Contents

5 Service Manual "Switched-mode Power Supply"

5.1 Function Description

(See circuit diagrams 819.1568 S, 819.1716 S and 819.1916 S)

The module is a primary switched-mode power supply. Five secondary voltages are generated:

+ 24 V, + 15 V, -15 V, + 5 V for analog circuits and + 5 V for digital circuits.

The power supply also contains a mains transformer, rectifier and linear regulator so that the crystal reference of the SMGU can still be operated when in standby mode. The power supply has a power fail circuit to detect AC power brought-outs and failures.

5.1.1 Description of AC Power Input Circuit

The AC voltage is applied via fuses F1 and F2, AC filter, AC power switch and voltage selector to the input of circuit board A41.

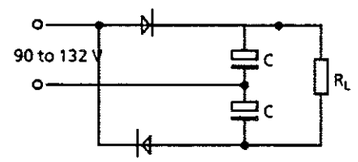
The AC power supply ranges are 90 to 132 V or 190 to 260 V.

5.1.2 Description of PCB A41

Following the EMI suppression filter containing L100 and C100, the AC voltage is applied to the AC transformer T100 and also via the NTC resistor V101 (inrush current limiting) to rectifier V110.

Rectification of the AC supply is by means of a bridge rectifier for the voltage range from 190 to 260 V and as a voltage doubler in the range from 90 to 132 V. The magnitude of the hum voltage is the same in both cases as a result of the electrolytic capacitors switched over in the process.

Range from 90 to 132 V:



Range from 190 to 260 V:

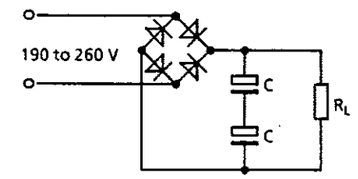


Fig. 5-1 Rectifier principle

The rectified AC supply voltage is then applied to connector X20 via the noise suppression inductor L102.

The VDR (V102) prevents spikes from reaching the switching transistor.

The mains transformer T100 has two primary windings and two secondary windings.

The two primary windings are selected according to the AC voltage ranges.

One of the secondary windings powers the components connected to the AC supply potential, the second winding is connected to the instrument ground (earth) and is used to supply the power supply and the crystal oven in the SMGU.

The secondary voltages are applied to the bridge rectifiers V111 and V112 via fuses F100 and F101. + 12 V are then generated by each of the linear regulators N101 and N102. The function of the component D100 and the associated parts of the circuit is described in Section 5.1.3.1.

5.1.3 Description of PCB A42

The rectified AC voltage applied to PCB A42 via connector X20 is connected to the primary winding of the transformer T200. The primary current is switched at 100 kHz by the switching transistor V220. The transformer core is magnetized by a direct current which is reduced again by the demagnetization winding when the primary current is switched off.

The duty factor of the 100-kHz pulse must therefore be <0.5. The 100-kHz pulses generated in this manner are transmitted to four secondary windings with the respective transmission ratio.

The secondary voltages are each rectified by two diodes.

A voltage Vout results on the electrolytic capacitor by means of a storage inductor and a charging capacitor according to the following equation:

$$V_{out} = V_p \times v_t$$

where V_{out} = output voltage
V_p = peak voltage
v_t = duty factor

Three secondary voltages have their chokes on a common core (triple choke) and are therefore coupled together via the magnetic flux. It is then sufficient to load one of the three voltages under open-circuit conditions in order to prevent a rapid increase of the voltage on the electrolytic capacitor.

The fourth secondary voltage has its own choke.

As can be seen from the equation for the voltage on the charging capacitor, the output voltage can be set using the duty factor. A secondary voltage is thus regulated at 6 V using a control loop. The other secondary voltages are controlled at the same time by means of the duty factor and the respective turns ratio of the transformer.

5.1.3.1 Function of Control IC

Central functions of the control loop are handled by the control IC D100 on the PCB A41. It implements the following functions:

- Generation of pulse-width modulated drive signal for the power transistor (PWM signal)
- Hum precontrol of PWM signal
- Slow start-up, of duty factor limiting
- Switching on/off of power supply
- Current limiting for power transistor

- **Oscillator**

R105 and C112 determine the switching frequency, which is approx. 100 kHz.

- **Sawtooth generator**

The capacitor C115 is charged via a current mirror circuit whose input current is derived from the rectified AC supply by means of the series resistors R105 and R106.

The oscillator discharges C115 at the end of the period so that a sawtooth voltage results at pin 10.

- **Generation of pulse-width modulated squarewave signal**

Fig. 5-2 explains the principle:

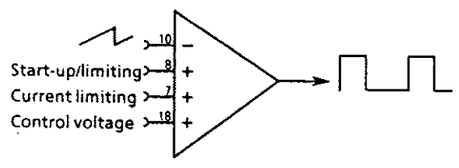


Fig. 5-2

The 100-kHz sawtooth voltage is therefore basically connected to the input of a comparator and compared with the voltages at three other inputs.

The three inputs fulfil the following tasks:

- **Pin 8**, slow start-up, hum precontrol and limiting of duty factor

Duty factor limiting is implemented in conjunction with the hum precontrol.

A voltage is derived from the rectified AC supply voltage by means of the divider R110, R111 and R107. This voltage is then smoothed by C116. The voltage at pin 8 together with the hum modulation of the sawtooth voltage at pin 10 results in hum precontrol and therefore compensation of the secondary hum voltage.

The time constant for C115 is dimensioned such that the voltage at pin 10 with the minimum AC supply voltage cannot rise to more than half the period of the oscillator frequency. A maximum duty factor of 0.5 is therefore not exceeded.

- **Pin 7**, current limitation for power transistor

The voltage between pins 6 and 7 is compared using an internal comparator. R117 and R118 define the voltage for the switch-off threshold. The precision resistor R202 is connected between the source of V220 and ground. The voltage drop across this resistor is applied to pin 7 via X20. The maximum current in the power transistor is then calculated as follows:

$$I_{pmax} = V_p\,(Pin\ 6) / R202$$

where I_{pmax} = max. peak current
$V_p\,(Pin\ 6)$ = voltage at pin 6 (approx. 1 V)
$R202$ = 0.15 Ω

The power supply is switched off if the peak current exceeds 6.6 A.

- **Pin 18**, control voltage input

Pin 18 is the input of a voltage follower. The control voltage of the switching controller is connected to this input. The control voltage comes from the module A42 via the opto isolator U101 and X20.

The duty factor v_t can be adjusted from 0 to v_{tmax} by means of the control voltage.

- **Switching the power supply on and off**

A switching signal generated by the standby switch and the following circuit on PCB 842 is applied to the opto isolator U100 via plug connector X20.

This opto isolator switches pin 2 of D100 either to approx. 6 V (= on) or 0 V (= off).

5.1.3.2 Design of Control Loop

The following block diagram represents the control loop for controlling the +6 V of the switched-mode power supply:

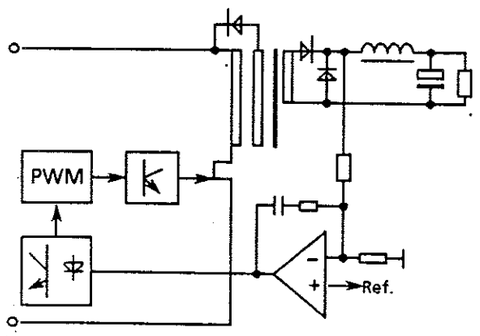


Fig. 5-3 Control of switched-mode power supply

5.1.3.3 Generation of Output Voltages

All voltages after the storage inductors are subject to further regulation from the linear regulators.

The regulators (some of which are of discrete design) and the switching controller have a common reference voltage of +5 V (V300, N300, adjustment using R304).

- +5 V controller for supplying the digital circuit

This consists of an integrated linear regulator N290.

- +5 V controller for supply of analog circuit

The regulator is a series regulator and has N300-B as an amplifier.

L281 and C287 are the noise suppression filter for 100 kHz.

- −15-V controller

This is implemented with the positive controller N270. The output voltage is generated by applying the positive voltage output of the controller to ground. The negative reference point serves as the output.

L270 and C275 are the EMI suppression filter for 100 kHz.

- + 15-V controller

This is designed with V241 as the control element and N240-A, V242 and V243 as the control amplifier. The output voltage is set using R260, R261 and R262. R255 is used as a shunt. A fold-back characteristic at load currents > 6 A with N240-B.

L240 and C245 are the EMI suppression filter for 100 kHz.

- + 24-V controller

This is designed using V212 as a series regulator and with N210-A as a control amplifier. The output voltage is set using R222, R223 and R224.

N210-B and the shunt R234 provide the fold-back characteristic.

L211 and C217 form the 100 kHz EMI suppression filter.

5.1.3.4 Further Circuits

- **Fan supply**

The fan is supplied by the unregulated voltage of the 24-V controller via R212, R213 and R214. A thermostat bypasses resistor R212 at temperatures > + 45 °C and increases the speed of the fan. The fan is switched off again by the thermostat at temperatures < + 35 °C.

- **Voltage monitoring**

The voltages of + 6 V, + 5 V (analog) and -15 V are monitored for overvoltage and undervoltage by means of the window comparator N320-A and N320-B.

The voltages of + 15 V, + 5 V (digital) and + 24 V are monitored for undervoltage by means of N320-D.

The power supply is switched off if a fault occurs.

During power-up, the voltage monitoring is disabled for approx. 500 ms by means of C350, C351 and R350.

- **Power fail**

The microprocessor receives a power fail pulse to save the data when the unit is switched off or if there is a power failure. The pulse is generated by comparator N320-C.

- **Standby switch**

Transistor V353 is switched on by the standby switch via V350 and the RS flip-flop (N350-C and N350-B). The power supply is then switched on via the opto isolator U100. The LED V352 indicates the "On" status of the power supply.

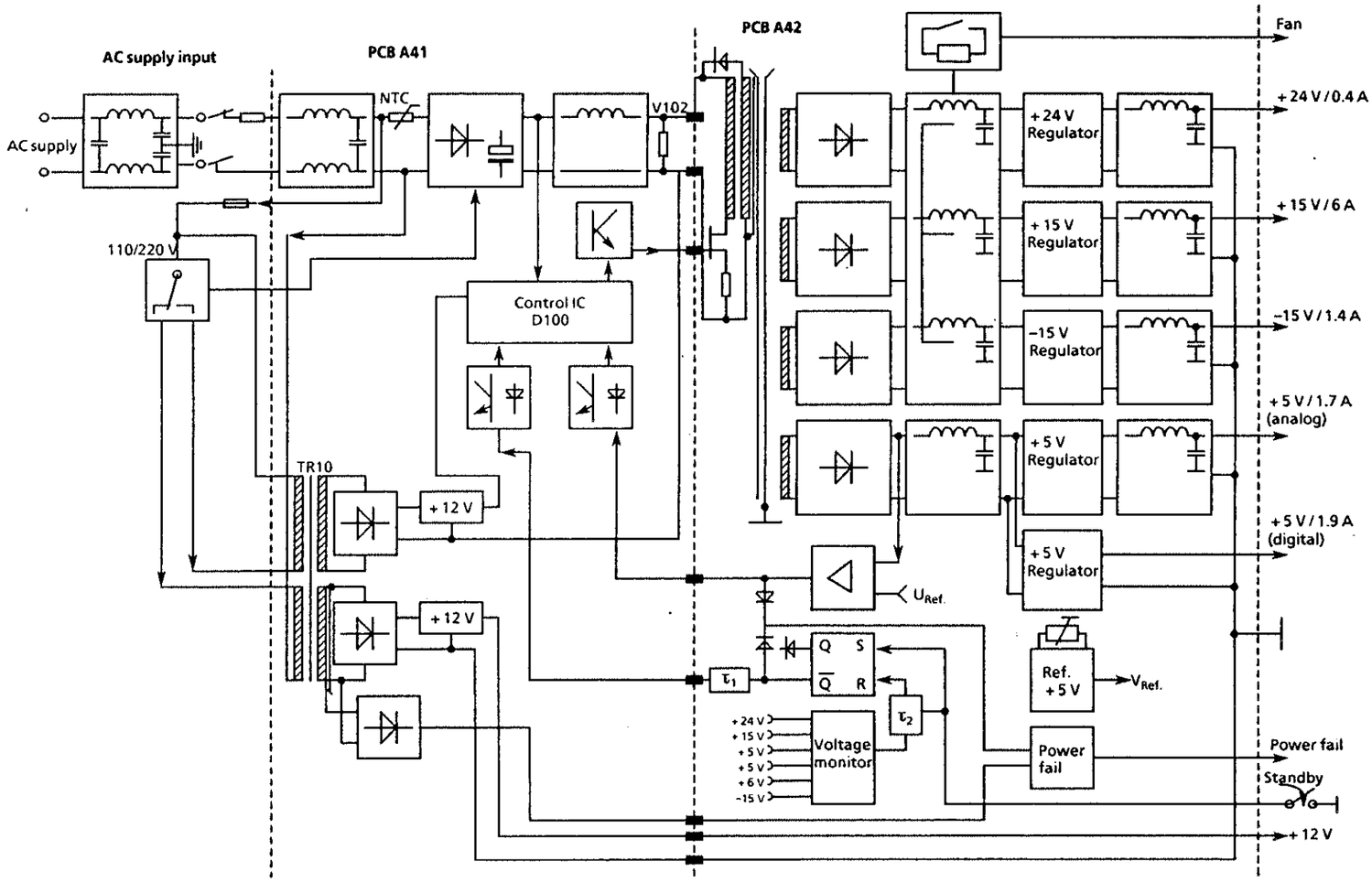


Fig. 5-4 Block diagram of switched-mode power supply

5.2 Testing and Adjustment

The power supply is automatically switched off if there is no load at the output. If not otherwise specified, at least 1 A must be taken at + 5 V.

Caution: ***Both PCBs contain components connected to the AC supply voltage. An isolating transformer must therefore be used when using oscilloscopes because of the danger of a short-circuit with the oscilloscope ground.***

5.2.1 Testing the Rectifier PCB A41

5.2.1.1 Testing the AC Rectification and the Standby Power Supply

Open up power supply and fold out PCB A41. With the AC power plug disconnected, remove X20. Connect power supply to isolating transformer and switch on.

Set voltage selector to 190 to 240 V.
Check using the following table:

Test point	DC voltage	± Tol.
P12-P13	264 to 335 V	10 V
P1-P2	12 V	0.5 V
P3-P4	12 V	0.5 V

Set voltage selector to 90 to 132 V.

Check using the following table:

Test point	DC voltage	± Tol.
P12-P13	250 to 362 V	10 V
P1-P2	12 V	0.5 V
P3-P4	12 V	0.5 V

Reconnect X20.

5.2.1.2 Brief Power Supply Test

Switch on the SMGU on the isolating transformer with a 220-V supply and check the following data on the power supply:

- The control voltage at test point P303 must be between 9 and 11 V.
- Check that the reference voltage at P301 is 5.00 V ± 0.01 V.
- Check the unregulated voltage and output voltages using Table 5-1.
- Also check the noise voltages according to Table 5-1.
- Connect oscilloscope ground to P13 and check pulse at P10:
  Amplitude: 10 V_{pp} ± 1 V_{pp}
  Pulse width: 0.5 to 4 µs
  Period: 8.9 to 11.5 µs

If all data are correct, the main functions of the power supply are OK.

The following sections describe further tests.

5.2.2 Testing and Adjustment of PCB A42

5.2.2.1 Adjustment of Reference Voltage

- Connect DC voltmeter to P301.
- Operate power supply in standby mode and adjust voltage at P301 to 5.00 V ± 0.01 V using R304.

5.2.2.2 Testing the Unregulated and Output Voltages of the Regulators

Check according to Table 5-1.

5.2.2.3 Checking Spurious Voltages

Check the spurious voltages using Table 5-1 with an AF voltmeter with a bandwidth from 15 Hz to 100 kHz.

5.2.2.4 Testing the Control Voltage Monitoring

Check the power supply using the following table:

Test point	DC voltage	± Tol.
P322	2.18 V	0.1 V
P323	1.75 V	0.1 V
P327	3.75 V	0.1 V
P324	11.5 V	1.0 V

Short-circuit the voltages at the output one after the other:
the power supply must cut out each time.

5.2.2.5 Testing the Power Fail Circuit

Connect DC voltmeter to P325. Set AC power selector to 90 to 132 V. The voltmeter must indicate a voltage between 4 and 5 V.

Slowly reduce the AC supply using the transformer:

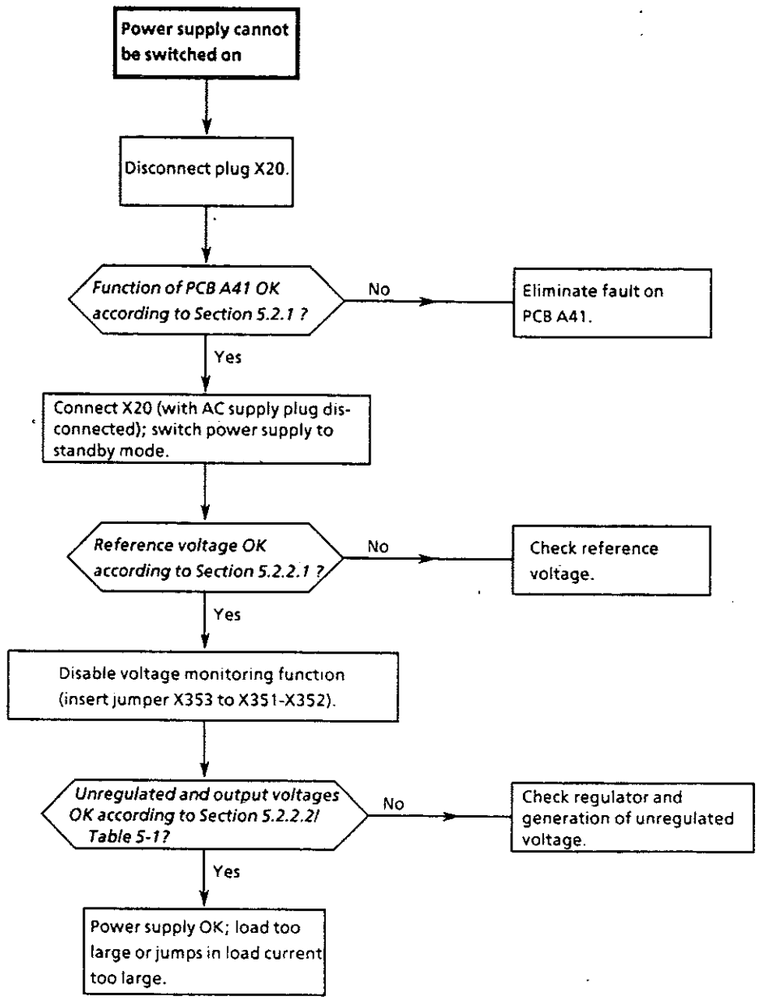
the voltage at P325 must drop to 0 V at <90 V.

Table 5-1 Checking the unregulated and output voltages of the regulators

Voltage	Test point/ unregulated voltage	Test point/ output voltage	Noise voltage 15 Hz to 100 kHz
+24 V	P210: +26 to +28 V	P213: +23.5 to +24.6 V	X4.19 <1 mV
+15 V	P240: +16.5 to +17.5 V	P242: +14.9 to +15.3 V	X14.14 <2 mV
−15 V	P271: +1.8 to +2.5 V	P271: −15.25 to −14.5 V	X4.6 <2 mV
+5.2 V	P280: +5.7 to +6 V	P290: +5.1 to +5.4 V	X4.2 <4 mV
+5.1 V	P280: +5.7 to +6 V	P292: +5.0 to +5.2 V	X4.9 <1 mV
+12 V		Z300: +11.0 to +12.1 V	X4.B5 <30 mV

5.3 Troubleshooting

The power supply is switched off automatically by a voltage monitoring circuit if there is a fault. A possible cause of the fault can be located using the following troubleshooting diagram.



5.4 Interfaces

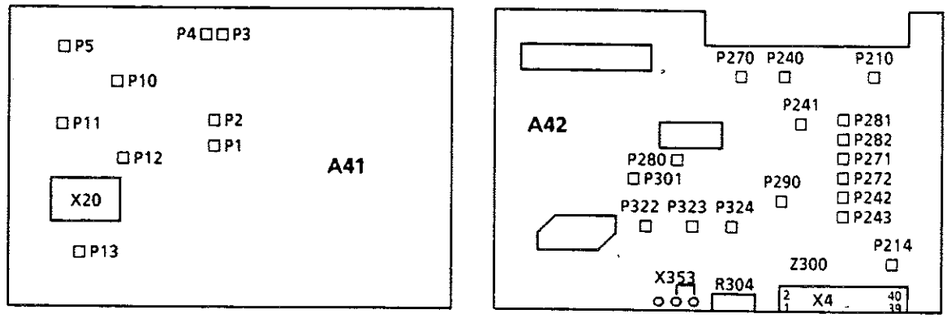


Fig. 5-5 Layout of test points and trimmers

Analog Interfaces

Test point	Voltage	max. output current	Test point
X4-37, X4-38	+24 V	0.4 A	P214
X4-25, X4-26, X4-27	+15 V	6.0 A	P243
X4-28, X4-29, X4-30			
X4-11, X4-12, X4-13	−15 V	1.4 A	P272
X4-3, X4-4, X4-5	+5.2 V	1.9 A	P290
X4-17, X4-18, X4-19	+5.1 V	1.7 A	P282
X4-20			
X4-6, X4-8, X4-10,	Ground		
X4-14, X4-16, X4-22,	Ground		
X4-24, X4-32, X4-34,	Ground		
X4-7, X4-15, X4-21,	Ground		
X4-23, X4-31, X4-33,	Ground		
X4-35, X4-36, X4-39,	Ground		
X4-40	Ground		
X4-9	+12 V	0.15 A	Z300

Digital Interfaces

Test point	Voltage	Function	Test point
X4-1	0 V	Standby ON	X355-1
X4-1	7 to 8 V	Standby OFF	X355-1
X4-2	4.75 V	Power fail OFF	P325
X4-2	0 V	Power fail ON	P325

ROHDE&SCHWARZ

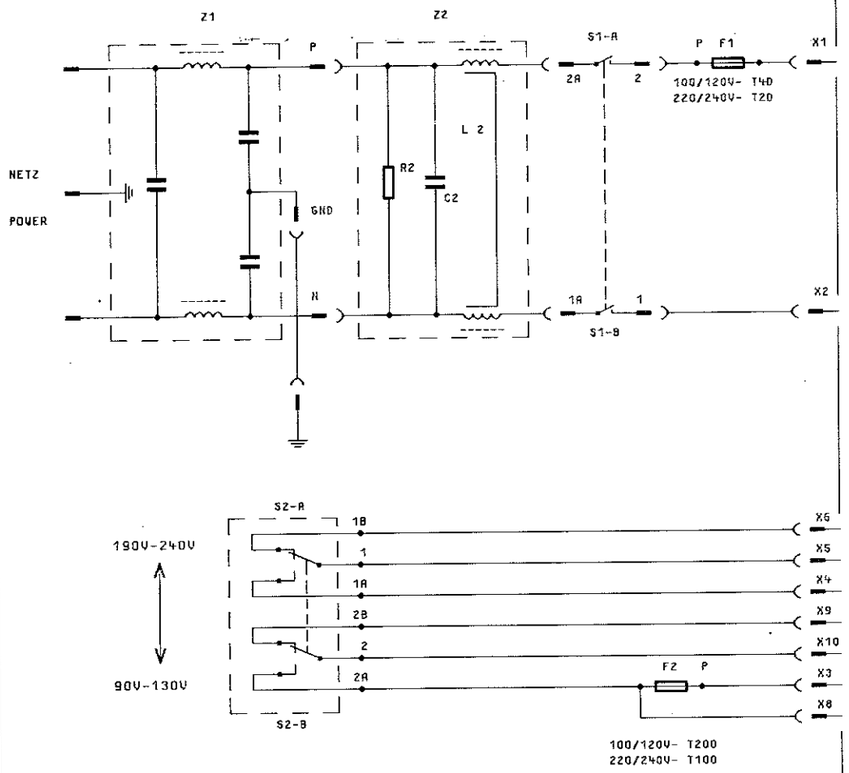
Schaltteillisten
Stromläufe
Bestückungspläne
Part lists
Circuit diagrams
Components plans
Listes des pièces détachées
Schémas de Circuit
Plans des composants

(R 29500 Bl. 2)
095.1000 Bl. 2

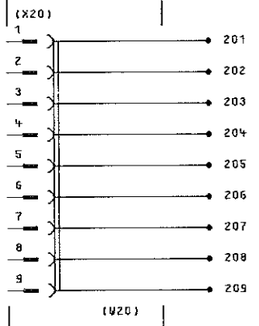
Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
A41	ED GLEICHRICHTUNG RECTIFIER	819.1716.02			
A42	ED SCHALTREGLER SWITCHED REGULATOR	819.1916.02			
C2	CS 1.0UF+-10% 630/250V CAPACITOR ENTHALTEN IN/INCLUDED IN Z2	811.2542	SIEMENS	B81121-C-B132	819.1739
F1	SS SCHMELZS.T2 D DIN41571 FUSE	SS 020.7546	WICKMANN	T2D DIN 41571 TROP	
F2	SS SCHMELZS.T100 DIN41662 FUSE	SS 020.7146	WICKMANN	TO,1 DIN 41662 TROP	
L2	LD STROMKOMPENS.DROSSEL COMPENSATION INDUCTOR ENTHALTEN IN/INCLUDED IN Z2	811.2571			819.1739
R2	RL 1W 182 KOHM+-1%TK100 METAL FILM RESISTOR ENTHALTEN IN/INCLUDED IN Z2	RL 006.5927	RESISTA	MK5 182 KOHM 1%TK100	819.1739
S1	SK WIPPSCH.2POL.AUS SW SWITCH	SK 553.2925	MARQUARDT	1802.1102	
S2	SK SPANNUNGSUMSCH.115/220 VOLTAGE SWITCH	292.5387	MARQAURDT	4021.0501	
X1	ENTHALTEN IN/INCLUDED IN Z1				
Z1	FN EINBAUST.M.NETZFILT.3A POWER LINE FILTER	FN 006.0977.	SCHAFFNER	FN328-3/05	
Z2	LD NETZFILTER POWER LINE FILTER	819.1739			
					- ENDE -

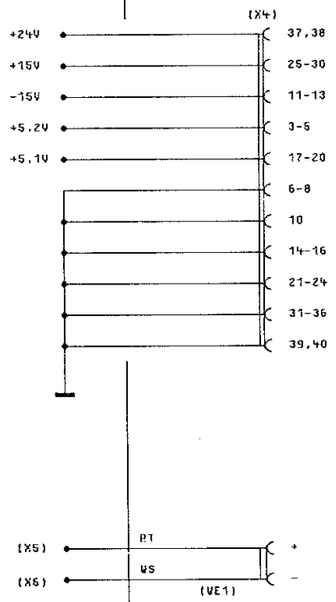
ROHDE & SCHWARZ	Äl	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	15	0489	ZE NETZTEIL POWER SUPPLY	819.1568.01 SA	1-

A41 GLEICHRICHTUNG
RECTIFIER



A42 SCHALTREGLER
SWITCHED REGULATOR





				1KSB	TAG	NAME	BENENNUNG
				BEARB.		LS	SCHALTNETZTEIL
				GEPR.		*	POWER-SUPPLY
				NORM			
				PLOTT	12. 4.89	*	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 819.1568.01S
				ZU GERAET SMGU			BLATT-NR. 1 v. 1 BL.
							REG.I.V. 819.0010 ERSTE Z.

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
C100	CS 1,0UF+-10% 630/250V CAPACITOR	811.2542	SIEMENS	B81121-C-B132	
C102	CK 68NF+-20%250V QUADER CAPACITOR	CK 087.4184	ERO	MKC1862 368/25+-20%	
C103	CK 68NF+-20%250V QUADER CAPACITOR	CK 087.4184	ERO	MKC1862 368/25+-20%	
C104	CE 470UF-10+30%250V40X45 ELECTROLYTIC CAPACITOR	CE 006.9939	VALVO	2222-052-43471	
C105	CE 470UF-10+30%250V40X45 ELECTROLYTIC CAPACITOR	CE 006.9939	VALVO	2222-052-43471	
C106	CE 470UF-10+50% 40V 15X30 ELECTROLYTIC CAPACITOR	CE 087.0572	ROEDERST	ELKO EK470/40	
C107	CK 330NF+-5%63V5RM MKT CAPACITOR	CK 099.2969	WIMA	MKS2/63/0,33UF/5%	
C108	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR	CE 208.4007	ROEDERST	ELKOEK100/25	
C109	CE 470UF-10+50% 40V 15X30 ELECTROLYTIC CAPACITOR	CE 087.0572	ROEDERST	ELKO EK470/40	
C110	CK 330NF+-5%63V5RM MKT CAPACITOR	CK 099.2969	WIMA	MKS2/63/0,33UF/5%	
C111	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR	CE 208.4007	ROEDERST	ELKOEK100/25	
C112	CK 2,2NF +-1% 100V RM5 KP POLYPROPYLENE CAPACITOR	CK 007.7617	ROE	KP1830-222/011-R	
C115	CK 1,0NF +-1% 100V RM5 KP POLYPROPYLENE CAPACITOR	CK 007.7598	ROE	KP1830-210/011-R	
C116	CE 15 UF+-20%16V 7X 5X11 ELECTROLYTIC CAPACITOR	CE 087.9328	ROEDERSTEI	ETR 3 15/16	
C117	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C118	CC 330PF+-2%6X9N750 CERAMIC CAPACITOR	CC 087.6964	VALVO	2222 678 58331	
C122	CS 1NF+-20%250V/50HZ VDE Y-CAPACITOR (DISC)	834.9143	ROEDERSTEI	Y8102 MCMBFOK	
C123	CK 10NF+-20%630V QUADER CAPACITOR	CK 024.7763	ROEDERST	MKT1822-310/6	
C124	CK 10NF+-20%630V QUADER CAPACITOR	CK 024.7763	ROEDERST	MKT1822-310/6	
D100	BO UC2840J OA2 SCH.REGL REG.PULSE WIDTH MODULATOR	374.9904	UNITRODE	UC2840J	
F100	SS SCHMELZS.T 0,5A YTR5-T FUSE TR5T 0,5A	SS 815.8239	WICKMANN	TR5-T500MA NR.19372K	
F101	SS SCHMELZS.T 0,5A YTR5-T FUSE TR5T 0,5A	SS 815.8239	WICKMANN	TR5-T500MA NR.19372K	
L100	LD STROMKOMPENS.DROSSEL COMPENSATION INDUCTOR	811.2571			
L102	LD 100UH 20% 1A 0,6500HM CHOKE	LD 155.9446	SIEMENS	B82111-E-C25	
N101	BO LM7812CT+12V1AO VREGL VOLTAGE REGULATOR	BO 344.9641	NSC	LM7812CT	
N102	BO LM7812CT+12V1AO VREGL VOLTAGE REGULATOR	BO 344.9641	NSC	LM7812CT	
P1 ..14	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
P21	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
P31 ..34	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
R101	RL 0,35W 221 KOHM+-1%TK50 RESISTOR	RL 083.2270	DRALORIC	SMA0207/221K-F-C	
R102	RL 0,35W 221 KOHM+-1%TK50 RESISTOR	RL 083.2270	DRALORIC	SMA0207/221K-F-C	
R103	RL 0,35W 3,92KOHM+-1%TK50 RESISTOR	RL 083.1039	RESISTA	MK2	
R104	RL 0,35W 3,92KOHM+-1%TK50 RESISTOR	RL 083.1039	RESISTA	MK2	
R105	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	DRALORIC	SMA0207/4,75K-F-D	
R106	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR	RL 083.1116	DRALORIC	SMA0207/4,99K-F-D	
R107	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
R108	RL 0,35W 210 KOHM+-1%TK50 RESISTOR	RL 083.2258	DRALORIC	SMA0207/210K-F-C	
R109	RL 0,35W 300KOHM+-1%TK50 RESISTOR	RL 082.7840	DRALORIC	SMA0207/300K-F-D	
R110	RL 0,35W 475 KOHM+-1%TK50 RESISTOR	RL 083.2593	DRALORIC	SMA0207/475K-F-C	
R111	RL 0,35W 681 KOHM+-1%TK50 RESISTOR	RL 083.2735	DRALORIC	SMA0207/381K-F-C	
R112	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR	RL 082.2277	DRALORIC	SMA0207/1,82K-F-C	
R113	RL 0,35W 825 OHM+-1%TK50 RESISTOR	RL 082.2502	DRALORIC	SMA 0207/8250HM-F-C	
R114	RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390	DRALORIC	SMA0207/4750HM-F-D	
R115	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	DRALORIC	SMA0207/100HM-F-D	
R116	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMA0207/1K-F-C	
R117	RL 0,35W 6,81KOHM+-1%TK50 RESISTOR	RL 082.2560	DRALORIC	SMA 0207/6,81K-F-C	
R118	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR	RL 082.2277	DRALORIC	SMA0207/1,82K-F-C	
R119	RL 0,35W 825 OHM+-1%TK50 RESISTOR	RL 082.2502	DRALORIC	SMA 0207/8250HM-F-C	
R120	RL 0,35W 562 OHM+-1%TK50 RESISTOR	RL 083.0461	DRALORIC	SMA0207/5620HM-F-D	
R125	RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390	DRALORIC	SMA0207/4750HM-F-D	
R127	RL 0,35W 511 KOHM+-1%TK50 RESISTOR	RL 083.2629	DRALORIC	SMA0207/511K-F-C	
R128	RL 0,35W 511 KOHM+-1%TK50 RESISTOR	RL 083.2629	DRALORIC	SMA0207/511K-F-C	
R150	RL 0,35W 681 OHM+-1%TK50 RESISTOR	RL 083.0490	DRALORIC	SMA0207/6810HM-F-D	
R153	RL 0,35W 221 OHM+-1%TK50 RESISTOR	RL 083.0084	DRALORIC	SMA0207/2210HM-F-D	
R185	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMA0207/1K-F-C	
T100	LT NETZTRANSFORMATOR LINE TRANSFORMER	819.1851			
U100	BP H11A550 OPTOCOUPLER OPTO COUPLER	BP 006.0948	GEN-ELECTR	H11A550	
U101	BP H11A550 OPTOCOUPLER OPTO COUPLER	BP 006.0948	GEN-ELECTR	H11A550	
V101	RK HEISSL 4.7 OHM,10%1.5W THERMISTOR	820.3319	SIEMENS	Q63023-S1479-M	
V102	RK VARISTOR 300V 1W VARISTOR	820.3348	SIEMENS	BEST.-NR.Q69-X3234	
V103	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V104	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V105	AK 2N2222A N 40V 800MA TRANSISTOR	AK 010.5405	VALVO	2N2222A	
V110	AG KBU4K 560V 4A0 BRGL RECTIFIER	820.3302	GEN.INSTR.	KBU4K	
V111	AG B80C800 BRGL RECTIFIER	AG 013.2042	AEG-TELEF.	B80C800SI	
V112	AG B80C800 BRGL RECTIFIER	AG 013.2042	AEG-TELEF.	B80C800SI	
V115	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V116	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
X1 ..6	FV FLACHSTECKER 2,8X0,8 FLAT PLUG 2,8X0,8	FV 279.1998	VOGT	3775A/0,8/MS-S18	
X8 ..18	FV FLACHSTECKER 2,8X0,8 FLAT PLUG 2,8X0,8	FV 279.1998	VOGT	3775A/0,8/MS-S18	
X20	FP EINLOETSTECKER 9POL CONNECTOR 9POL	681.1150	AMP	350712-1	
					- ENDE -

L102
100UH

C102
68N
250V
MKC

R101
221K

C104
470UF
250V

R120
562R

C103
68N
250V
MKC

R102
221K

C105
470UF
250V

V102
RK41S1

R109
300K

R111
681K

R108
210K

R110
475K

C122
1N KL.Y

X20 1

P12

P13

X20 4

D100
UC2840

+VIN/SUPPLY

VIN SENSE

SLOW START

STOP

REF 5V

R/C

CURRENT TH

START V

OV SENSE RESET GND

INV INP

COMP

NON INV INP

PWM OUTP

DRIVER BIAS

CURRENT S

RAMP

R106
4K99

R115
10R

R112
1K82

V103
1N4448

R150
681R

U100
H11A550

N101
UA7812UC

N102
UA7812UC

C107
330N

C108
100U
25V

C110
330N

C111
100U
25V

P1

P2

P3

P4

P5

P6

P7

P8

P14

R103
3K92

R117
6K81

R105
4K75

R104
3K92

R118
1K82

C117
1U
050V
MKT

C112
2N2
1%
100V

C116
15U
35V
TA

R107
10K

C115
1N
100V
1%
FKP

P21

R125
475R

R114
475R

V105
2N2222A

V104
1N4448

P9

P10

C118
330P
N750

R119
100R

R116
1K

R113
825R

R153
221R

U101
H11A550

P11

VOLTAGE-CONTROL

X20 8

X20 9

CURRENT-LIMITING

X20 7

ON/OFF - REGULATION

X20 6

X20 3

+12V STANDBY

X20 2

X20 5

ZU/TO SCHALTNETZTEIL-A2/POWERSUPPLY-A2

STROMLAUF GILT FUER VAR.02

CIRCUIT DIAGRAM IS VALID FOR MOD.02

				1KGB	TAG	NAME
				BEARB.		JN
				GEPR.		JN
				NORM		
				PLOTT	2. 9.88	*
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME			

BENENNUNG

GLEICHRICHTUNG
RECTIFIER

ROHDE&SCHWARZ

ZU GERAET SMGU

ZEICHN.-NR. 819.1716.01S

BLATT-NR. 1

V. 1 BL.

REG.I.V. 819.0010

ERSTE Z.

1 2 3 4 5 6 7 8 9 10 11 12

A B C D E F

ZU/TO Z1

L100
STROMKOMPDR
SW SW
US US

C100
1U
315V

R127
511K

R128
511K

V101
K231

C123
10N
630V
MKT

V110
KBU4K

C124
10N
630V
MKT

C102
68N
250V
MKC

C103
68N
250V
MKC

R101
221K

R102
221K

C104
470UF
250V

C105
470UF
250V

L102
100UH

R120
562R

V102
RK4151

C122
1N KL.Y

R109
300K

R108
210K

R111
681K

R110
475K

X1 X2 X3 X4 X5 X6

T100
TRAFO
X11 SW X17 GN
X12 BR X18 GN
X13 BR X15 RT
X14 BL X16 RT
X8 X9 X10

F100
SI 0.5A

F101
SI 0.5A

V111
B80C800

V112
B80C800

R185
1K

V115
1N4448

V116
1N4448

C106
470UF
40V

C107
330N

C109
470UF
40V

C110
330N

N101
UA7812UC

N102
UA7812UC

C108
100U
25V

C111
100U
25V

P1 P2 P3 P4

R150
681R

U100
H11A550

D100
UC2840

+VIN/SUPPLY
VIN SENSE
SLOW START
STOP
REF 5V
R/C
CURRENT TH
START V
OV SENSE
RESET
GND
INV INP
COMP
NON INV INP
PWM OUTP
DRIVER BIAS
CURRENT S
RAMP

R106
4K99

R115
10R

R103
3K92

R117
6K81

R105
4K75

R104
3K92

R118
1K82

C117
1U
050V
MKT

C112
2N2
1%
100V

C116
15U
35V
TA

R107
10K

P5 P6 P7 P8 P9 P14

C115
1N
100V
1%
FKP

C118
330P
N750

R119
100R

R125
475R

R114
475R

V105
2N2222A

V104
1N444

P21

DRAUFSICHT
TOP VIEW
U100
U101

DRAUFSICHT
TOP VIEW
D100

V105

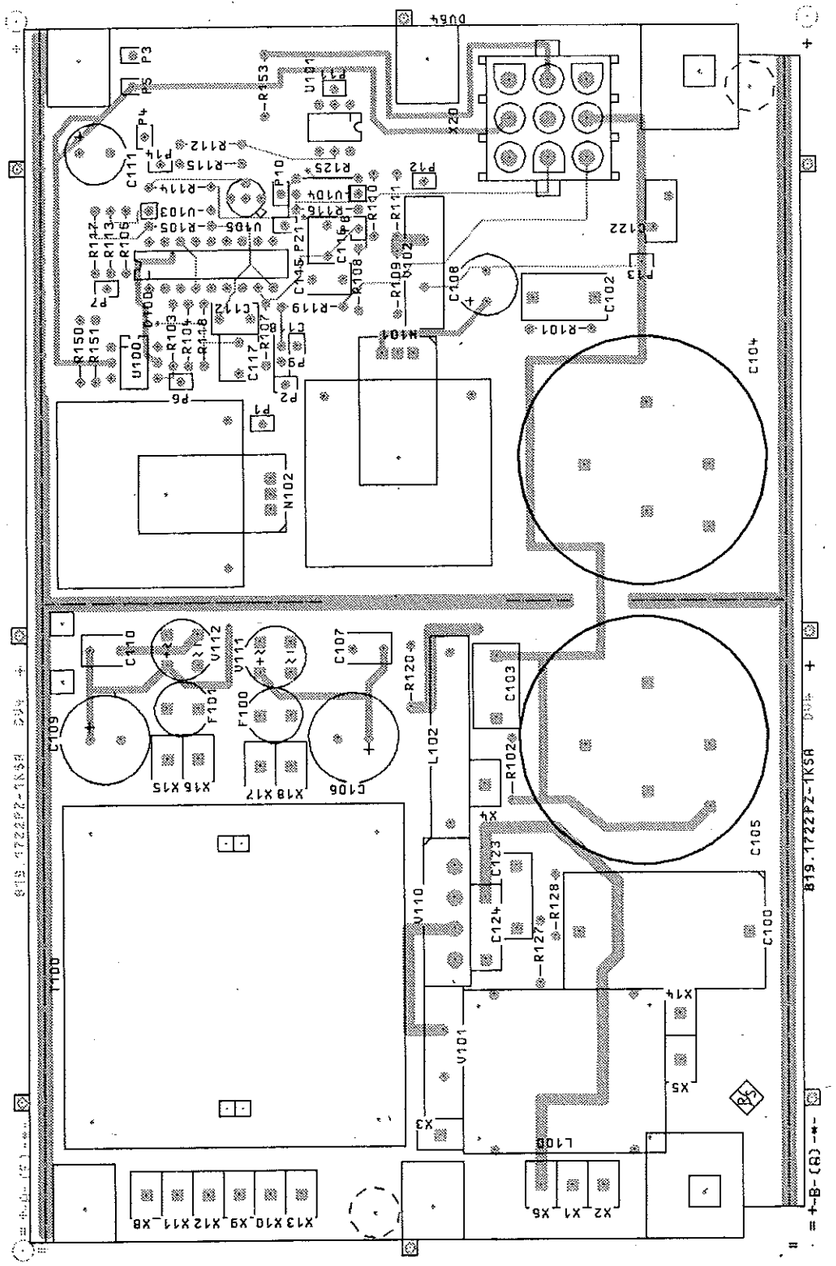
TOP VIEW
N101
N102

STROMLAUF GILT FUER VAR.02

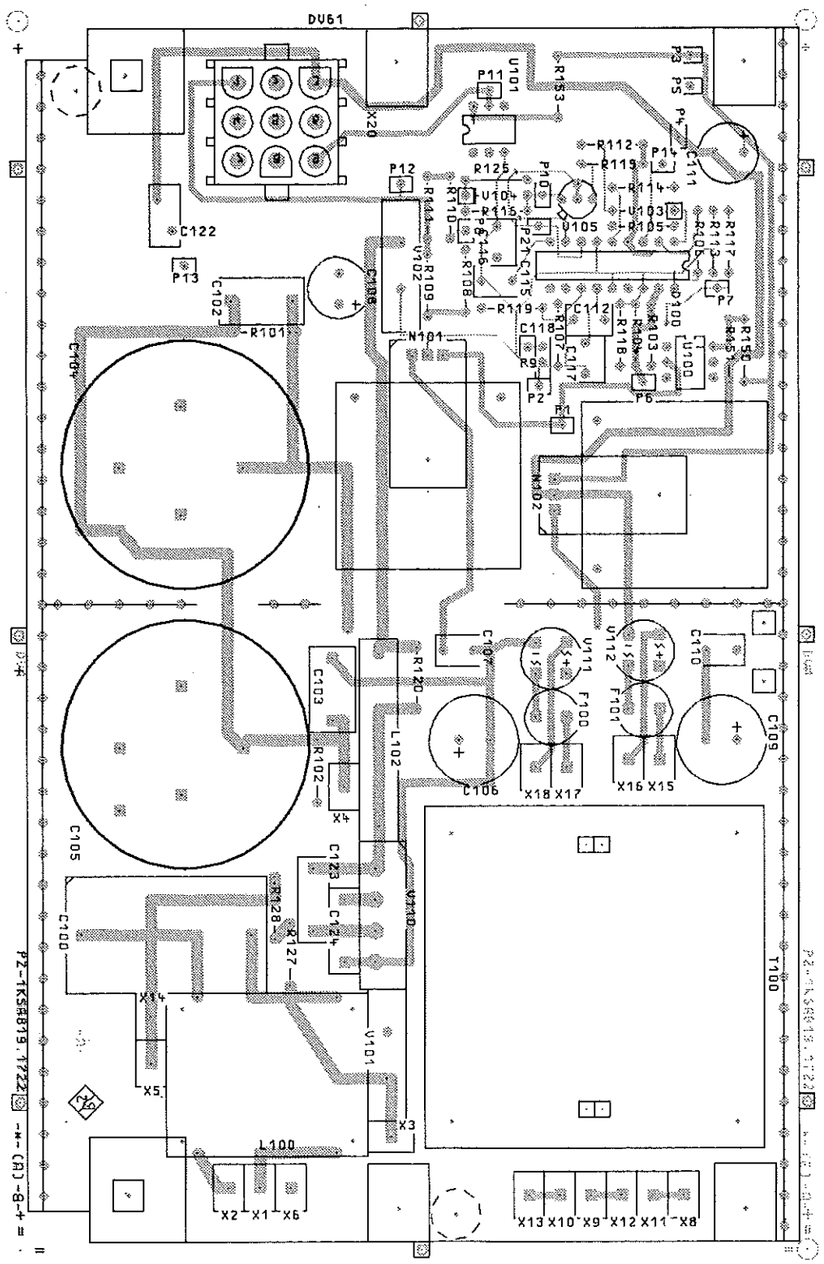
CIRCUIT DIAGRAM IS VALID FOR MOD.02

AEND. IND.	AENDERUNG MITTEILUN

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



Ansicht und Leitungsführung Lötseite
View of tracks on solder side



ISO-Projektion
Methode E

ACHTUNG: EGB!
Elektrostatisch gefährdete Bauelemente erfordern eine besondere Handhabung

ATTENTION ESD!
Electrostatic sensitive devices require a special handling.

(hierzu HVC 250)

				Maße ohne Toleranzangabe		Maßstab 1 : 1
						Halbzeug, Werkstoff
				1KGB	Tag / Name	Benennung
				Bearb.	08.88 / JN	
				Gepr.		
				Norm		
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	ROHDE&SCHWARZ		Zeichn.-Nr. 819.1716 / Blatt-Nr. 2 v. 2 Bl.
				zu Gerät SMGU		reg. i. V. 819.0010V / erste Z.

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
C200	CK 2,2UF+-5%400V RM27,5 FILM-CAPACITOR	681.2133	SIEMENS	B32650-K4225-J	
C210	CC 150PF+-20% HDK700 RD5 CERAMIC CAPACITOR	006.0448	VALVO	2222 655 53151	
C211	CC 100PF+-20% HDK700 RD5 CERAMIC CAPACITOR	006.0431	VALVO	2222 655 53101	
C212	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C213	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C214	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C215	CK 10NF+-5%63V5RM MKT CAPACITOR	CK 099.2869	WIMA	FKS 2/100/0,01UF/5%	
C216	CE 2,2UF+-20%40V SAL ELECTR.CAPACITOR	CE 007.3911	VALVO	2222 122 37228	
C217	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C218	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 007.5237	VITRAMON	VJ1206 Y 104 K FAT	
C219	CC 100PF+-1%50V NP0 1206 CERAMIC CHIP CAPACITOR	CC 099.8415	VITRAMON	VJ1206 A 101 F FAT	
C240	CC 1 NF+50-20%5HDK4000 CERAMIC CAPACITOR	006.0490	VALVO	2222 655 53102	
C241	CC 1 NF+50-20%5HDK4000 CERAMIC CAPACITOR	006.0490	VALVO	2222 655 53102	
C242	CE 1000UF 40V 16RDX30 ELECTROLYTIC CAPACITOR	573.9931	SIEMENS	B 41293-B7108-T	
C243	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C244	CE 10UF+-20%25V SAL ELECTR.CAPACITOR	CE 007.3934	VALVO	2222 122 30006	
C245	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C246	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 007.5237	VITRAMON	VJ1206 Y 104 K FAT	
C247	CC 100PF+-1%50V NP0 1206 CERAMIC CHIP CAPACITOR	CC 099.8415	VITRAMON	VJ1206 A 101 F FAT	
C270	CC 100PF+-20% HDK700 RD5 CERAMIC CAPACITOR	006.0431	VALVO	2222 655 53101	
C271	CC 100PF+-20% HDK700 RD5 CERAMIC CAPACITOR	006.0431	VALVO	2222 655 53101	
C272	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C273	CK 330NF+-5%63V5RM MKT CAPACITOR	CK 099.2969	WIMA	MKS2/63/0,33UF/5%	
C274	CE 10UF+-20%25V SAL ELECTR.CAPACITOR	CE 007.3934	VALVO	2222 122 30006	
C275	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C280	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
C281	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
C282	CE 1000UF-10+50%25V 17X26 ALUMINIUM CAPACITOR	565.9513	ROEDERST.	EKR00JG410E	
C284	CC 1NF+-1% 50V NP0 1206 CERAMIC CHIP CAPACITOR	CC 007.7398	VITRAMON	VJ1206 A 102 F FAT	
C285	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C286	CE 10UF+-20%25V SAL ELECTR.CAPACITOR	CE 007.3934	VALVO	2222 122 30006	
C287	CE 470UF-10+50%40V15RDX26 ELECTROLYT CAPACITOR	629.9776	ROEDERSTEI	EKR00HG347G	
C290	CK 330NF+-5%63V5RM MKT CAPACITOR	CK 099.2969	WIMA	MKS2/63/0,33UF/5%	
C291	CE 22UF+-20%10V SAL ELECTR.CAPACITOR	CE 007.3940	VALVO	2222 122 34229	
C292	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C300	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C301	CE 22UF+-20%10V SAL ELECTR.CAPACITOR	CE 007.3940	VALVO	2222 122 34229	
C302	CK 10NF+-5%63V5RM MKT CAPACITOR	CK 099.2869	WIMA	FKS 2/100/0,01UF/5%	
C303	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	

ROHDE & SCHWARZ	Al	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	04	0789	ED SCHALTREGLER SWITCHED REGULATOR	819.1916.01 SA	1+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
C304	CK 10NF+-5%63V5RM MKT CAPACITOR	CK 099.2869	WIMA	FKS 2/100/0,01UF/5%	
C305	CC 3,3NF+-10%6X7R2000 CAPACITOR	CC 087.7083	VALVO	2222 63051 332	
C306	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C320	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C321	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
C322	CC 47PF+-2%3X4N750 CAPACITOR	CC 087.6864	VALVO	2222 678 58479	
C323	CC 47PF+-2%3X4N750 CAPACITOR	CC 087.6864	VALVO	2222 678 58479	
C324	CK 220NF+-5%63V5RM MKT CAPACITOR	CK 099.2952	WIMA	MKS2/63/0,22UF/5%	
C350	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C351	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C352	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
C353	CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930	WIMA	MKS/2/63/0,1UF/5%	
C354	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998	WIMA	MKS2/50/1UF/10%	
L210	LD DREIFACHDR.650UH/4A STORAGE CHOKE	820.3377	VAC	ZKB 419/864...	
L211	LD 100UH 20% 1A 0,650OHM CHOKE	LD 155.9446	SIEMENS	B82111-E-C25	
L212	LD 680 UH10%60,00HMO,030A CHOKE	LD 067.3201	DELEVAN	DROSSEL1025-88	
L240	LD 9UH 6A 0,012OHM CHOKE	LD 026.4826	SIEMENS	B82111-B-C22	
L241	LD 680 UH10%60,00HMO,030A CHOKE	LD 067.3201	DELEVAN	DROSSEL1025-88	
L270	LD 56UH 1,5A 0,30HM CHOKE	LD 099.5197	SIEMENS	B 82111-E-C24	
L280	LD SPEICHERDR.63UH/10A CHOKE	686.9565	VAC	ZKB 419/407-02-H2	
L281	LD 25UH 3A 0,046OHM CHOKE	LD 026.4849	SIEMENS	B82111-B-C24	
L300	RL 0-OHM-WIDERST. 0204 0-OHM RESISTOR	RL 069.0000	DRALORIC	OMA 0204	
N210	BO LM358P 2X OPAMP OPERATIONAL AMPLIFIER	BO 377.3813	TEXAS	LM358P	
N240	BO LM358P 2X OPAMP OPERATIONAL AMPLIFIER	BO 377.3813	TEXAS	LM358P	
N270	BO SI3152V +15V2AO VREGL VOLTAGE REGULATOR	803.0615	SANKEN	SI3152V	
N290	BO SI3052V + 5V2AO VREGL VOLTAGE REGULATOR	641.8553	SANKEN	SI3052V	
N300	BO TL074IN 4XFET OPAMP OPERATIONAL AMPLIFIER	568.7528	TEXAS INST	TL074IN	
N320	BO LM339N 4X COMPAR COMPARATOR	BO 342.2062	NSC	LM339N	
N350	BL CD4025BF 3X3INP.NORG NOR GATE	086.8111	RCA	CD4025BF	
P200	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P202 2-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P201	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P210	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P212,P213 3-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P211	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P214	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P240	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
P241	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P270	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P280	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P281	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P243,P271,P272,P242,P282 6-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P283	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P290	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P300	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	BINDER	742-5-11-0178-00-36	
P301	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P302 2-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P303	FP INDIREKT.STECKERL.36P. PIN CONNECTOR 11X1-POLIG	FP 242.3600	BINDER	742-5-11-0178-00-36	
P322	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P323-P325 4-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P326	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P321,P351 3-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
P327	FP INDIREKT.STECKERL.36P. PIN CONNECTOR P350,X350-X356 8-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
R200	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR	RL 082.9571	DRALORIC	SMA0207/56,2OHM-F-D	
R201	RG 332 OHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5650	DALE	CRCW1206-10 332R F-T	
R202	RD 0,8W 0,15 OHM+-3% WIRE-WOUND RESISTOR	RD 087.5222	SAGE	1000S0,15OHM+3%	
R210	RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390	DRALORIC	SMA0207/475OHM-F-D	
R211	RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390	DRALORIC	SMA0207/475OHM-F-D	
R212	RD 0,8W 100 OHM+-3% WIRE WOUND RESISTOR	RD 082.6420	SAGE	1000S/100OHM/3%	
R213	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR	RL 082.9507	DRALORIC	SMA0207/47,5OHM-F-D	
R214	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR	RL 082.9507	DRALORIC	SMA0207/47,5OHM-F-D	
R220	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R221	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.9080	DALE	CRCW1206-10 681R F-T	
R222	RL 0,35W 18,2KOHM+-1%TK50 RESISTOR	RL 083.1480	DRALORIC	SMA/207/18,2K-F-C	
R223	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884	DALE	CRCW1206-10 100R F-T	
R224	RG 4,75KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5820	DALE	CRCW1206-10 4K75 F-T	
R225	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R230	RG 221 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.6004	DALE	CRCW1206-10 221K F-T	
R231	RG 332 OHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5650	DALE	CRCW1206-10 332R F-T	
R232	RG 332 OHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5650	DALE	CRCW1206-10 332R F-T	
R233	RG 47,5KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5950	DALE	CRCW1206-10 47K5 F-T	
R234	RD 0,8W 0,33 OHM+-3%TK80 WIRE WOUND RESISTOR	RD 450.6670	SAGE	1000S/0,330HM03%	
R235	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884	DALE	CRCW1206-10 100R F-T	
R240	RD 0,8W 47 OHM+-3% WIRE-WOUND RESISTOR	RD 082.0680	SAGE	1000S/470HM/3%	

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Menufacturer	Bezeichnung Designation	enthalten in contained in
R241	RD 0,8W 47 OHM+-3% WIRE-WOUND RESISTOR	RD 082.0680	SAGE	1000S/470HM/3%	
R245	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R246	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	DRALORIC	SMA0207/100HM-F-D	
R247	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	DRALORIC	SMA0207/100HM-F-D	
R248	RG 2,74KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5766	DALE	CRCW1206-10 2K74 F-T	
R249	RG 5,62KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0735	DALE	CRCW1206-10 5K62 F-T	
R250	RG 8,25KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0770	DALE	CRCW1206-10 8K25 F-T	
R251	RL 0,35W 909 KOHM+-1%TK50 RESISTOR	RL 083.2858	DRALORIC	SMA0207/909K-F-C	
R252	RL 0,35W 909 KOHM+-1%TK50 RESISTOR	RL 083.2858	DRALORIC	SMA0207/909K-F-C	
R253	RG 1,1KOHM+-1%TK100 1206 CHIP RESISTOR	006.9951	DALE	CRCW1206-10 1K1 F-T	
R254	RG 47,5KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5950	DALE	CRCW1206-10 47K5 F-T	
R255	RD 2.4 W 0,05 OHM+-3% RESISTOR	RD 069.1964	SAGE	1200S/080200HM/3%	
R260	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R261	RG 150 OHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5589	DALE	CRCW1206-10 150R F-T	
R262	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	DRALORIC	SMA0207/4,75K-F-D	
R263	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R270	RL 0,35W 332 OHM+-1%TK50 RESISTOR	RL 083.0255	DRALORIC	SMA0207/3320HM-F-D	
R271	RL 0,35W 332 OHM+-1%TK50 RESISTOR	RL 083.0255	DRALORIC	SMA0207/3320HM-F-D	
R280	RD 0,8W 15 OHM+-3% WIRE-WOUND RESISTOR	RD 087.5316	SAGE	1000S150HM+3%	
R281	RD 0,8W 15 OHM+-3% WIRE-WOUND RESISTOR	RD 087.5316	SAGE	1000S150HM+3%	
R283	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884	DALE	CRCW1206-10 100R F-T	
R285	RG 47,5 OHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5566	DALE	CRCW1206-10 47R5 F-T	
R286	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R287	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R288	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R290	RG 162 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8932	DALE	CRCW1206-10 162R F-T	
R291	RG 10,0 OHM+-1%TK100 1206 CHIP -RESISTOR	RG 006.8649	DALE	CRCW1206-10 10R F-T	
R292	RG 10,0 OHM+-1%TK100 1206 CHIP -RESISTOR	RG 006.8649	DALE	CRCW1206-10 10R F-T	
R300	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7259	DALE	CRCW1206-10 825R F-T	
R301	RG 15,0KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5843	DALE	CRCW1206-10 15K F-T	
R302	RG 33,2KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5914	DALE	CRCW1206-10 33K2 F-T	
R303	RG 3,32KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5789	DALE	CRCW1206-10 3K32 F-T	
R304	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T	RS 247.7526	BOURNS	3386X1-103	
R305	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R306	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R307	RL 0,35W 5,23KOHM+-1%TK50 RESISTOR	RL 083.1122	DRALORIC	SMA0207/5,23K-F-D	
R308	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R309	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R310	RG 4,75KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5820	DALE	CRCW1206-10 4K75 F-T	

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	anthalten in contained in
R311	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884	DALE	CRCW1206-10 100R F-T	
R312	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR	RL 082.9571	DRALORIC	SMAO207/56,2OHM-F-D	
R320	RL 0,35W 6,04KOHM+-1%TK50 RESISTOR	RL 082.6089	DRALORIC	SMA 0207/6,040HM-F-C	
R321	RL 0,35W 5,11KOHM+-1%TK50 RESISTOR	RL 082.2348	DRALORIC	SMAO207/5,11K-F-C	
R322	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR	RL 083.1400	DRALORIC	SMAO207/15K-F-D	
R323	RL 0,35W 14,3KOHM+-1%TK50 RESISTOR	RL 083.1380	DRALORIC	SMAO207/14,3K-F-D	
R324	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R325	RG 130 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5966	DALE	CRCW1206-10 130K F-T	
R326	RG 82,5KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1925	DALE	CRCW1206-10 82K5 F-T	
R327	RG 82,5KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1925	DALE	CRCW1206-10 82K5 F-T	
R328	RG 3,01KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5772	DALE	CRCW1206-10 3K01 F-T	
R329	RG 511 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.9051	DALE	CRCW1206-10 511R F-T	
R330	RG 1,82KOHM+01%TK100 1206 RESISTOR CHIP	RG 007.5720	DALE	CRCW1206-10 1K82 F-T	
R331	RG 12,1KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0841	DALE	CRCW1206-10 12K1 F-T	
R332	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R333	RG 100KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1948	DALE	CRCW1206-10 100K F-T	
R334	RG 82,5KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1925	DALE	CRCW1206-10 82K5 F-T	
R335	RG 6,81KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0758	DALE	CRCW1206-10 6K81 F-T	
R336	RG 4,75KOHM+-1%TK100 1206 RESISTOR CHIP	RG 007.5820	DALE	CRCW1206-10 4K75 F-T	
R337	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206-10 1K F-T	
R338	RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	DRALORIC	SMAO207/100K-F-C	
R339	RL 0,35W 33,2KOHM+-1%TK50 RESISTOR	RL 083.1674	DRALORIC	SMAO207/33,2K-F-C	
R340	RL 0,35W 24,3KOHM+-1%TK50 RESISTOR	RL 083.1574	DRALORIC	SMA/207/24,3K-F-C	
R341	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR	RL 083.1400	DRALORIC	SMAO207/15K-F-D	
R342	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR	RL 083.1116	DRALORIC	SMAO207/4,99K-F-D	
R343	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477	DRALORIC	SMA 0207/2,21K-F-C	
R350	RG 1,00MOHM+-1%TK100 1206 CHIP RESISTOR	RG 815.7532	DALE	CRCW1206-10 1M F-T	
R351	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R352	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R353	RG 5,62KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0735	DALE	CRCW1206-10 5K62 F-T	
R354	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R355	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.0793	DALE	CRCW1206-10 10K F-T	
R356	RG 1,00MOHM+-1%TK100 1206 CHIP RESISTOR	RG 815.7532	DALE	CRCW1206-10 1M F-T	
R357	RG 1,21KOHM+-1%TK100 1206 CHIP RESISTOR	006.9968	DALE	CRCW1206-10 1K21 F-T	
R358	RG 100KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1948	DALE	CRCW1206-10 100K F-T	
R359	RG 68,1KOHM+-1%TK100 1206 CHIP RESISTOR	RG 007.1902	DALE	CRCW1206-10 68K1 F-T	
S3	ST TEMP.SCHALT.45GRSCHL TEMPERATURE SWITCH	801.8325	HAMLIN	TS-A/45 GRD C	
T200	LU SCHALTTRAFO TRANSFORMER	819.2112			

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
V200	AE TVS310 10V SUPPR SUPPRESSOR	811.2594	UNITRODE	TVS310	
V202	AG BYV96E GL1000V 0A8 RECTIFIER	099.9034	VALVO	BYV96E	
V210	AG BYV32/200 2GL200V10A0 RECTIFIER	803.0644	VALVO	BYV32/200	
V211	AE BZY93/C30R 20W ZDI# ZENER DIODE (SUPPR.)	464.9160	VALVO	BZY93/C30R	
V212	AL BD438 P 45V 4A0 TRANSISTOR	AL 010.0403	VALVO	BD438	
V213	AE BZX79/C6V8 0,5W ZDI ZENER DIODE	AE 012.2478	VALVO	BZX79/C6V8	
V214	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V220	AM BUZ58 N-E1000V MOSF POWER MOSFET	820.3354	SIEMENS	BUZ58	
V240	AG BYV32/200 2GL200V10A0 RECTIFIER	803.0644	VALVO	BYV32/200	
V241	AL BDT92 P 60V 10A0 TRANSISTOR	803.0650	VALVO	BDT92	
V242	AK BC550B N 50V 100MA TRANSISTOR	AK 007.2050	SIEMENS	BC550B GURT,POL.CBE	
V243	AL BD139 N 80V 1A0 TRANSISTOR	AL 274.8994	VALVO	BD139	
V244	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V270	AG BYV32/200 2GL200V10A0 RECTIFIER	803.0644	VALVO	BYV32/200	
V280	AG BYV32/200 2GL200V10A0 RECTIFIER	803.0644	VALVO	BYV32/200	
V281	AM BUZ10 N-E 50V MOSF MOS-FET	AM 608.9490	SIEMENS	BUZ10	
V300	AE 1N827 6,2V REFDI REFERENCE DIODE	AE 418.0029	CDI	1N827	
V301	AG 1N4007 GL1000V 1A0 RECTIFIER	AG 013.0310	AEG-TELEF	1N4007	
V302	AG 1N4007 GL1000V 1A0 RECTIFIER	AG 013.0310	AEG-TELEF	1N4007	
V320	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V321	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V322	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V350	AK BC550B N 50V 100MA TRANSISTOR	AK 007.2050	SIEMENS	BC550B GURT,POL.CBE	
V351	AD 1N4448 75V 0A15 UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V352	AF HLMP1503 LED GN RD3 LED	AF 252.5570	QTC	HLMP1503 L1819	
V353	AK BC550B N 50V 100MA TRANSISTOR	AK 007.2050	SIEMENS	BC550B GURT,POL.CBE	
V354	AE BZX79/C3V9 0,5W ZDI ZENER DIODE	AE 086.8234	VALVO	BZX55/C3V9 BZX79...	
W20	DX KABEL (W20) CABLE	819.2106			
WE1	DX KABEL WE1 CABLE	819.2158			
X4	DX BUCHSENEINHEIT CONNECTOR UNNIT	819.2135			
X5	VL LOETOESE 11,5 X 1,4 SOLDERING PIN	VL 082.5247	VOGT	N.ZEICHNUNG 082.5247	
X6	VL LOETOESE 11,5 X 1,4 SOLDERING PIN	VL 082.5247	VOGT	N.ZEICHNUNG 082.5247	
X300	FP INDIREKT.STECKERL.36P. PIN CONNECTOR X301 2-POLIG/PINS	FP 242.3600	BINDER	742-5-11-0178-00-36	
X302	FP KURZSCHLUSSBUCHSE SHORTING PLUG	FP 491.7042	PK	452-70302	
X353	FP KURZSCHLUSSBUCHSE SHORTING PLUG	FP 491.7042	PK	452-70302	
X357	FP KURZSCHLUSSBUCHSE SHORTING PLUG	FP 491.7042	PK	452-70302	

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
Z210	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z240	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z270	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z280	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z290	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z300	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z320	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
Z350	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER	LD 451.4636	OXLEY	SLT5/P/2000/REF.1	
					- ENDE -

+24V
Z210
X4 37
X4 38
Z217
470U
+15V
Z240
X4 26
X4 26
X4 27
X4 28
X4 29
X4 30
Z270
X4 11
X4 12
X4 13
Z290
X4 3
X4 4
X4 5
Z280
X4 17
X4 18
X4 19
X4 20
X4 6
X4 8
X4 10
X4 14
X4 16
X4 22
X4 24
X4 32
X4 34
X4 7
X4 15
X4 21
X4 23
X4 31
X4 33
X4 35
X4 36
X4 39
X4 40

+12V
R353 5K62 L
R355 10K L
Z350
X4 1
R354 10K L
C353 100N
N350-C CD4025BF
C362 1U
V350 BC550B
R356 1M L
V351 1N4448
X354 1
X357
X355 1
X356 1
R359 68K1 L
P351
V353 BC550B
N350-B CD4025BF
R358 100K L
C354 1U
V354 C349
R351 10K L
R357 1K21 L
V352 HLMP1503
P321
R320 6K04
+6V
R321 5K11
+5.1V
R322 15K
-15V
R323 14K3
C322 47P
C350 1U
C351 1U
R331 12K1 L
N350-A CD4025BF
P322
R328 3K01 L
R329 511R L
P323
R330 7K82 L
N320-A LM339N
N320-B LM339N
P350
R352 10K L
X350 1
X353
X351 1
X352 1
R360 1M L
P326
R340 24K3
+24V
R341 15K
+15V
R342 4K99
+5.2V
R343 2K21
P327
R339 33K2
C323 47P
R338 100K
N320-D LM339N
P324
V321 1N4448
R332 10K L
R335 6K81 L
P325
Z320
X4 2
R337 1K L
C321 10N
R334 82K5 L
R333 100K L
C320 1U
N320-C LM339N
R336 4K75 L
V320 1N4448

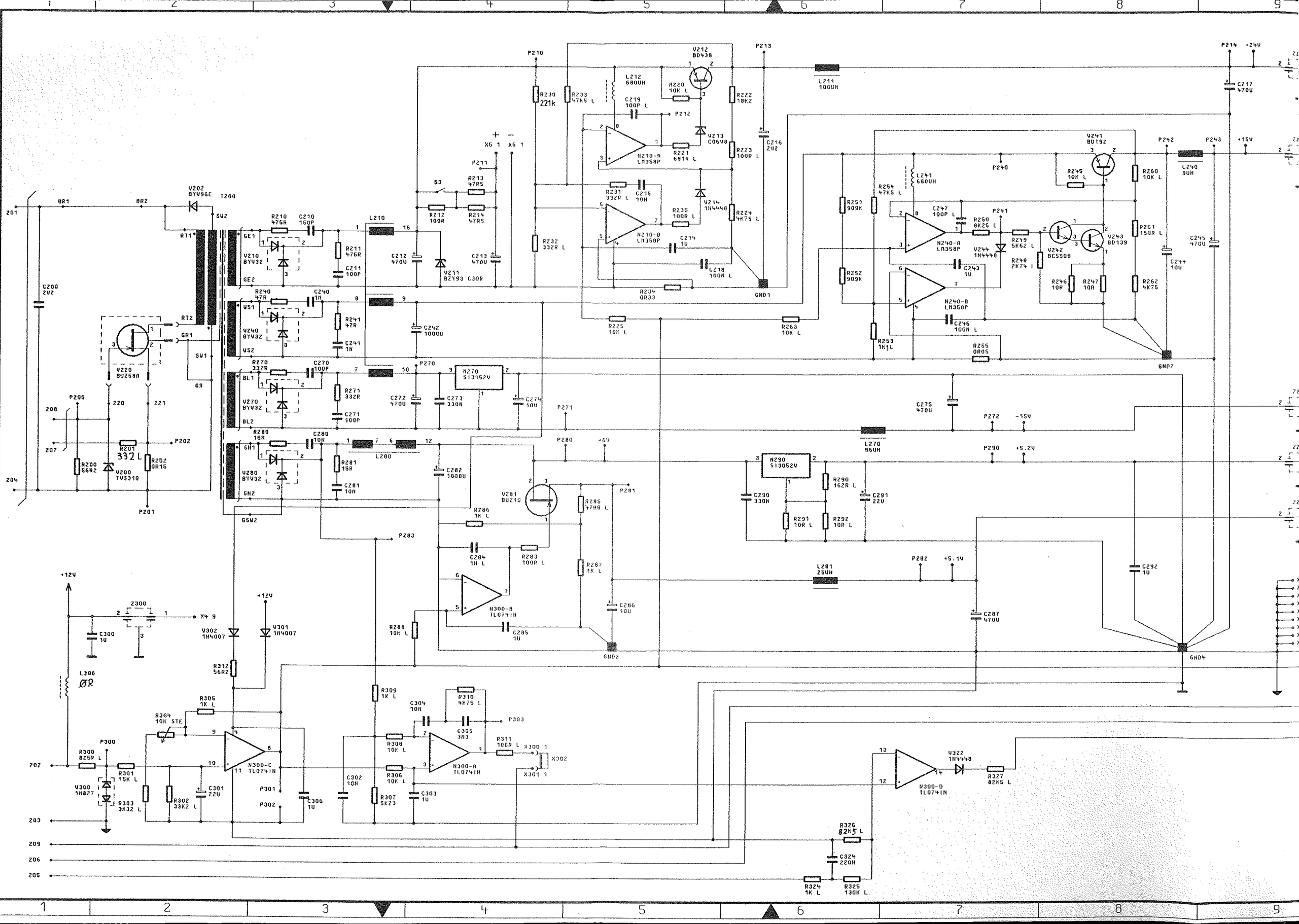
N210, N240
DRAUFSICHT
TOP VIEW
N300, N320
N350
DRAUFSICHT
TOP VIEW
V242, V350, V353
V212, V243
V210, V240, V241
V270, V280, V281
V241
N270, N290

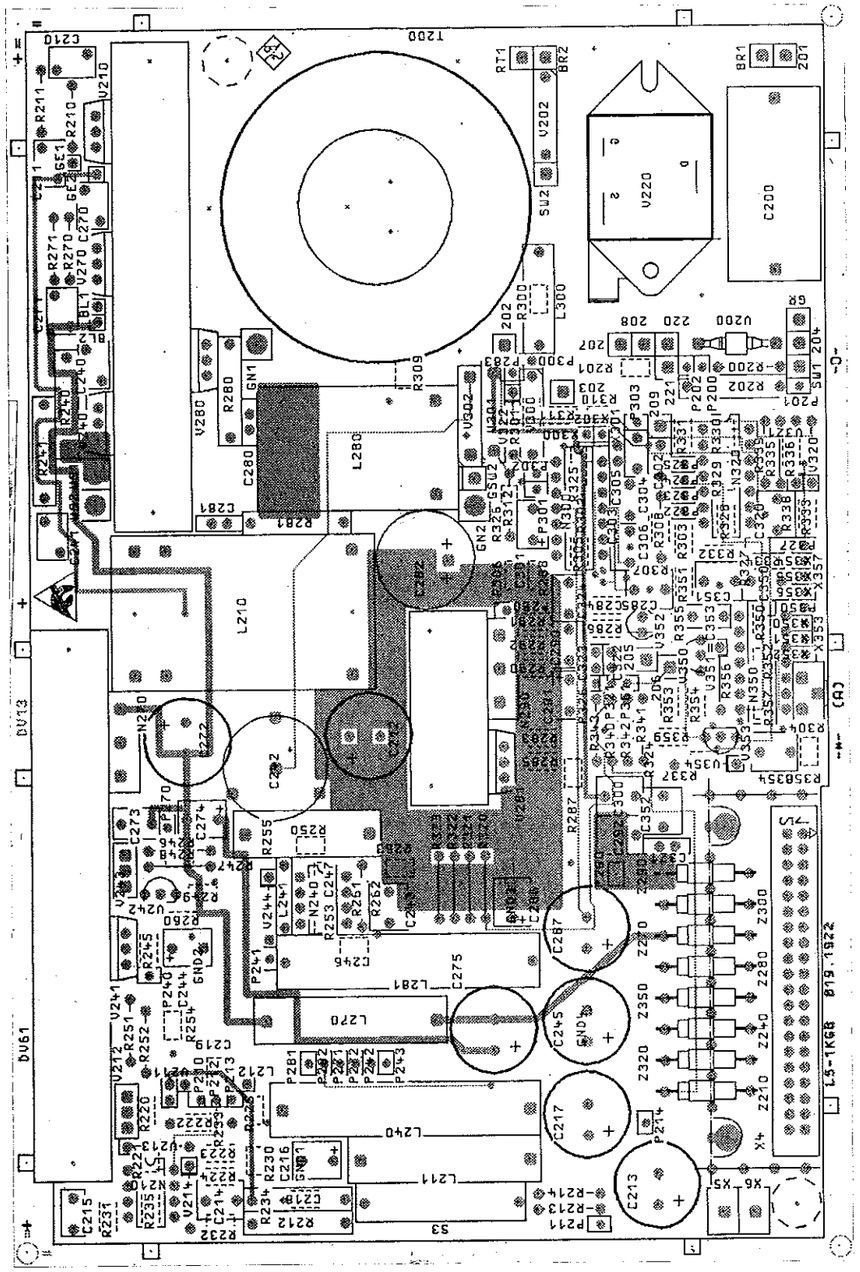
+12V
14
N350-D CD4025BF
7

V220
G
S
D
DRAUFSICHT
TOPVIEW

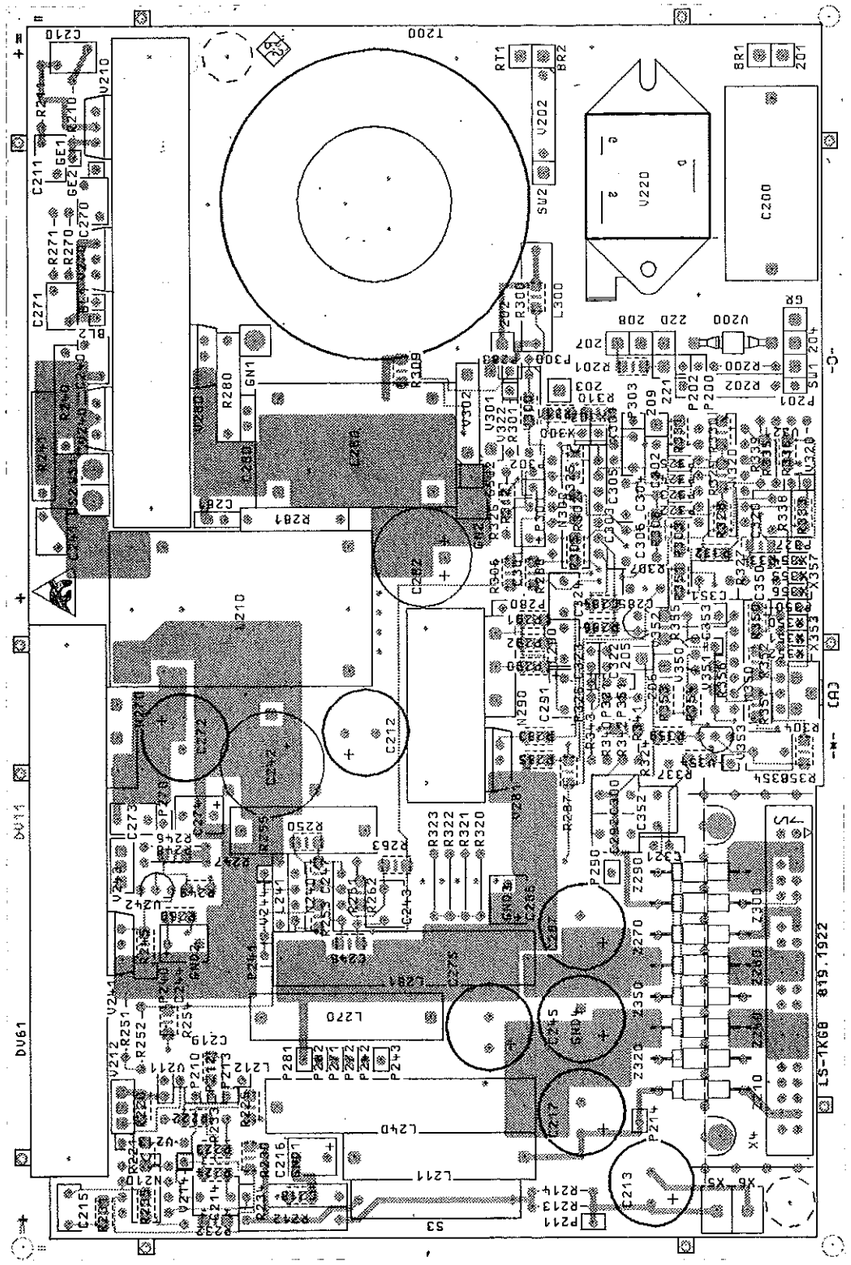
B	39845	12.88	LS	1KGB	TAG	NAME	BENENNUNG
C	41825	06.89	LS	BEARB.		LS	SCHALTREGLER
				GEPR.		LS	SWITCHED REGULATOR
				NORM			
				PLOTT	31. 8.88	*	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 819.1916.01S
				ZU GERAET SMGU			BLATT-NR. 1
				REG.I.V. 819.0010			ERSTE Z.

V. 1 BL.


Z00
Z01
Z02
Z03
Z04
Z05
Z06
Z07
Z08
Z09
BR1
BR2
T200
V202 BYV96E
SW2
RT1
RT2
GR1
SW1
GR
V210 BYV32
V240 BYV32
V270 BYV32
V280 BYV32
V220 BU258A
V200 TVS310
V211 BZY93 C30R
V212 BD438
V213 C06V8
V214 1N4448
V241 BD192
V242 BC550B
V243 BD139
V244 1N4448
V300 1N827
V301 1N4007
V302 1N4007
V322 1N4448
L210
L211 100UH
L212 680UH
L240 9UH
L241 680UH
L270 56UH
L280
L281 25UH
L300 ØR
R200 56R2
R201 332 L
R202 0R15
R210 475R
R211 476R
R212 100R
R213 47R5
R214 47R5
R220 10K L
R221 681R L
R222 18K2
R223 100R L
R230 221k
R231 332R L
R232 332R L
R233 47K5 L
R234 0R33
R235 100R L
R240 47R
R241 47R
R242 8K25 L
R243 5K62 L
R244 2K74 L
R245 10K L
R246 10R
R247 10R
R248 2K74 L
R249 5K62 L
R250 8K25 L
R251 909K
R252 909K
R253 1K1 L
R254 47K5 L
R255 0R05
R260 10K L
R261 150R L
R262 4K75
R263 10K L
R270 332R
R271 332R
R280 16R
R281 15R
R283 100R L
R285 47R5 L
R286 1K L
R287 1K L
R288 10K L
R290 162R L
R291 10R L
R292 10R L
R300 8259 L
R301 15K L
R302 33K2 L
R303 3K32 L
R304 10K STE
R305 1K L
R306 10K L
R307 5K23
R308 10K L
R309 1K L
R310 4K75 L
R311 100R L
R312 56R2
R324 1K L
R325 130K L
R326 82K5 L
R327 82K5 L
C200 2U2
C210 150P
C211 100P
C212 470U
C213 470U
C214 1U
C215 10N
C216 2U2
C217 470U
C218 100N L
C219 100P L
C240 1N
C241 1N
C242 1000U
C244 10U
C245 470U
C246 100N L
C247 100P L
C270 100P
C271 100P
C272 470U
C273 330N
C274 10U
C275 470U
C280 10N
C281 10N
C282 1000U
C283 1N L
C284 1N L
C285 1U
C286 10U
C287 470U
C290 330N
C291 22U
C292 1U
C300 1U
C301 22U
C302 10N
C303 1U
C304 10N
C305 3N3
C306 1U
C324 220N
N210-A LM358P
N210-B LM358P
N240-A LM358P
N240-B LM358P
N270 SI3152V
N290 SI3052V
N300-A TL074IN
N300-B TL074IN
N300-C TL074IN
N300-D TL074IN
Z300
X300 1
X301 1
X302
X4 9
X6 1
S3
GND1
GND2
GND3
GND4
GSW2
P200
P201
P202
P210
P211
P212
P213
P214
P240
P241
P242
P243
P270
P271
P272
P280
P281
P282
P283
P290
P300
P301
P302
P303
+240
+15V
-15V
+6V
+5.2V
+5.1V
+12V



DV13



DV11

Ansicht und Leitungsführung Lötseite
View of tracks on solder side

(hierzu HVE 250)

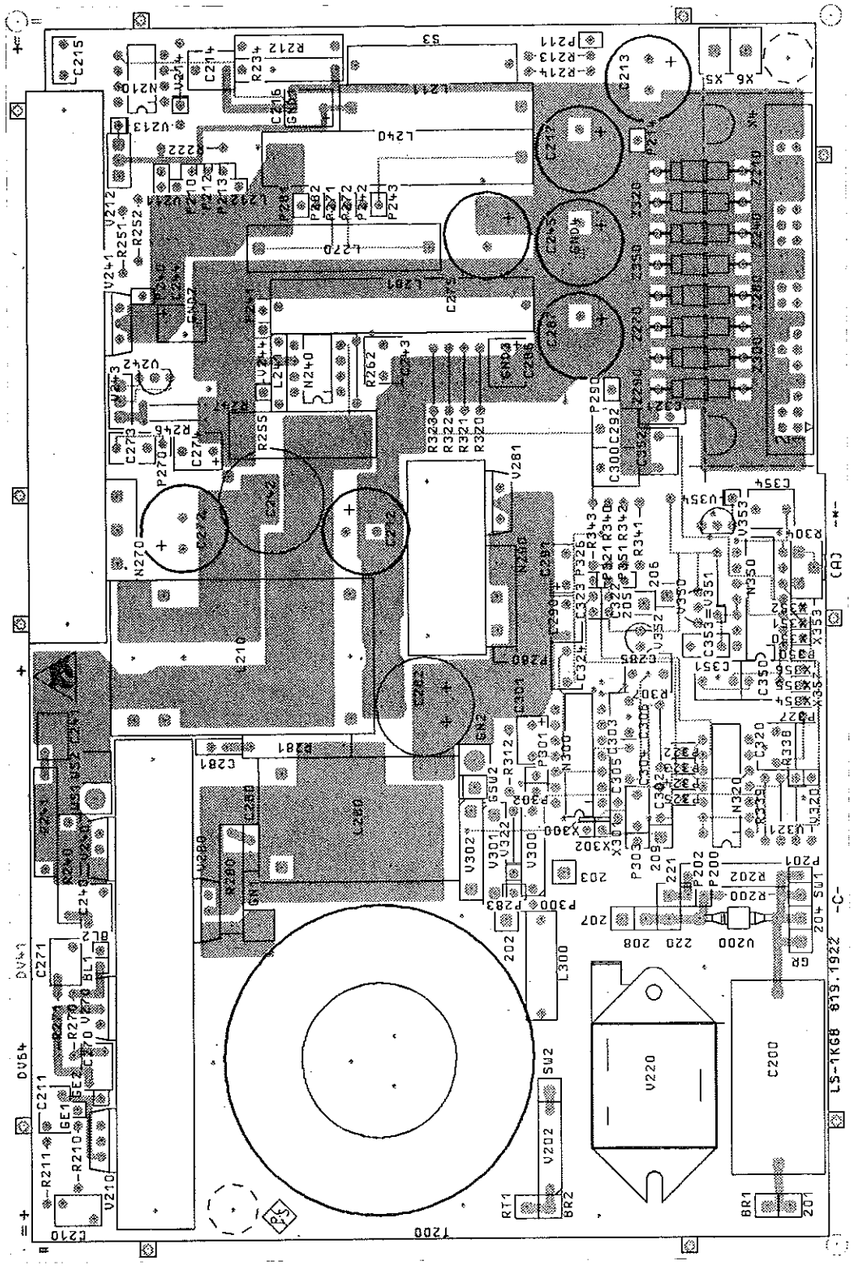
ACHTUNG: EGB!
Elektrostatisch gefährdete Bauelemente erfordern eine besondere Handhabung.

ATTENTION ESD!
Electrostatic sensitive devices require a special handling.

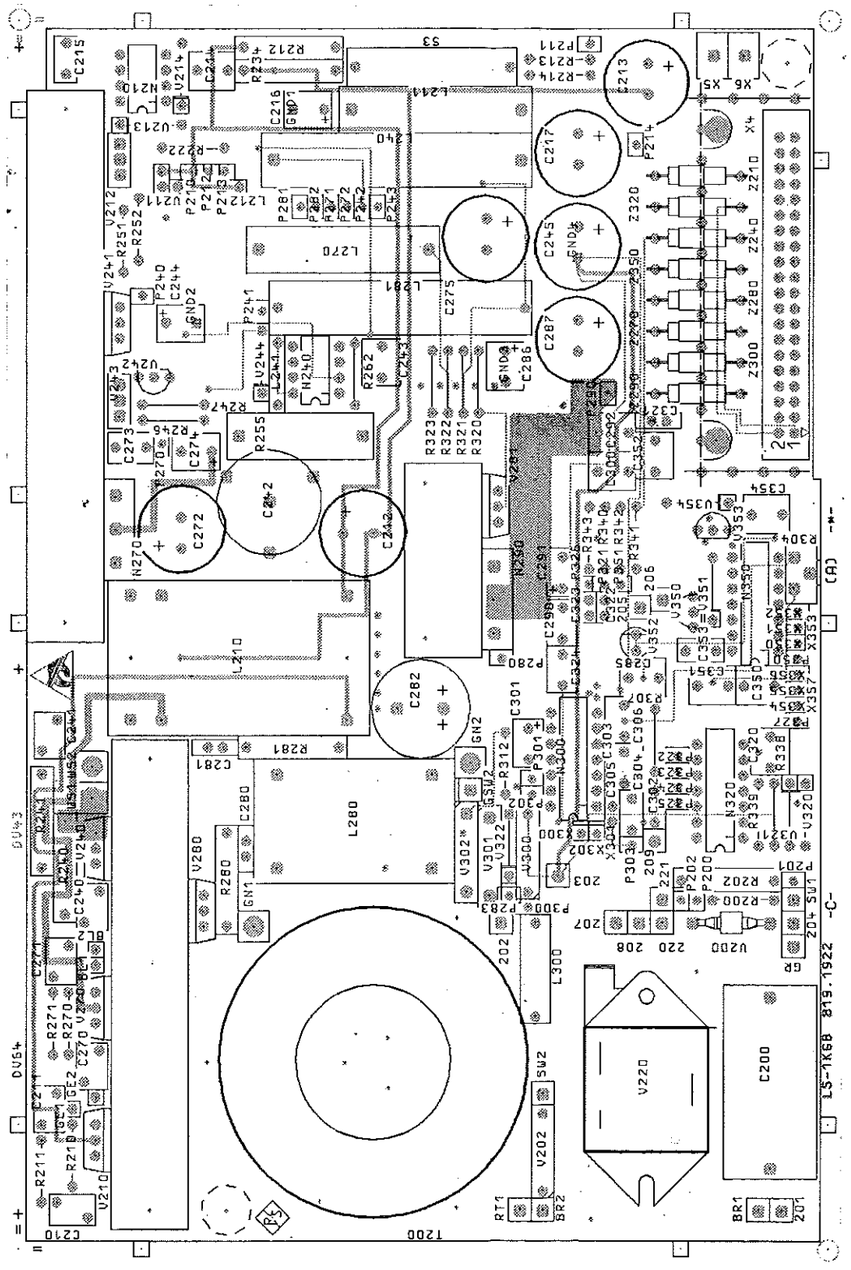
ISO-Projektion
Methode E

Änd. Zust.	Änderungs-Mitteilung	Tag	Name	Maße ohne Toleranzangabe		Maßstab 1 : 1	
						Halbzeug, Werkstoff	
				1KGB	Tag	Name	Benennung
				Bearb.	09.88	LS	SCHALTREGLER SWITCHED REGULATOR — Z
				Gepr.			
				Norm			
				ROHDE&SCHWARZ			Zeichn.-Nr. 819.1916 — Blatt-Nr. 3 v. 4 Bl.
				zu Gerät SMGU			reg. i. V. 819.0010 V — erste Z.

11 6107 87



DV41



DV43

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side

ACHTUNG: EGB!
Elektrostatisch gefährdete Bauelemente erfordern eine besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive devices require a special handling.
(hierzu HVC 250)

ISO-Projektion
Methode E

Änd. Zust.	Änderungs-Mitteilung	Tag	Name

Maße ohne Toleranzangabe

1KGB	Tag	Name
Bearb.	09.88	LS
Gepr.		
Norm		

ROHDE&SCHWARZ

zu Gerät SMGU

Maßstab 1 : 1

Halbzeug, Werkstoff

Benennung
SCHALTREGLER
SWITCHED REGULATOR

Z

Zeichn.-Nr. 819.1916

Blatt-Nr. 2 v. 4 Bl.

reg. i. V. 819.0010 V

erste Z.