 , R114	Resistor,Metalfilm	18K	50ppm	1%		0207 MK2	Resista	17072
R116	Resistor,Metalfilm	2,2K	50ppm	1%		0207 MK2	Resista	17052
R117	Resistor,Metalfilm	15K	50ppm	1%		0207 MK2	Resista	17046
R119	Resistor,Carbon	10E		5%		0207	Resista	17001
R121	Resistor,Metalfilm	80,6E	50ppm	1%		0207 MK2	Resista	17083
R121'	Resistor,Metalfilm	56E	50ppm	1%		0207 MK2	Resista	170904
R122	Resistor,Metalfilm	100K	50ppm	1%		0207 MK2	Resista	170960
R123	Resistor,Metalfilm	15K	50ppm	1%		0207 MK2	Resista	17046
R126	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R127	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R130	Resistor,Metalfilm	1K	50ppm	1%		0207 MK2	Resista	170957
R201 , R202	Resistor,Metalfilm	4,7K	50ppm	1%		0207 MK2	Resista	17074
R206	Resistor,Metalfilm	1,1K	50ppm	1%		0207 MK2	Resista	17051
R208	Resistor,Metalfilm	82K	50ppm	1%		0207 MK2	Resista	17048
R209	Resistor,Metalfilm	82K	50ppm	1%		0207 MK2	Resista	17048
R210	Resistor,Metalfilm	402E	50ppm	1%		0207 MK2	Resista	17085
R211	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R212	Resistor,Metalfilm	22K	50ppm	1%		0207 MK2	Resista	17053
R213 , R214	Resistor,Metalfilm	18K	50ppm	1%		0207 MK2	Resista	17072
R216	Resistor,Metalfilm	2,2K	50ppm	1%		0207 MK2	Resista	17052
R217	Resistor,Metalfilm	15K	50ppm	1%		0207 MK2	Resista	17046
R219	Resistor,Carbon	10E		5%		0207	Resista	17001
R221	Resistor,Metalfilm	80,6E	50ppm	1%		0207 MK2	Resista	17083
R221'	Resistor,Metalfilm	56E	50ppm	1%		0207 MK2	Resista	170904
R222	Resistor,Metalfilm	100K	50ppm	1%		0207 MK2	Resista	170960
R223	Resistor,Metalfilm	15K	50ppm	1%		0207 MK2	Resista	17046
R226	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R227	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R230	Resistor,Metalfilm	1K	50ppm	1%		0207 MK2	Resista	170957
R301	Resistor,Metalfilm	27K	50ppm	1%		0207 MK2	Resista	17049
R302	Resistor,Metalfilm	15K	50ppm	1%		0207 MK2	Resista	17046
R303	Resistor,Metalfilm	22K	50ppm	1%		0207 MK2	Resista	17053
R305	Resistor,Metalfilm	4,7K	50ppm	1%		0207 MK2	Resista	17074
R306	Resistor,Metalfilm	470K	50ppm	1%		0207 MK2	Resista	17076
R307	Resistor,Metalfilm	2,2K	50ppm	1%		0207 MK2	Resista	17052
R308	Resistor,Metalfilm	1M	50ppm	1%		0207 MK2	Resista	17055
R309	Resistor,Metalfilm	10K	50ppm	1%		0207 MK2	Resista	17059
R311	Resistor,Metalfilm	47K	50ppm	1%		0207 MK2	Resista	17047

POS	BESCHREIBUNG	WERT		TYPE		HERSTELLER	ARTIKEL
R313 , R314	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R315	Resistor, Metalfilm	100K	50ppm	1%	0207 MK2	Resista	170960
R316	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R317	Resistor, Metalfilm	2,2K	50ppm	1%	0207 MK2	Resista	17052
R318	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R319	Resistor, Metalfilm	4,7K	50ppm	1%	0207 MK2	Resista	17074
R319'	Resistor, Metalfilm	3,3K	50ppm	1%	0207 MK2	Resista	17073
R320	Resistor, Metalfilm	100K	50ppm	1%	0207 MK2	Resista	170960
R321 , R322	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R323	Resistor, Metalfilm	100K	50ppm	1%	0207 MK2	Resista	170960
R324	Resistor, Metalfilm	1,5K	50ppm	1%	0207 MK2	Resista	17014
R325 , R326	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R327 , R328	Resistor, Metalfilm	100K	50ppm	1%	0207 MK2	Resista	170960
R329	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R330	Resistor, Metalfilm	47K	50ppm	1%	0207 MK2	Resista	17047
R331	Resistor, Metalfilm	4,12k	50ppm	1%	0207	Resista	170811
R332	Resistor, Metalfilm	270E	50ppm	1%	0207 MK2	Resista	17087
R332'	Resistor, Metalfilm	1,5K	50ppm	1%	0207 MK2	Resista	17014
R333	Resistor, Carbon	470E		5%		Resista	170993
R334	Resistor, Metalfilm	270E	50ppm	1%	0207 MK2	Resista	17087
R335	Resistor, Metalfilm	3,3K	50ppm	1%	0207 MK2	Resista	17073
R336	Resistor, Metalfilm	1,5K	50ppm	1%	0207 MK2	Resista	17014
R337	Resistor, Metalfilm	270E	50ppm	1%	0207 MK2	Resista	17087
R338	Resistor, Metalfilm	150E	50ppm	1%	0207 MK2	Resista	170905
P1 , P2	Potentiometer, Trim	100E			3362P-001	Bourns	17134
P3 , P4	Potentiometer, Trim	10K			3362P-001	Bourns	17130
P5 , P6	Potentiometer, Trim	50K			3362P-001 50K	Bourns	17146
C106	Capacitor, Elect	100uF	10V		SRA-VB	Chemi-Con	17327
C107	Capacitor, Ceramic	150p	COG	1%	AMC704	Resista	17370
C108	Capacitor, Ceramic	150p	COG	1%	AMC704	Resista	17370
C109	Capacitor, Ceramic	470pF	100V	1%	AMC704	Resista	17371
C112	Capacitor, Elect	22uF	6,3V		SRA-VB	Chemi-Con	17321
C113	Capacitor, Tantal	1,5uF	35V		ETP1,5/35	Ero	17319
C114	Capacitor, Tantal	33uF	10V	5%	ETPW-3G	Roederstein	17323
C115	Capacitor, Ceramic	0,1uF	63V		Z5U	Sprague	17422
C206	Capacitor, Elect	100uF	10V		SRA-VB	Chemi-Con	17327
C207	Capacitor, Ceramic	150p	COG	1%	AMC704	Resista	17370
C208	Capacitor, Ceramic	150p	COG	1%	AMC704	Resista	17370
C209	Capacitor, Ceramic	470pF	100V	1%	AMC704	Resista	17371
C212	Capacitor, Elect	22uF	6,3V		SRA-VB	Chemi-Con	17321
C213	Capacitor, Tantal	1,5uF	35V		ETP1,5/35	Ero	17319
C214	Capacitor, Tantal	33uF	10V	5%	ETPW-3G	Roederstein	17323
C215	Capacitor, Ceramic	0,1uF	63V		Z5U	Sprague	17422
C301	Capacitor, Ceramic	470pF	100V	1%	AMC704	Resista	17371
C302	Capacitor, Ceramic	22nF	63V		ROV767.11	Roederstein	17352
C303	Capacitor, Elect	3,3uF	50V		SRA-VB	Chemi-Con	17317
C304	Capacitor, Ceramic	100pF	63V		ROV745.11	Roederstein	17355
C305	Capacitor, Ceramic	1,2nF	63V		ROV767.11	Roederstein	17351
C310 - C312	Capacitor, Elect	10uF	50V		SRA-VB	Chemi-Con	17318

POS	BESCHREIBUNG	WERT		TYPE	HERSTELLER	ARTIKEL
C313	Capacitor,Elect	100uF	10V	SRA-VB	Chemi-Con	17327
C314	Capacitor,Elect	100uF	25V	SM-VB	Chemi-Con	17306
C315	Capacitor,Elect	47uF	16V	SM-VB	Chemi-Con	17304
C316 , C317	Capacitor,Elect	10uF	50V	SRA-VB	Chemi-Con	17318
C318	Capacitor,Elect	10uF	50V	SRA-VB	Chemi-Con	17318
C319	Capacitor,Ceramic	0,1uF	63V	Z5U	Sprague	17422
C322	Capacitor,Ceramic	0,1uF	63V	Z5U	Sprague	17422
C323	Capacitor,Elect	3,3uF	50V	SRA-VB	Chemi-Con	17317
C324 - C326	Capacitor,Ceramic	0,1uF	63V	Z5U	Sprague	17422
CT101 , CT201	Capacitor,Trim	70pF		VCT51H	ALPS	17432
L301	Choke	100uH		SP0406L-820	RTW	17699

POS	BESCHREIBUNG	WERT			TYPE	HERSTELLER	ARTIKEL
D601 - D604	Diode, Silicon				1N4005	ITT	17482
D605 , D606	Diode, Schottky				1N5819	Motorola	19401
D607 - D611	Diode, Schottky				BAT48	SGS-Thomson	19410
R601	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
R602	Resistor, Metalfilm	1K	50ppm	1%	0207 MK2	Resista	170957
R603 - R605	Resistor, Metalfilm	10K	50ppm	1%	0207 MK2	Resista	17059
C601	Capacitor, Ceramic	0,1uF	63V		Z5U	Sprague	17422
C602	Capacitor, Elect	470u	40V			Roederstein	17307
C0 01	Connector				SL3	RTW	14344
C0 02	Connector	16p			MICS	Lumberg	14334

POS	BESCHREIBUNG	WERT		TYPE	HERSTELLER	ARTIKEL
IC401 , IC402	IC-HC			74HC00	National	18021
IC403	IC-CMOS			CD4017BE	Texas-Instruments	17520
IC404	IC-ULN			ULN2023A/SN 75468	Texas Instruments	18056
T401 - T404	Transistor			BC337.40	Intermetall	17462
T405 , T406	Transistor			BC327-40	Intermetall	17461
T407	Transistor			MPSA 42	Motorola	17455
T408	Transistor			BC239C	Intermetall	17450
T410 , T411	Transistor			MPSA 42	Motorola	17455
T412 , T413	Transistor			MPSU 60	Motorola	17470
D401 - D414	Diode, Silicon			1N4148	ITT	17492
D415	Diode, Zener	130V		ZY 130	ITT	18505
D416	Diode, Zener	82V		ZY 82/ZPY 82	ITT	17499
D418 - D422	Diode, Silicon			1N4148	ITT	17492
AR401	Resistor, Array	10K		4608X-101-10K	Bourns	17095
R401 , R402	Resistor, Metalfilm	22K	50ppm	1% 0207 MK2	Resista	17053
R403 , R404	Resistor, Metalfilm	6,8K	50ppm	1% 0207 MK2	Resista	17071
R405	Resistor, Carbon	2,2M		5% 0207	Resista	17036
R406	Resistor, Metalfilm	100K	50ppm	1% 0207 MK2	Resista	170960
R407 , R408	Resistor, Metalfilm	22K	50ppm	1% 0207 MK2	Resista	17053
R409 , R410	Resistor, Metalfilm	10K	50ppm	1% 0207 MK2	Resista	17059
R411 , R412	Resistor, Metalfilm	1M	50ppm	1% 0207 MK2	Resista	17055
R413 , R414	Resistor, Metalfilm	56,2K	50ppm	5% 0207	Resista	170971
R415 , R416	Resistor, Metalfilm	1K	50ppm	1% 0207 MK2	Resista	170957
R418	Resistor, Metalfilm	1K	50ppm	1% 0207 MK2	Resista	170957
R419	Resistor, Metalfilm	6,8K	50ppm	1% 0207 MK2	Resista	17071
R422	Resistor, Metalfilm	100K	50ppm	1% 0207 MK2	Resista	170960
R423	Resistor, Metalfilm	22K	50ppm	1% 0207 MK2	Resista	17053
R424	Resistor, Metalfilm	100K	50ppm	1% 0207 MK2	Resista	170960
R425	Resistor, Carbon	10E		5% 0207	Resista	17001
R426 , R427	Resistor, Carbon	560K		5% 0207	Resista	17063
R428 , R429	Resistor, Metalfilm	1M	50ppm	1% 0207 MK2	Resista	17055
R430 - R432	Resistor, Metalfilm	3,3K	50ppm	1% 0207 MK2	Resista	17073
R433	Resistor, Metalfilm	22K	50ppm	1% 0207 MK2	Resista	17053
C401 - C404	Capacitor, Ceramic	3,3nF	100V	C320 C332K2R5	Kemet	17393
C405 - C406	Capacitor, Ceramic	1,5nF		EDPT06ROZ767P1	Roederstein	17387
C407 - C408	Capacitor, Polyester	10nF	250V	MKS 3	Wima	17401
C409 - C422	Capacitor, Elect	10uF	50V	SRA-VB	Chemi-Con	17318
C423	Capacitor, Ceramic	0,1uF	63V	Z5U	Sprague	17422
C424 - C426	Capacitor, Elect	10uF	50V	SRA-VB	Chemi-Con	17318
C427	Capacitor, Ceramic	0,1uF	63V	Z5U	Sprague	17422
SW401 - SW403	Push-button			LDT 0041.9293.7.2	Schurter	14021
SW404	Push-button			LDS 0041.9156.3.1.1.7	Schurter	14033
CON2	Connector			2,5 MS 12 AU	Lumberg	17664
CON3	Connector	10p		MICS	Lumberg	14332
CON4	Connector	12p		SL3/12/Z	RTW	14349

POS	BESCHREIBUNG	WERT	TYPE	HERSTELLER	ARTIKEL
	Bar-Graph-Display		201 Segments	RTW	17556
	Scale, horizontal		1227B	RTW	166961

POS	BESCHREIBUNG	WERT	TYPE	HERSTELLER	ARTIKEL
	Power transformer		OB14/12	RTW	14509**
	Power plug		6075 X	RTW	14104**
	Power cable				179731
	Fuse Holder		031.1383	Schurter	14153
	Fuse	100mA sl.bl.	T	Wickmann	17543
	Voltage Selector		0033.4604	Schurter	14154
IC315	Voltage, Regulator		LM317T	National	17527

POS	BESCHREIBUNG	WERT	TYPE	HERSTELLER	ARTIKEL
	XLR-Socket	3Pin	NC3FD-VBAG	Neutrik	17667
	8 Pin Female Socket		KFV80	Lumberg	17679
	Toggle Switch		MS244	RTW	17703

**EG-Konformitätserklärung nach Artikel 10.1 der Richtlinie 89/336/EWG
und der Richtlinie 73/23/EWG**

Wir,

RTW GmbH & Co.KG
Elbeallee 19 · 50765 Köln · Germany

erklären in alleiniger Verantwortung, dass das Produkt:

RTW PPM 1227 E und B

auf das sich diese Erklärung bezieht, mit den folgenden Normen bzw. normativen Dokumenten übereinstimmt:

EMV **89/336/EWG**

EN 50081-1 (März 1993): EN 55022 B, gestrahlt
EN 55022 B, leitungsgeführt

EN 50082-1: EN 61000-4-2
EN 61000-4-3
EN 61000-4-4
EN 61000-4-5
EN 61000-4-6
EN 61000-4-11

Sicherheit **73/23/EWG**

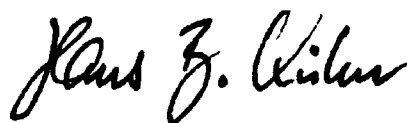
EN 60950 (1992 + A1/1993)

Geprüft und dokumentiert von nachfolgend aufgeführten Firmen:

ELEKLUFTH GmbH, Bonn, akkreditiertes Prüflabor
RTW GmbH & Co.KG, Köln

Datum und Unterschrift des Verantwortlichen:

20.02.2001



EC-Declaration of Conformity Directive 89/336/EEC and Directive 73/23/EEC

We,

RTW GmbH & Co.KG
Elbeallee 19 · 50765 Köln · Germany

declare under sole responsibility that the product:

RTW PPM 1227E and B

meets the intend of the Directive 89/336/EEC and Directive 73/23/ECC. Compliance was demonstrated to the following specifications as listed in the official journal of the European Communities:

EMC	89/336/EEC
EN 50081-1 Emissions (march 1993):	EN 55022 Radiated, Class B EN 55022 Conducted, Class B
EN 50082-1 Immunity:	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-11
Safety	73/23/EEC
EN 60950 (1992 + A1/1993)	

Tested and documented by the following companies:

ELEKLUFT GmbH, Bonn, accredited EMC laboratory
RTW GmbH & Co.KG, Köln

Date and signature of the responsible person:

20.02.2001

