



ROHDE & SCHWARZ

Measuring Instruments
and Systems Division

Service manual

RADIOCOMMUNICATION TESTER CMT

802.2020.52

802.2020.54

VOLUME 2

The service manual consists of 2 volumes

Printed in the Federal
Republic of Germany

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2. Preparations and Operation
3. Maintenance

Service manual

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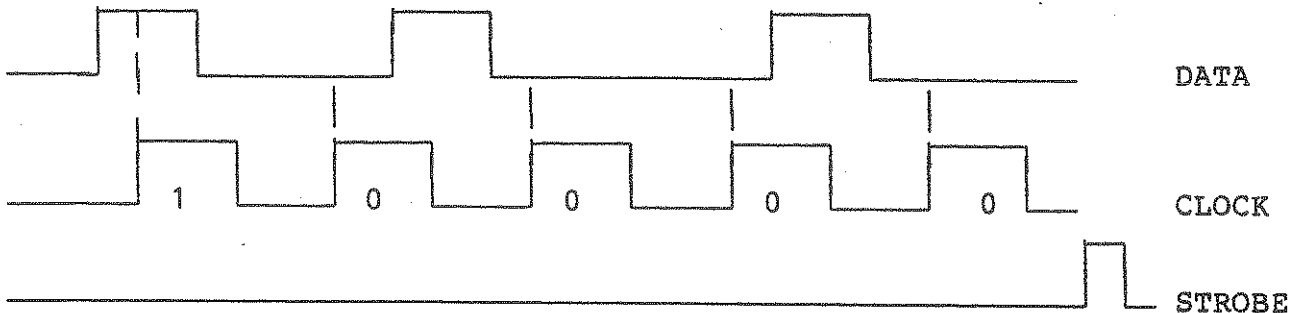
5 Service Manual for the Individual Modules

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General

Serial data transmission to the individual plug-in modules takes place on three lines: CLOCK, DATA and STROBE. The data must be read in using an external controller, e.g. PUC, in order to adjust or test the modules independent of the basic instrument.

The timing diagram for data transmission is shown below.



The data on the DATA line are transferred to the parallel/serial converter with each rising edge of the CLOCK pulses; a subsequent STROBE pulse enables the data at the converter outputs. The following BASIC program shows how the user port of the PUC can address the module:

```
10 POKE 59259,255      Set user port
20 DIM A(20)           Number of individual data bits,
                       20 in this case
30 A(1)=0:A(2)=1...    Define individual data

40 FOR I=1 TO 20
50 POKE 59471,A(I)      Read in data;
60 POKE 59471,A(I)+2    Line with significance  $2^0$  = DATA,
                       significance  $2^1$  = CLOCK
70 NEXT

80 POKE 59471,4         Output of STROBE pulse on line
90 POKE 59471,0:END     with significance  $2^2$ 
```




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SERVICE INSTRUCTIONS

IEC Bus/Control Interface Option CM-B4

803.3914.02

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5 Service Manual for IEC Bus/Control Interface
 Option CM-B4
(See circuit diagram 803.3920 S and block diagram)

5.1 Function Description

This module comprises two subassemblies:

- + IEC-bus interface
- + Relay interface

The IEC-bus interface enables the instrument to be used as a listener or as a talker together with an IEC-bus controller.

It is also possible to access the eight relays on the module by the CMT. The contacts can be assigned as desired.

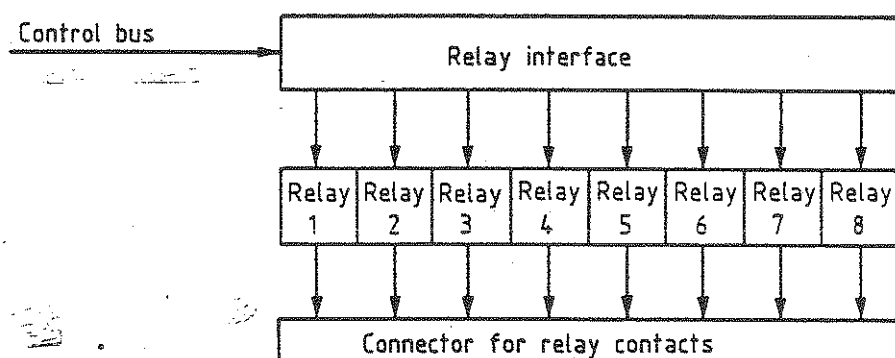
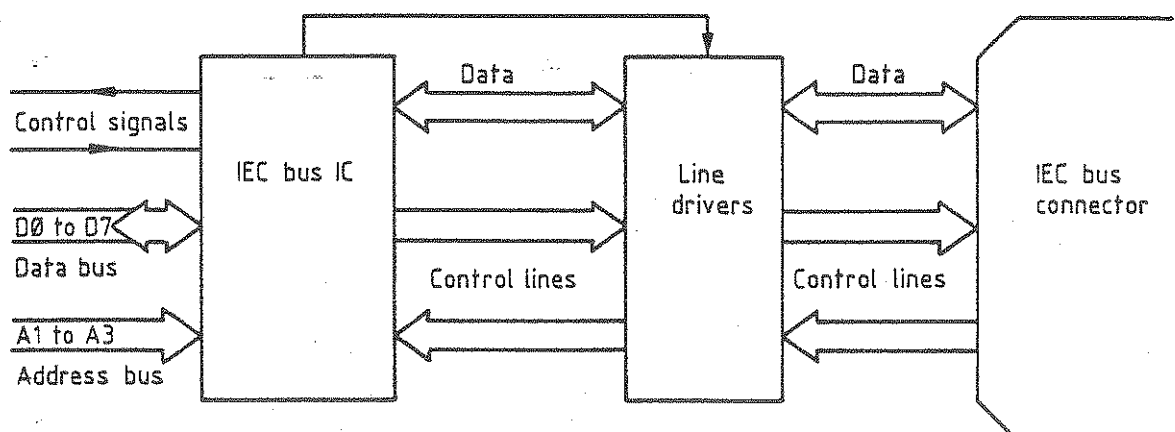


Fig. 5-1 Block diagram of the IEC-bus/control interface

5.1.1 IEC-bus Interface

The IEC-bus interface is based on the talker/listener IC 8291A GPIB. This IC provides all the interface functions which must be carried out between the controller and the IEC-bus output and can be directly addressed by the controller via the data bus and certain system control lines.

Functions:

- Read
- Write
- Load IEC-bus IC

It is possible to set the IC to a particular mode using the load operation. The internal registers of the 8291A IC are selected to this end via the address lines A1, A2, A3.

The controller addresses the IC via its select input \overline{CS} by means of a special range selection line.

All IEC-bus signals pass via bidirectional line drivers before they are applied to the IEC-bus output. Data transfer with the CPU can take place under interrupt control or in DMA mode.

5.1.2 Relay Interface

The interface circuit for triggering the eight relays corresponds to the standard interface circuit with serial-to-parallel data conversion.

The interface circuit provides a control bit for each relay so that the complete interface need only provide eight parallel control lines.

The control bus consists of three lines:

CPS-S	Clock
DO-S	Data (relay control)
IEC	Strobe pulse

5.2 Testing and Adjustment

The module cannot be adjusted. All tests should be carried out using Section 3.



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Schaltteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans



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AZ

Datum
Date

08

0285

Schaltteilliste für

Parts list for

ED IEC-BUS-INTERFACE


Sachnummer
Stock No.

803.3920.01 SA

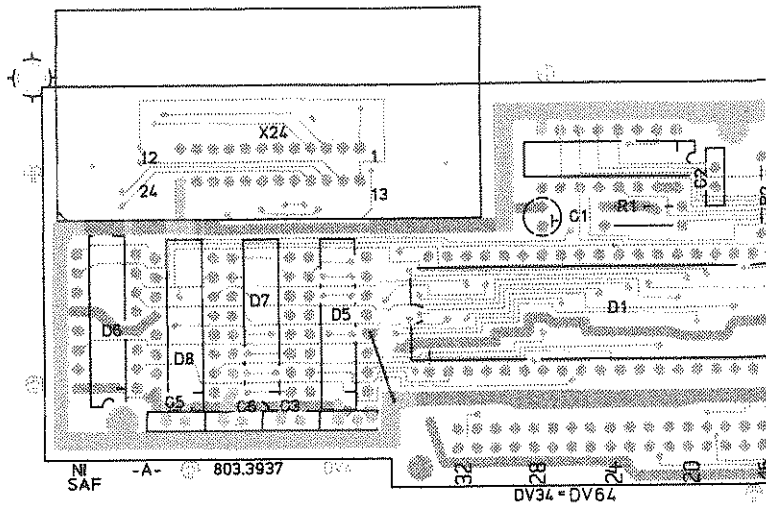
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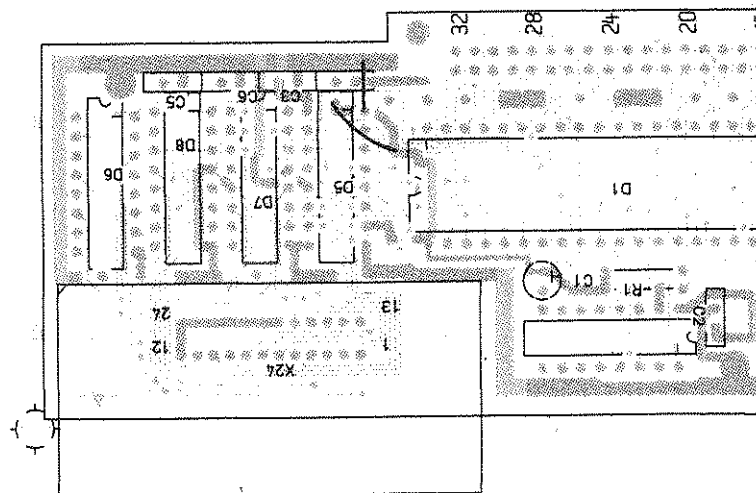
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C1	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR	358.6062	
C2	NCC SRE 22UF/16V+-20% CC 10NF-20+50%7X8R6000 CAPACITOR	CC 087.7525	
BIS/TO C6	VALVO 2222 63051 64051103		
D1	BC P8291A IEC BUS INTERF IEC BUS INTERFACE	BC 099.4978	
D2	INTEL P2891A BL SN7406N 6XINVERTER IC HEX INVERTER SN7406N	BL 237.0487	
D3	TEXAS SN7406N BL SN7406N 6XINVERTER IC HEX INVERTER SN7406N	BL 237.0487	
D4	TEXAS SN7406N BL CD4094BE 8BIT SH.REG SHIFT REGISTER	BL 586.7726	
D5	RCA CD4094BE BJ MC3448AP 4XBUS-TRANSC BUS-TRANSCIEIVER	BJ 300.6247	
BIS/TO D8	MOTOROLA MC3448AP		
K1	SR 5 V 1XU DIL RELAY	SR 340.4551	
K2	SIEMENS V23100-V4305-C000 SR 5 V 1XU DIL RELAY	SR 340.4551	
K3	SIEMENS V23100-V4305-C000 SR 5V3600HM1MAL1RH-JC-GEH RELAY	SR 412.0027	
BIS/TO K8	CLARE PRME 15005		
R1	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R2	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R3	DRALORIC SMA0207/4,75K-F-D TRIMMWERT / SELECTED		
R4	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477	
	DRALORIC SMA 0207/2,21K-F-C		
V1	AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	
BIS/TO	VALVO 1N4448		

<div> ROHDE & SCHWARZ</div>		AZ Datum Date	08 0285	Schaltteilliste für Parts list for ED IEC-BUS-INTERFACE	Sachnummer Stock No.	803.3920.01 SA	Blatt Page	2
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in			
V8								
X1	FP STECKERL-INDIR-64POLIG 64-PIN INSERT			FP 084.6470				
	ERNI STV-P-264 9722-333.							
X23	FM WINK-BUCHSENLEIST.25P. 25-SOCKET INSERT			FM 243.0962				
	SOURIAU DB-25S-500C							
X24	FM BUCHSENLEISTE 24P. CONNECTOR			349.3012				
	AMPHENOL 57LE20240-27CR-D35							
					- ENDE -			

Ansicht und Leitungs
View of tracks on con

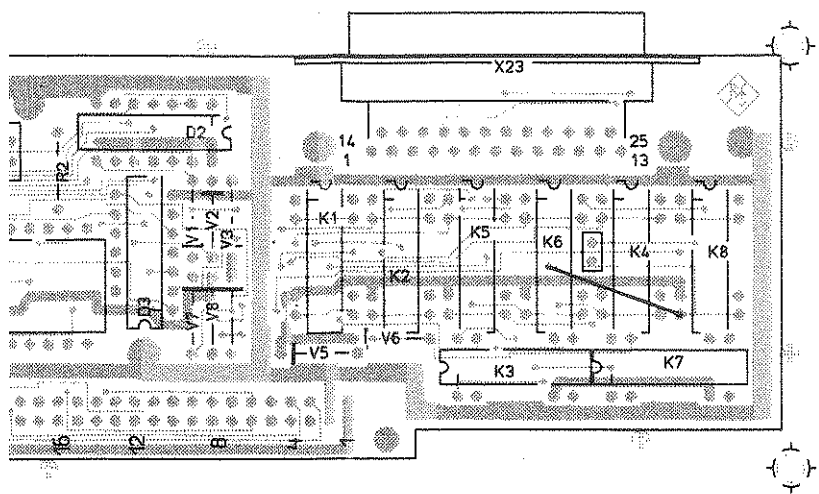


Ansicht und Leitungs
View of tracks on soli

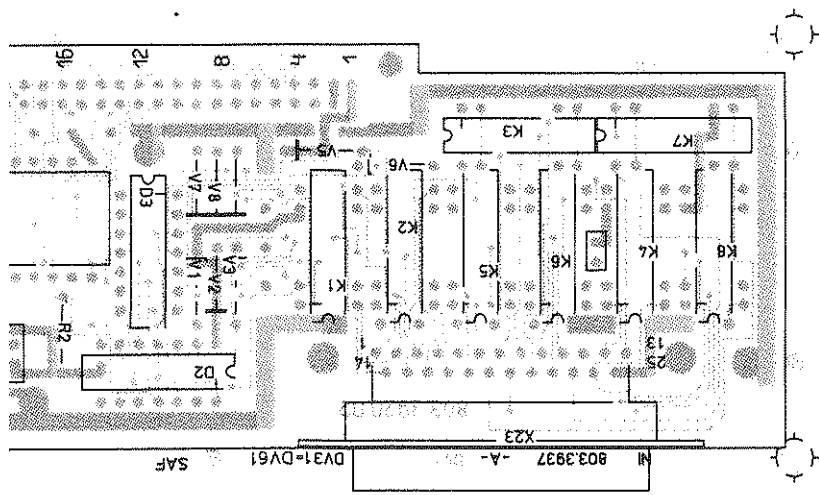



Achtung! MOS - Bauteile
Caution. MOS components

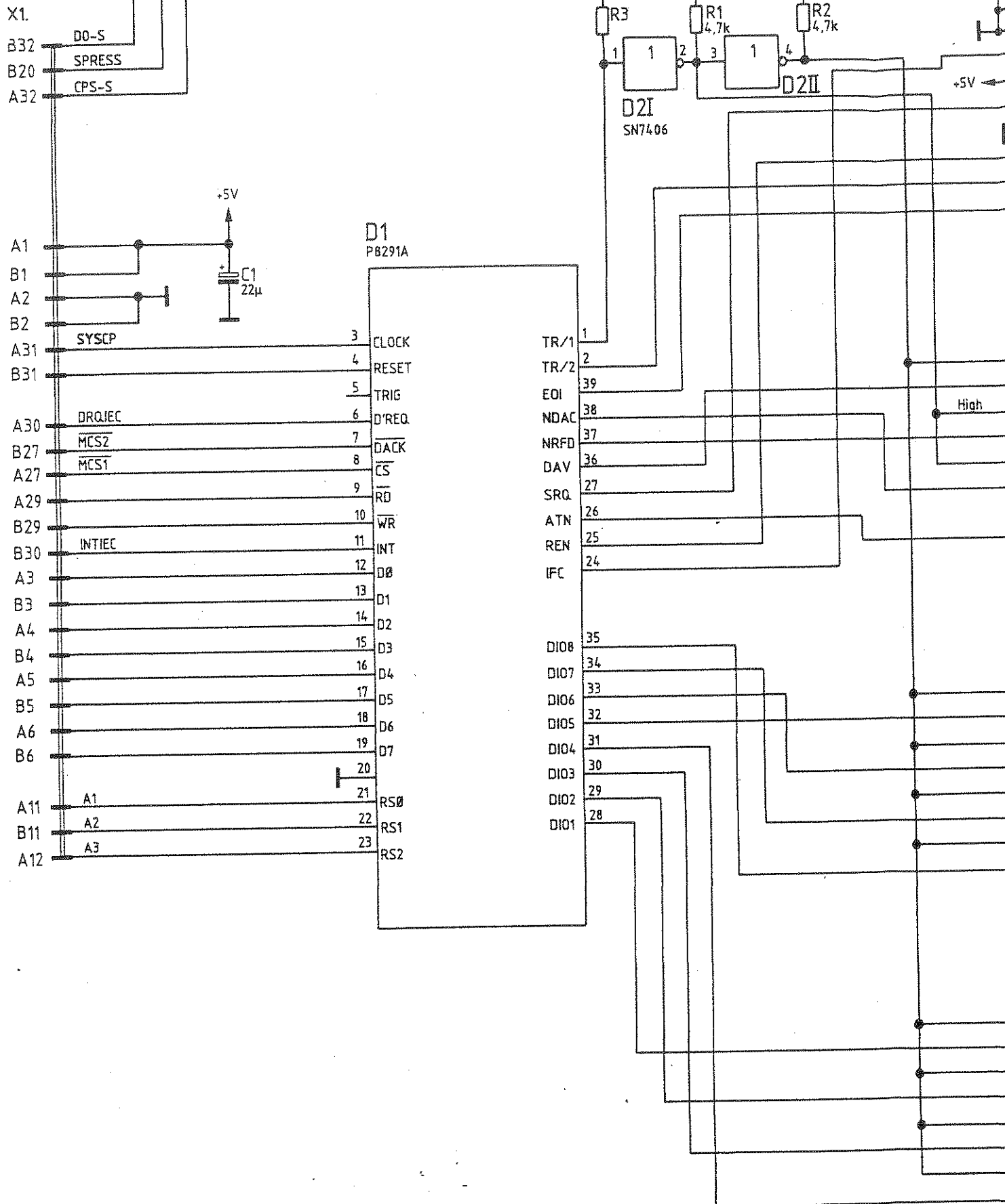
ngsführung Bauteilseite
component side

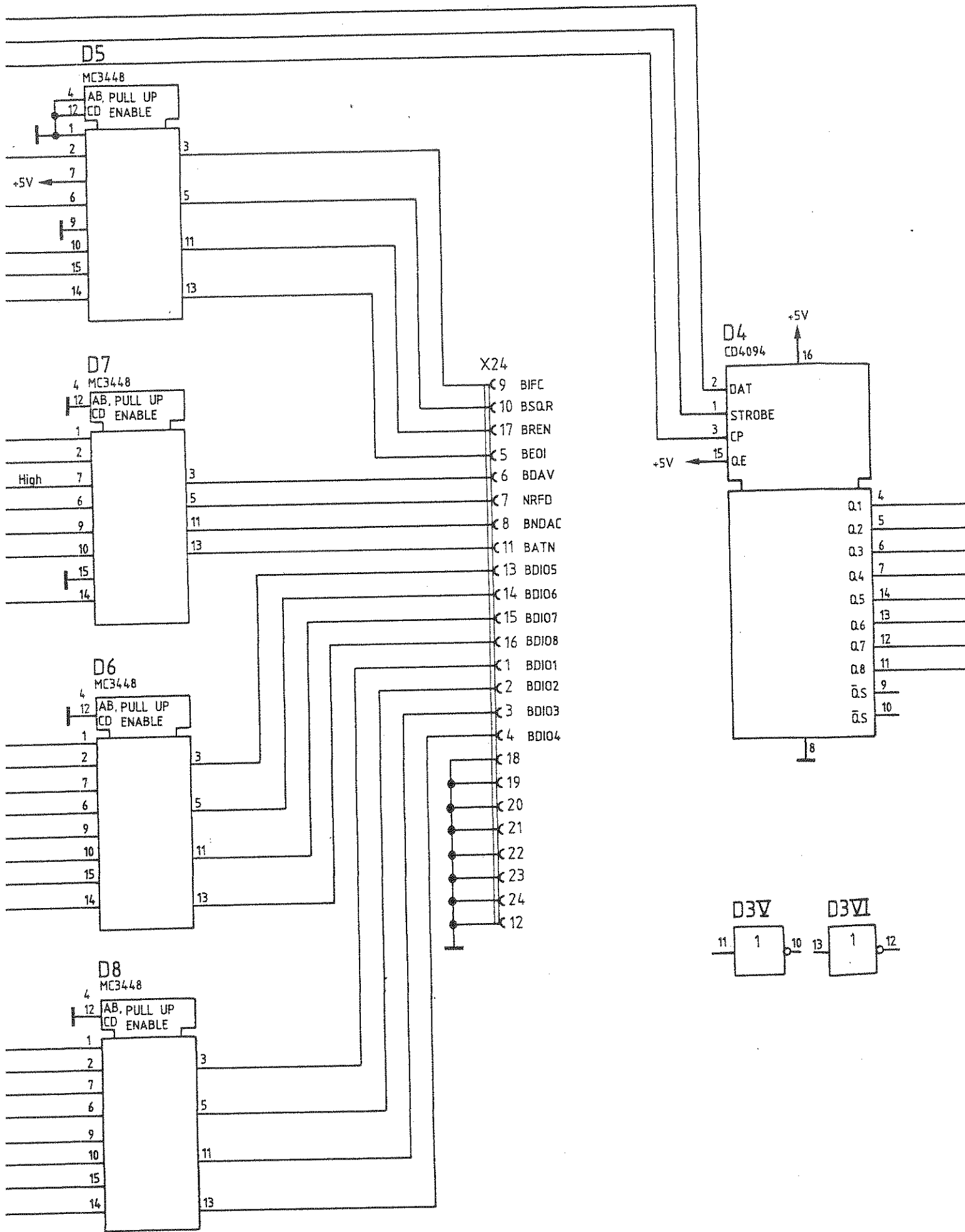


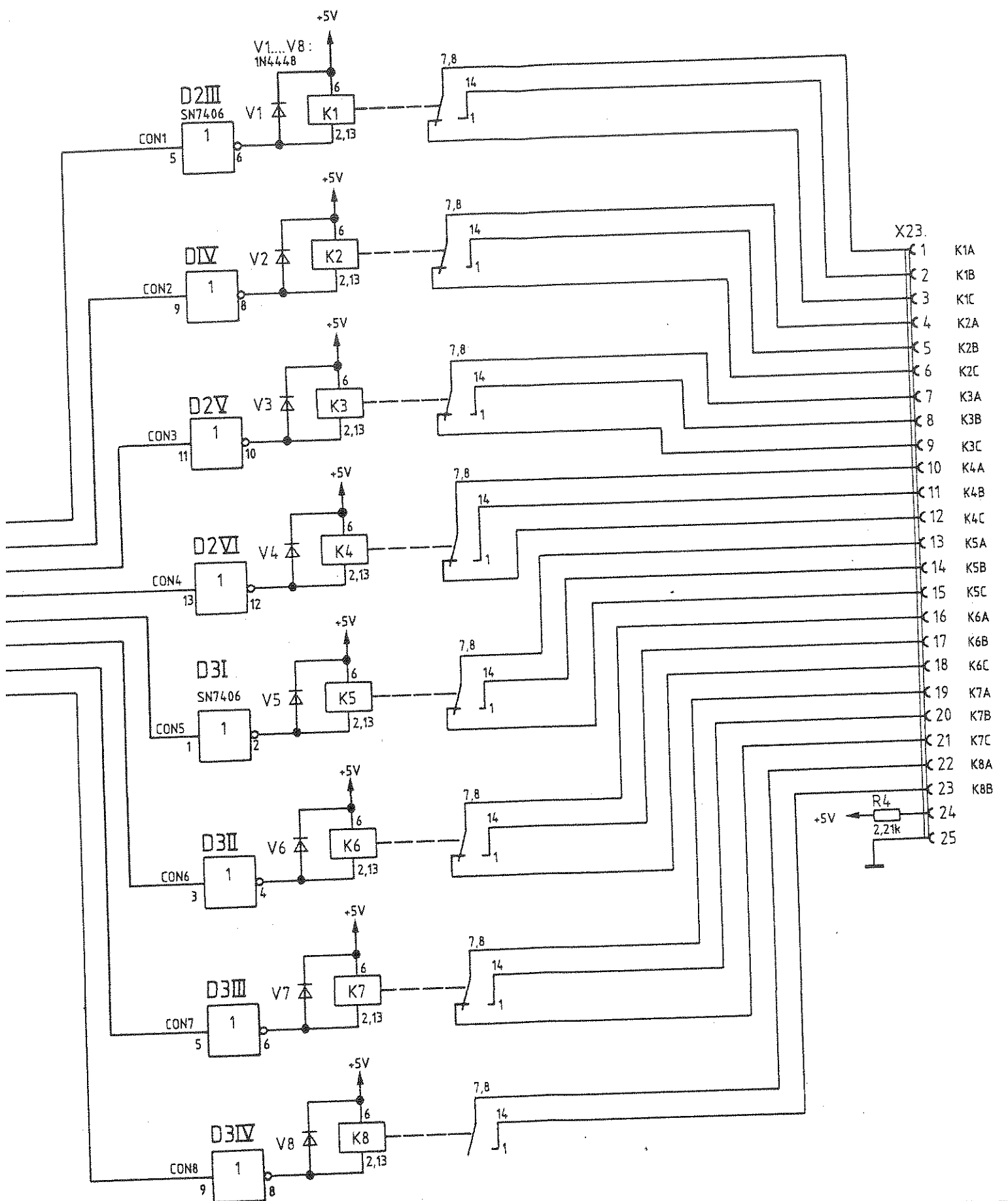
ngsführung Lötseite
solder side



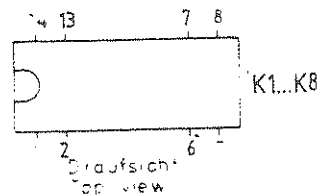
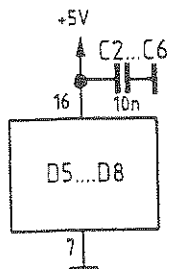
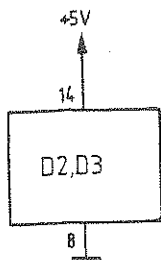
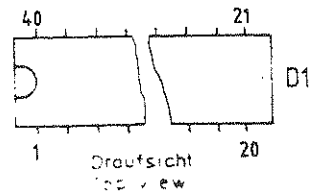
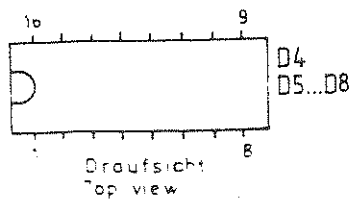
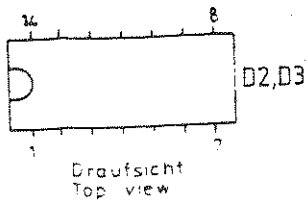
A	—	02.85	NI	Maße ohne Toleranzangabe		Maßstab		1 : 1		
B	32912	8.85	NI			Halbzeug, Werkstoff				
				1KGA	Tag	Name	Benennung IEC - BUS - INTERFACE			Z
				Bearb.	02.85	NI				
				Gepr.						
				Norm						
							Zeichn.-Nr. 803.3920			Blatt-Nr. 2
Änd. Zust.	Änderungs- Mitteilung	Tag	Name	 ROHDE & SCHWARZ			reg. i. V. 803.3914 V			erste Z. —
zu Gerät CMT - B4										
										v. Bl.







	A	7.85	CO					1KGA	Tag
								Beart	10.84
								Gepr	
Ans	Angebungs	Datum	Name	Ans	Angebungs	Datum	Name	Norm	



Stromlauf gilt für VAR 02
Circuit diagramm is valid for model 02

ig	Name	Benennung	Z	Zeichn.-Nr
84	ni	IEC-BUS-Control interface IEC-BUS-Steuerinterface		803.3920 S
		zu Gerät CM-B4		803.3914 V
				erste Z 803.3914



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SERVICE INSTRUCTIONS

2nd AF Synthesizer Option CMT-B7

803.2618.02

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5.2.4	Testing the Filter	5.2
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Component lists
Circuit diagrams
Component layout diagrams

5.1 Function Description

This option is largely identical with the AF synthesizer on the 1st modulation generator module (802.5713.02).

A signal with 32 times the frequency of the required signal is applied to input PILCP (X1.B22). The level can be adjusted in 256 steps using the D/A converter N8 up to a maximum of 1.77 V_{rms}. The two outputs PILOT (X1.B24) and PILINT (X1.A27) provide signals for the two function units on the 1st modulation generator module: PILOT for the modulation control, PILINT for the AF synthesizer for two-tone generation.

The option also generates an interrupt signal either at phase positions 90° and 270° of the stepped sinewave.

5.2 Testing and Adjustment

The module need not be adjusted.

5.2.1 Testing the Input Stage

X1.B22 (PILCP): $f = 32 \times f_{PIL}$, i.e. $640 \text{ Hz} < f < 800 \text{ kHz}$, squarewave voltage ($V_{Low} = 0 \text{ V}$, $V_{High} = 100 \text{ mV}$) but distorted above $f > 100 \text{ kHz}$ by series-connected lowpass; V_{max} remains at 100 mV .

P1: TTL signal with $f = 32 \times f_{PIL}$

5.2.2 Adjusting the Sinewave Generator

D1/3: TTL signal with $f = f_{PIL}$

P4: Stepped sinewave (32 steps/period) with $f = f_{PIL}$, Using R31, adjust peak amplitude to $2.5 \text{ V} \pm 10 \text{ mV}$.

5.2.3 Testing the Reference Voltage

P3: DC voltage $V = +5 \text{ V} \pm 0.3\%$.

5.2.4 Testing the Filter

P5: Sinewave signal with $f = f_{PIL}$ and $V_{rms} = 1.768 \text{ V} \pm 1\%$

5.2.5 Testing the Level Attenuator

Instrument setting:

Modulation depth from 0 to 100%

The voltage V_{rms} at X1.B24 must change from 0 to 1.76 V without jumps.

5.2.6 Testing the PILINT Output
(Internal Pilot Tone Output)

Instrument setting:

Two-tone modulation

X1.A27: Sinewave signal with $V_{rms} = 1.768 \text{ V} \pm 3\%$
 $f = f_{INT2}$



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Schaltteillisten
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Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in	
C1	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C3	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C4	CE 22UF+-20%16V5RD5RAD.A ELECTROLYTIC CAPACITOR	358.6062	NCC	SRE 22UF/16V+-20%		
C5	CE 22UF+-20%16V5RD5RAD.A ELECTROLYTIC CAPACITOR	358.6062	NCC	SRE 22UF/16V+-20%		
C6	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C8	CE 22UF+-20%16V5RD5RAD.A ELECTROLYTIC CAPACITOR	358.6062	NCC	SRE 22UF/16V+-20%		
C10	CE 22UF+-20%16V5RD5RAD.A ELECTROLYTIC CAPACITOR	358.6062	NCC	SRE 22UF/16V+-20%		
C11	CK 15NF+-1%63V7,5QUX13 KP CAPACITOR	CK 340.8063	SIEMENS	B33531-A5153-F		
C12	CK 10NF+-1%63V7,5QUX13 KP CAPACITOR	CK 340.9076	SIEMENS	B33531-A5103-F		
C13	CK 22NF+-5%63V5RM MKT CAPACITOR	CK 099.2881	WIMA	MKS2/63/0,022UF/5%		
C14	CK 10NF+-1%63V7,5QUX13 KP CAPACITOR	CK 340.9076	SIEMENS	B33531-A5103-F		
C15	CK 39NF+-1%63V10QUX13 KP CAPACITOR	CK 099.1940	SIEMENS	B33531-A5393-F		
C16	CK 2,4NF+-1%63V,3QUX11KP CAPACITOR	CK 334.5637	SIEMENS	B33531-A5242-F		
C17	CC 100NF+-10%50V5K120OVIE CAPACITOR	CC 084.5350	UNION CARB	CK05BX104K		
C18	CK 6,8NF +-1% 63V RM5 KP POLYPROPYLENE CAPACITOR	007.7646	ROE	KP1830-268/061-R		
C19	CK 4,7NF+-1%63V6,3X11 KP PLASTIC-FOIL CAPACITOR	CK 283.1701	SIEMENS	B33531-A5472-F		
C20	CK 6,8NF +-1% 63V RM5 KP POLYPROPYLENE CAPACITOR	007.7646	ROE	KP1830-268/061-R		
C21	CK 3,3NF+-1%63V6,3QUX11KP CAPACITOR	CK 340.9030	SIEMENS	B33531-A5332-F		
C22	CK 15NF+-1%63V7,5QUX13 KP CAPACITOR	CK 340.8063	SIEMENS	B33531-A5153-F		
C23	CK 1NF+-2,5%63V RM5 KP POLYPROPYLENE CAPACITOR	CK 099.6129	WIMA	FKP2 1000/2,5%/63V		
C24	CK 1,5NF +-1% 100V RM5 KP POLYPROPYLENE CAPACITOR	007.7600	ROE	KP1830-215/011-R		
C25	CK 1NF+-2,5%63V RM5 KP POLYPROPYLENE CAPACITOR	CK 099.6129	WIMA	FKP2 1000/2,5%/63V		
C26	CK 3,3NF+-2,5%63V RM5 KP POLYPROPYLENE CAPACITOR	CK 099.6158	WIMA	FKP2 3300/2,5%/63V		
C27	CK 470PF +-1% 100V RM5 KP POLYPROPYLENE CAPACITOR	007.7575	ROE	KP1830-147/011-R		
C28	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103		
C29	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103		
C30 ..34	CC 100NF+-10%50V5K120OVIE CAPACITOR	CC 084.5350	UNION CARB	CK05BX104K		
C35	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C36	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C37	CC 10PF+-0,25PF3X4NPO CAPACITOR	CC 087.6429	VALVO	2222 678 09109		
C38	CC 10PF+-0,25PF3X4NPO CAPACITOR	CC 087.6429	VALVO	2222 678 09109		
C60	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
C61	CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580	MATSUSHITA	ECE-A1ESS-101		
D1	BL CD4520BE 2XBIN.COUNT COUNTER	BL 299.6908	RCA	CD4520BE		
D2	BL CD4015BE 2X4B.SH.REG SHIFT REGISTER	BL 086.7044	RCA	CD4015BE		
D3	BL CD4015BE 2X4B.SH.REG SHIFT REGISTER	BL 086.7044	RCA	CD4015BE		
D4	BL CD4094BE 8BIT SH.REG SHIFT REGISTER	BL 586.7726	RCA	CD4094BE		
D5	BL CD4094BE 8BIT SH.REG SHIFT REGISTER	BL 586.7726	RCA	CD4094BE		
ROHDE & SCHWARZ		Äl Datum Date	Schaltteilliste für Parts list for		Sachnummer Stock Nr.	Blatt Page
		13 1287	ED 2. NF-SYNTHESIZER 2ND AF SYNTHESIZER		803.2624.01 SA	1+

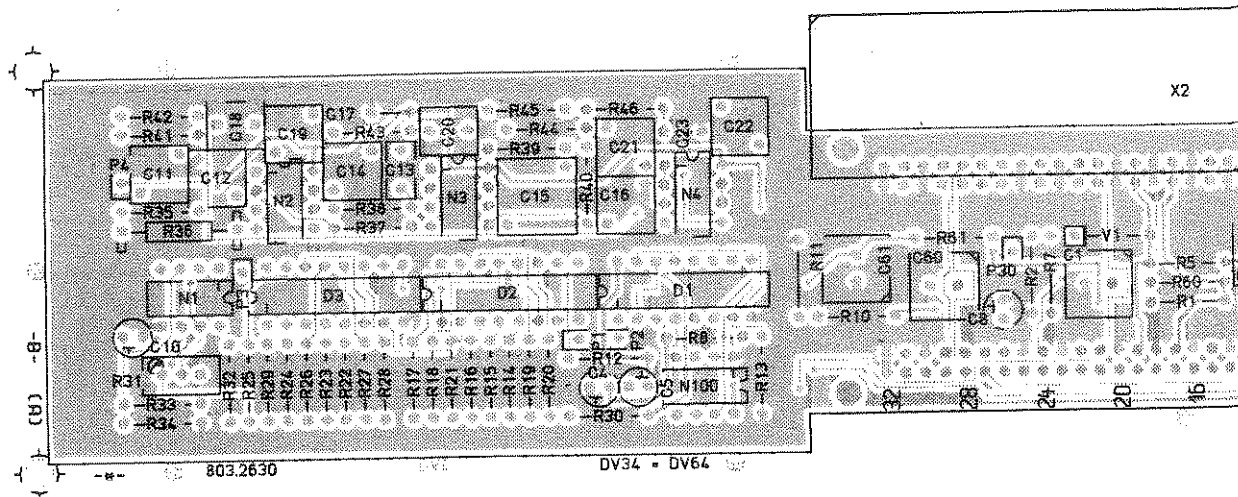
Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
D6	BL CD4071BE 4X2IN. ORG OR GATE	BL 299.6866	RCA	CD4071BE	
D7	BL MC14528BCP 2X MONOFLOP MONOSTABLE MULTIVIBRATOR	BL 086.7315	SSS	SCL4528BE	
N1	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N2	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N3	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N4	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N5	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N6	BL CD4053BE 3X2CH. MUX MULTIPLEXER	BL 565.3080	RCA	CD4053BE	
N7	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER	349.3058	NSC	LF411CN	
N8	BJ AD7523JN 8B.D/A-CONV D/A CONVERTER	801.8219	MICRO POW.	MP7523JN	
N9	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER	356.0521	NSC	LF412CN	
N10	BL CD4053BE 3X2CH. MUX MULTIPLEXER	BL 565.3080	RCA	CD4053BE	
N11	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER	349.3058	NSC	LF411CN	
N100	BO LM311N COMPAR COMPARATOR	BO 394.8755	NSC	LM311N	
D1	VL STECKLOETOESE 7,5X1,1 PLUG-IN SOLDERING LUG	VL 078.2747	-	R&S-ZCHNG.078.2747	
D2	VL STECKLOETOESE 7,5X1,1 PLUG-IN SOLDERING LUG	VL 078.2747	-	R&S-ZCHNG.078.2747	
P1	VL WIRE-WRAP PIN	VL 088.4507	BERG	NR. 75 403-001	
P10	VL WIRE-WRAP PIN	VL 088.4507	BERG	NR. 75 403-001	
P11	VL WIRE-WRAP PIN	VL 088.4507	BERG	NR. 75 403-001	
P30	VL WIRE-WRAP PIN	VL 088.4507	BERG	NR. 75 403-001	
R1	RL 0,35W2,21 OHM+-1%TK50 METALFILMRESISTOR	RL 099.7948	RESISTA	MK2 2,21 OHM 1% TK50	
R2	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R3	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	DRALORIC	SMA0207/100HM-F-D	
R5	RL 0,35W2,21 OHM+-1%TK50 METALFILMRESISTOR	RL 099.7948	RESISTA	MK2 2,21 OHM 1% TK50	
R7	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	DRALORIC	SMA0207/100HM-F-D	
R8	RL 0,35W4,75 OHM+-1%TK50 METALFILMRESISTOR	RL 099.8021	RESISTA	MK2 4,75 OHM 1% TK50	
R10	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R11	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543	DRALORIC	SMA0207/100/HM-F-D	
R12	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR	RL 083.0826	DRALORIC	SMA0207/2,00K-F-D	
R13	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMA0207/1K-F-C	
R14	RL 0,35W 178 KOHM+-1%TK50 RESISTOR	RL 083.2187	DRALORIC	SMA/207/178K-F-C	
R15	RL 0,35W 60,4KOHM+-1%TK50 RESISTOR	RL 083.1851	DRALORIC	SMA0207/60,4K-F-C	
R16	RL 0,35W 36,5KOHM+-1%TK50 RESISTOR	RL 083.1716	DRALORIC	SMA0207/36,5K-F-C	
R17	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR	RL 082.2583	DRALORIC	SMA 0207/27,4K-F-C	
R18	RL 0,35W22,6KOHM+-1%TK50 RESISTOR	RL 082.2219	DRALORIC	SMA0207/22,6K-F-C	
R19	RL 0,35W 19,6KOHM+-1%TK50 RESISTOR	RL 083.1516	DRALORIC	SMA/207/19,6K-F-C	
R20	RL 0,35W 18,2KOHM+-1%TK50 RESISTOR	RL 083.1480	DRALORIC	SMA/207/18,2K-F-C	
ROHDE & SCHWARZ		Alt Date	Schaltteilleiste für Parts list for		Sachnummer Stock Nr.
		13.12.87	ED 2. NF-SYNTHESIZER 2ND AF SYNTHESIZER		803.2624.01 SA
					2+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
R21	RL 0,35W 17,4KOHM+-1%TK50 RESISTOR	RL 083.1468	DRALORIC	SMA0207/17,4K-F-C	
R22	RL 0,35W 17,4KOHM+-1%TK50 RESISTOR	RL 083.1468	DRALORIC	SMA0207/17,4K-F-C	
R23	RL 0,35W 18,2KOHM+-1%TK50 RESISTOR	RL 083.1480	DRALORIC	SMA/207/18,2K-F-C	
R24	RL 0,35W 19,6KOHM+-1%TK50 RESISTOR	RL 083.1516	DRALORIC	SMA/207/19,6K-F-C	
R25	RL 0,35W 22,6KOHM+-1%TK50 RESISTOR	RL 082.2219	DRALORIC	SMA0207/22,6K-F-C	
R26	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR	RL 082.2583	DRALORIC	SMA 0207/27,4K-F-C	
R27	RL 0,35W 36,5KOHM+-1%TK50 RESISTOR	RL 083.1716	DRALORIC	SMA0207/36,5K-F-C	
R28	RL 0,35W 60,4KOHM+-1%TK50 RESISTOR	RL 083.1851	DRALORIC	SMA0207/60,4K-F-C	
R29	RL 0,35W 178 KOHM+-1%TK50 RESISTOR	RL 083.2187	DRALORIC	SMA/207/178K-F-C	
R30	RL 0,35W 10,2KOHM+-1%TK50 RESISTOR	RL 082.2331	DRALORIC	SMA/207/10,2K-F-C	
R31	RS 0,3W 2,0KOHM+-10% CERMET TRIMMING POTENTIOMETER	RS 006.9139	BECKMAN	67W 2KOHM 10%	
R32	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R33	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R34	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R35	RL 0,35W 17,4KOHM+-1%TK50 RESISTOR	RL 083.1468	DRALORIC	SMA0207/17,4K-F-C	
R36	RL 0,35W 57,6KOHM+-1%TK50 RESISTOR	RL 083.6830	DRALORIC	SMA0207/57,6K-F-C	
R37	RL 0,35W 19,1KOHM+-1%TK50 RESISTOR	RL 083.1500	DRALORIC	SMA/207/19,1K-F-C	
R38	RL 0,35W 35,7KOHM+-1%TK50 RESISTOR	RL 083.1700	DRALORIC	SMA0207/35,7K-F-C	
R39	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR	RL 083.1639	DRALORIC	SMA0207/30,1K-F-C	
R40	RL 0,35W 53,6KOHM+-1%TK50 RESISTOR	RL 082.2590	DRALORIC	SMA 0207/53,6K-F-C	
R41	RL 0,35W 2,61KOHM+-1%TK50 RESISTOR	RL 083.0903	DRALORIC	SMA0207/2,61K-F-D	
R42	RL 0,35W 8,06KOHM+-1%TK50 RESISTOR	RL 083.1222	DRALORIC	SMA0207/8,06K-F-D	
R43	RL 0,35W 4,64KOHM+-1%TK50 RESISTOR	RL 082.1687	DRALORIC	SMA0207/4,64K-F-C	
R44	RL 0,35W 6,49KOHM+-1%TK50 RESISTOR	RL 083.1168	DRALORIC	SMA0207/6,49K-F-D	
R45	RL 0,35W 6,34KOHM+-1%TK50 RESISTOR	RL 083.1151	DRALORIC	SMA0207/6,34K-F-D	
R46	RL 0,35W 7,15KOHM+-1%TK50 RESISTOR	RL 083.1174	DRALORIC	SMA0207/7,15K-F-D	
R47	RL 0,35W 1,21KOHM+-1%TK50 RESISTOR	RL 083.0655	DRALORIC	SMA0207/1,21K-F-D	
R48	RL 0,35W 3,40KOHM+-1%TK50 RESISTOR	RL 083.1000	DRALORIC	SMA0207/3,40K-F-D	
R49	RL 0,35W 1,69KOHM+-1%TK50 RESISTOR	RL 083.0778	DRALORIC	SMA0207/1,69K-F-D	
R50	RL 0,35W 2,37KOHM+-1%TK50 RESISTOR	RL 083.0878	DRALORIC	SMA0207/2,37K-F-D	
R51	RL 0,35W 1,0 OHM+-1%TK50 METALFILMRESISTOR	RL 099.7860	RESISTA	MK2 1,00 OHM 1% TK50	
R53	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R54	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
R60	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543	DRALORIC	SMA0207/100/HM-F-D	
R61	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543	DRALORIC	SMA0207/100/HM-F-D	
V1	AE BZX79/C9V1 0,5W Z-DI ZENER DIODE	AE 012.2503	VALVO	BZX79/C9V1	
V2	AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT	FP 084.6470	PANDUIT	100-064-033/999	
ROHDE & SCHWARZ		AI Datum Date	Schaltteilleiste für Parts list for		Sachnummer Stock Nr.
		13 1287	ED 2.NF-SYNTHESIZER 2ND AF SYNTHESIZER		803.2624.01 SA
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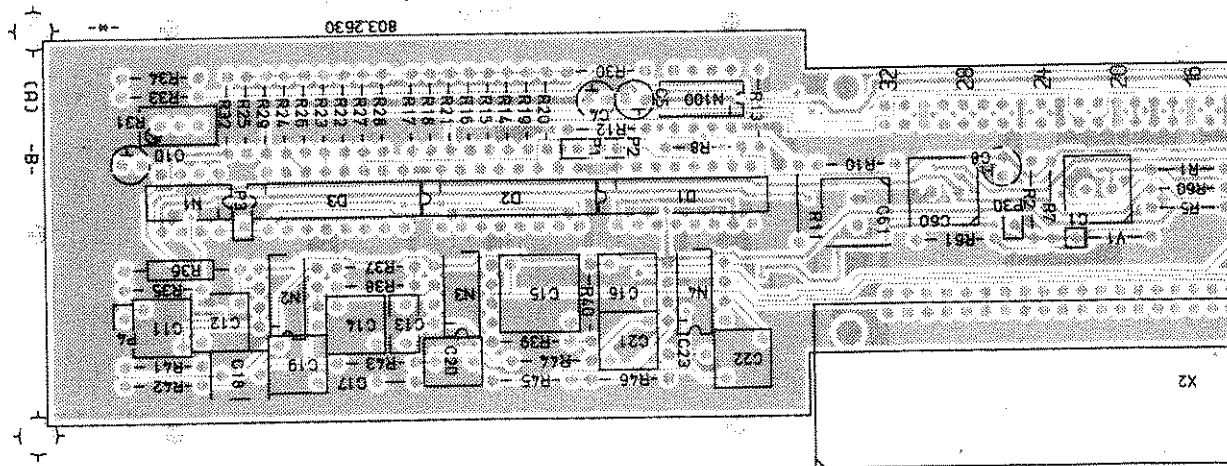
Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
X2	FP BUCHSENLEISTE64P.ABGEW	FP 099.0614	PANDUIT	100-064-533/999	- ENDE -

ROHDE & SCHWARZ	Äl	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	13	1287	ED 2. NF-SYNTHESIZER 2ND AF SYNTHESIZER	803.2624.01 SA	4-

Ansicht und Leitungsführung
View of tracks on compon



Ansicht und Leitungsführung
View of tracks on solder

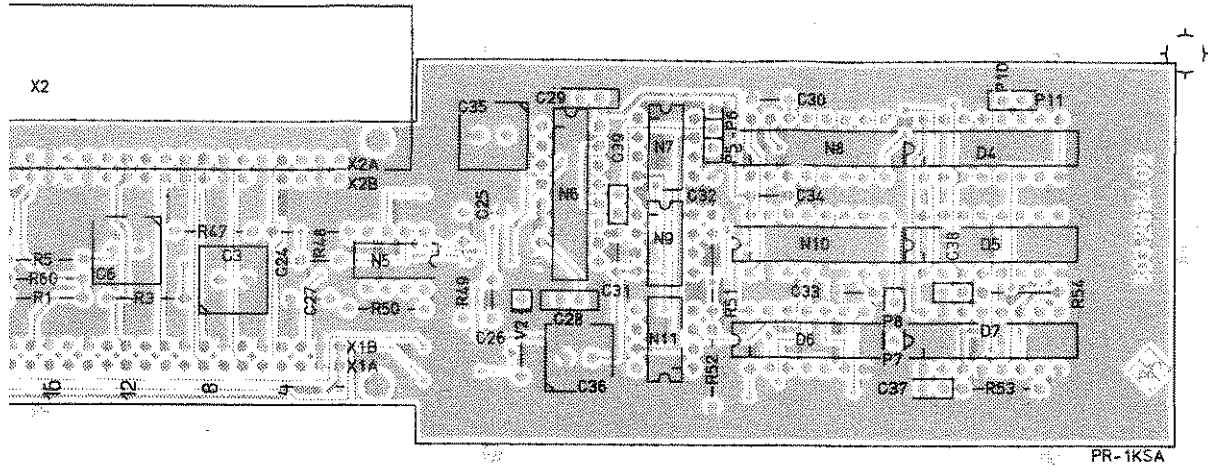


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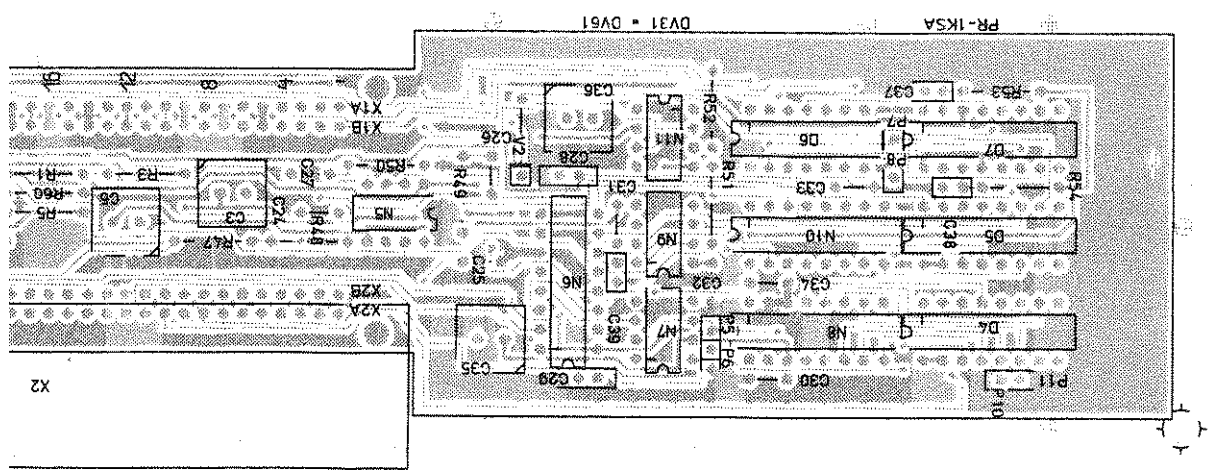


ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

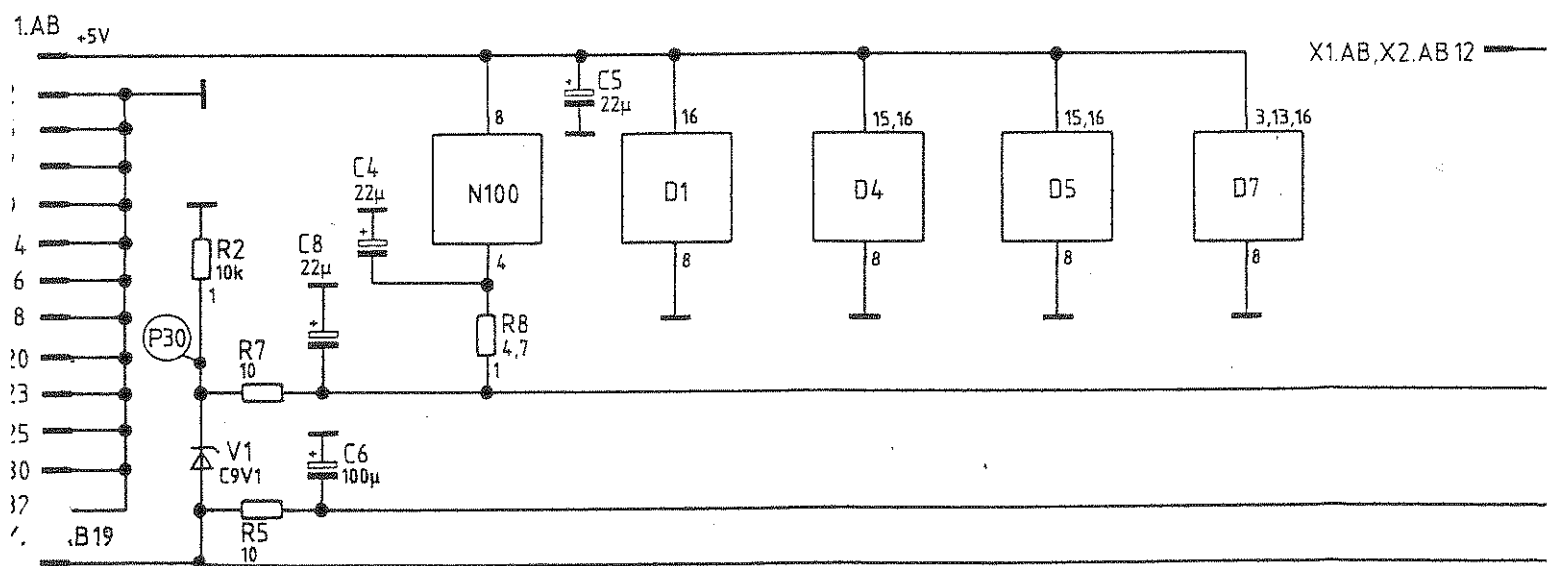
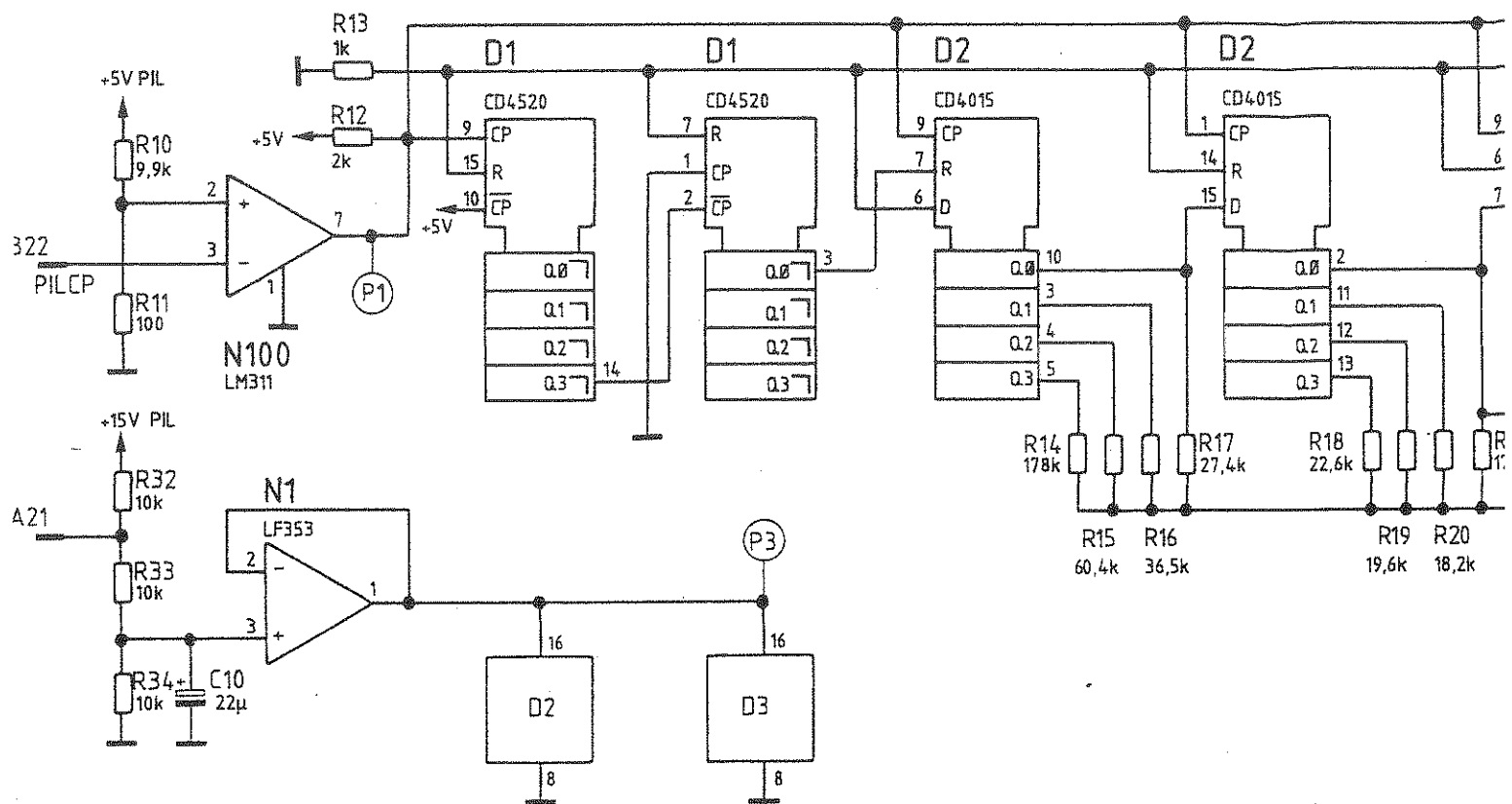
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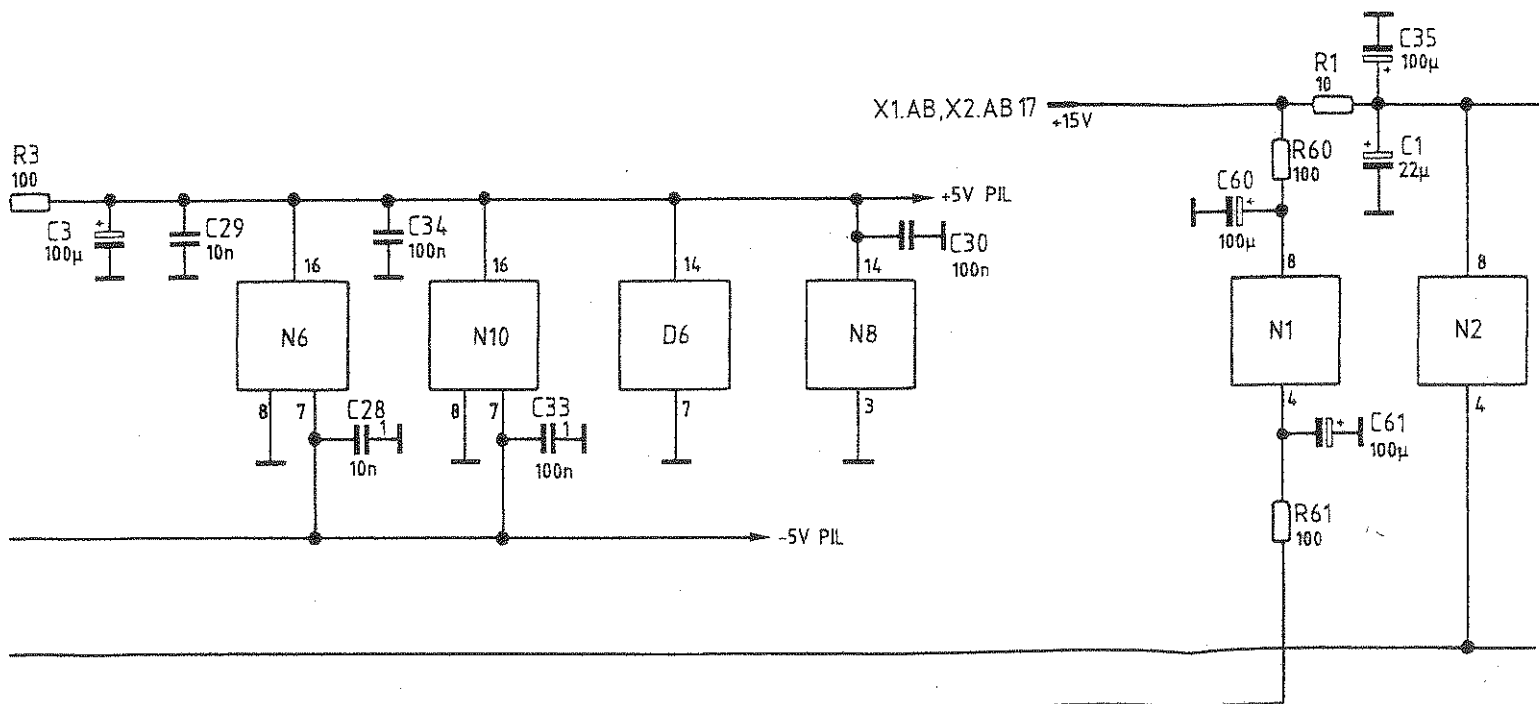
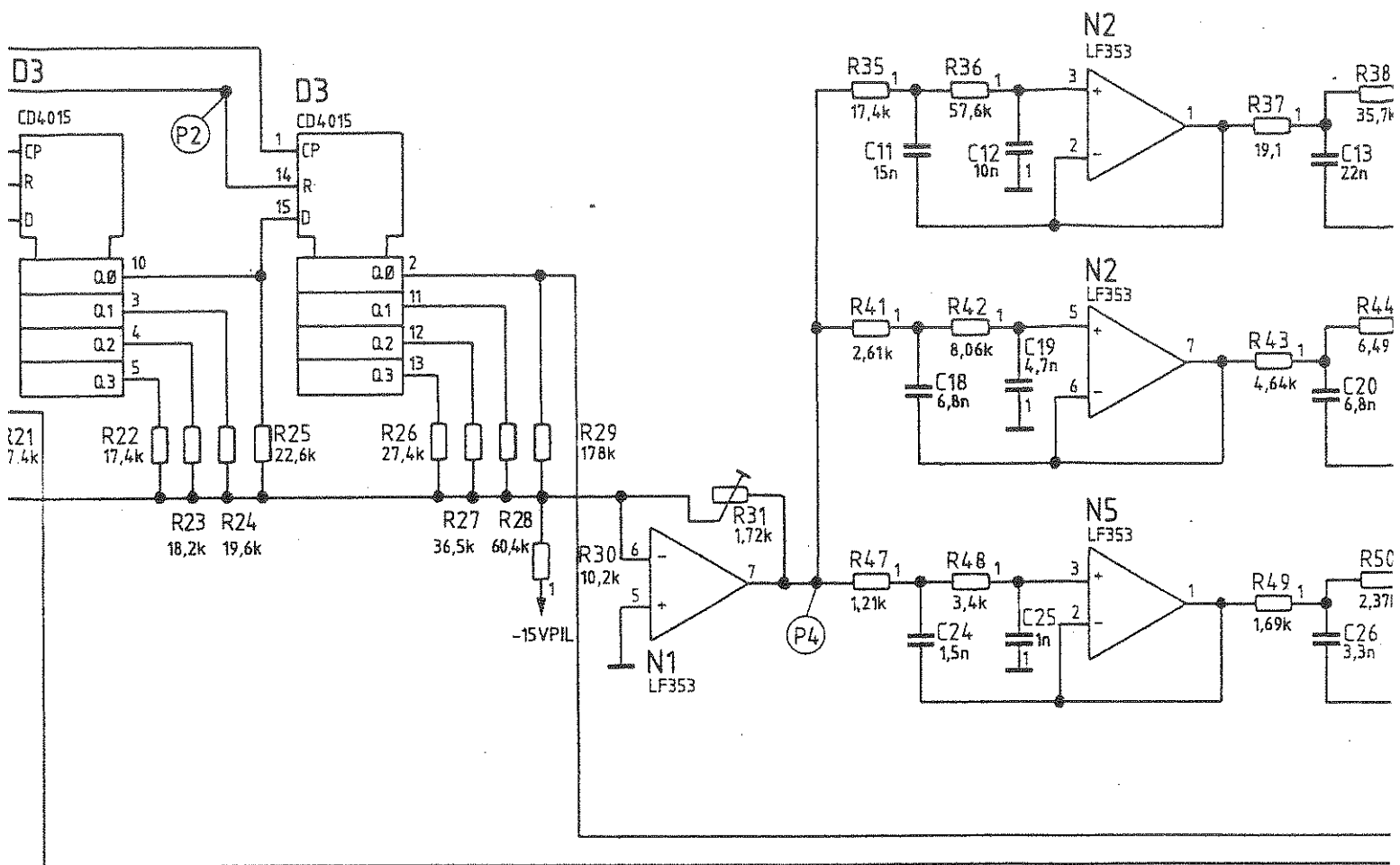


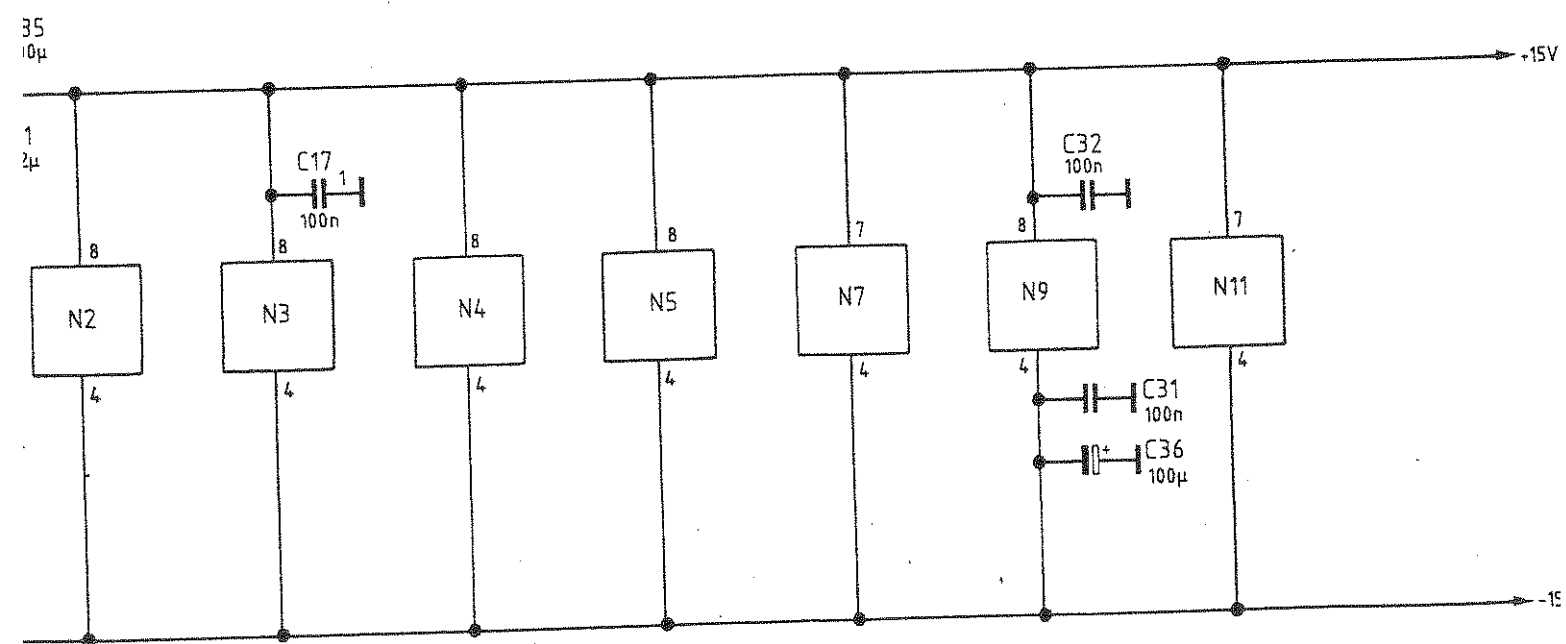
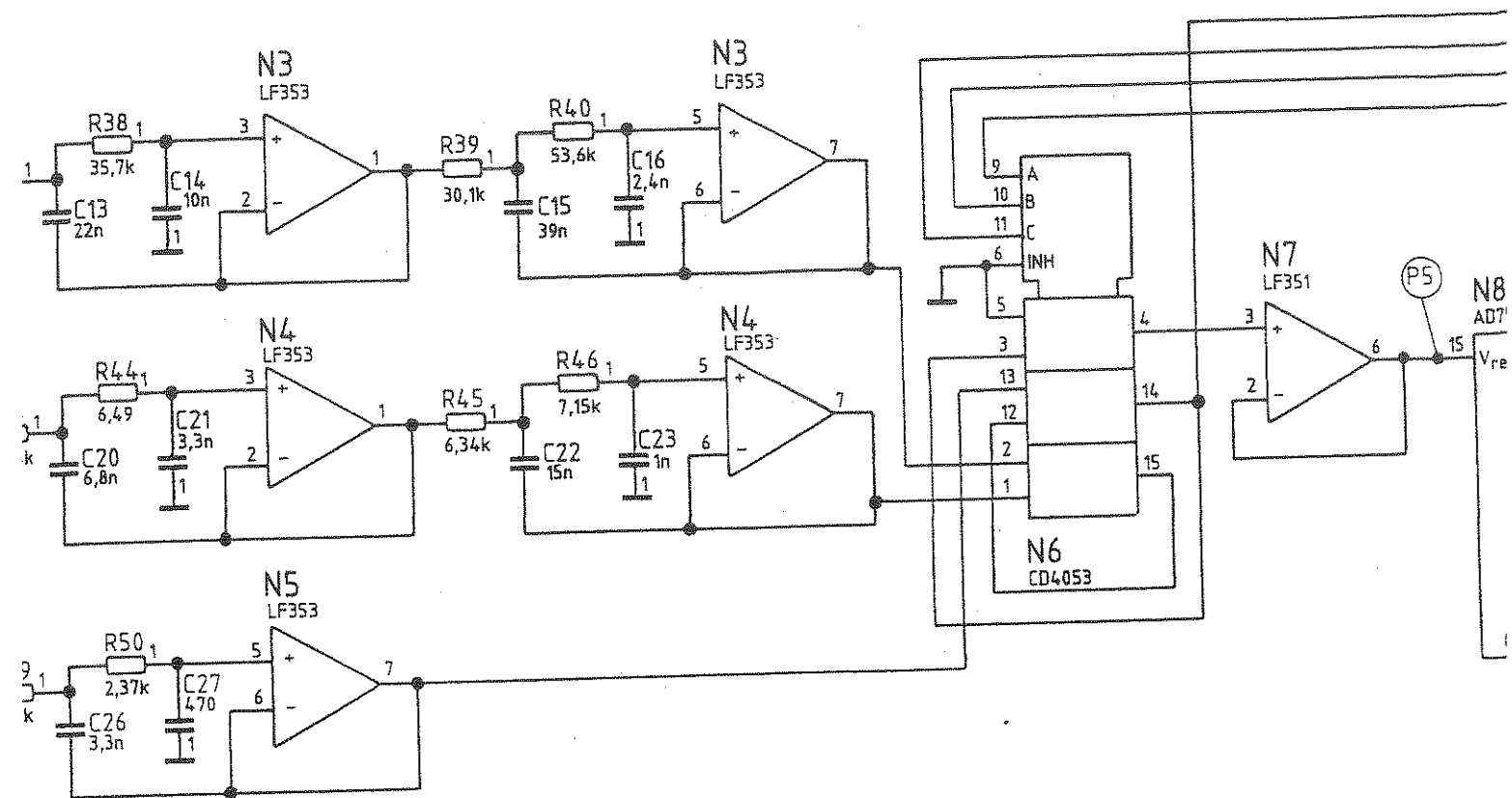
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der side

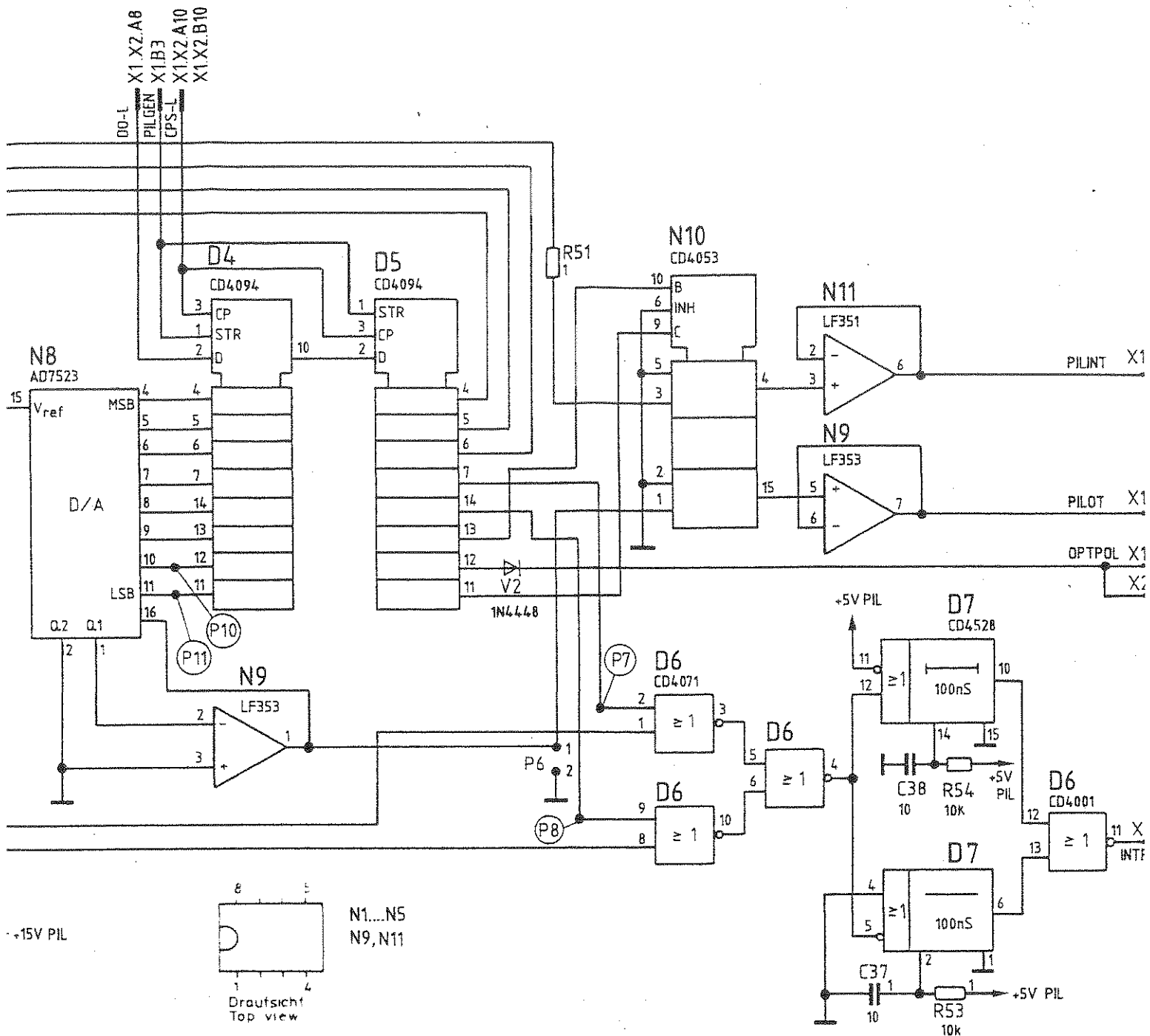


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						Halbzeug, Werkstoff			
				1KSA	Tag	Name	Benennung		
				Bearb.	12.86	PR	2. NF-Synthesizer		Z
				Gepr.			2nd AF Synthesizer		
				Norm					
						Zeichn.-Nr.		Blatt-Nr.	
						803.2624.01 EE		2	
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät 671		reg. i. V. 803.2618 V		erste Z.	
				ROHDE & SCHWARZ				v. 2 Bl.	



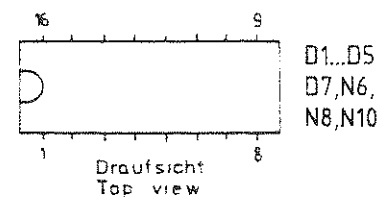
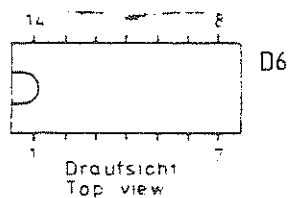
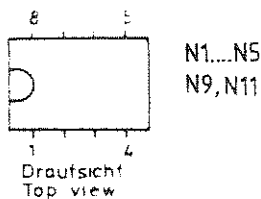






+5V PIL

+5V PIL



	Stromlauf zu 2.NF-Synthesizer / 2nd AF-Synthesizer CMT-B7 reg. i V 803.2618 V erste Z.	Zeichn.-Nr. 803.2624 S
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ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Adjacent-channel Power Meter

Option CMT-B6

803.7810.02

Contents

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5.1.2	455-kHz IF Section	5.3
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Component lists
Circuit diagrams
Component layout diagrams

5.1 Function Description

The internal RF synthesizer, the RF amplifier and mixer modules on the analog unit and the adjacent-channel power meter module are used for adjacent-channel power measurements.

The adjacent-channel power meter module consists of two circuits which are almost independent of one another:

- A 800-MHz fixed oscillator of high spectral purity with a 1:2 divider.
- A 455-kHz IF section with the weighting filter, selectable amplifiers and an rms meter.

If a transmitter with an RF <200 MHz is to be measured, the transmitter frequency is directly converted to 455 kHz using the internal RF synthesizer. The signal quality of the internal RF synthesizer is sufficient in this frequency range to enable measurements up to approx. 80 dB.

If the transmitter frequency is in the 70-cm band (approx. 450 MHz) or in the 900-MHz band, conversion to 400 MHz or 800 MHz is required.

The adjacent-channel power measurement is made as follows (see flowchart) using the filter (E160) (the filter has a 3-dB bandwidth of approx. 3.5 kHz, a 6-dB bandwidth of approx. 4 kHz and a stopband attenuation of more than 80 dB) and several conversion processes.

Start adjacent-channel measurement

Calibration: The filter characteristic is measured using the internal RF generator. Of interest are:

- The passband peak
- The right and left 3-dB points (subfilter bandwidth)
- The right and left 6-dB points

Reference measurements: Detection of the nominal wanted channel. The subfilter bandwidth is applied to the wanted channel by means of several conversion processes. The conversion frequencies are selected such that the subfilter bandwidths are combined with the 3-dB points. With the 10-kHz and 12.5-kHz channel spacing: 2 subfilter bandwidths; with the 20-kHz channel spacing depending on the individual subfilter bandwidth: 3 or 4 subfilter bandwidths; with the 25-kHz channel spacing: 4 subfilter bandwidths.

The intermediate results (true rms values) are collected by the computer and stored.

Adjacent-channel measurement: The 6-dB point of the filter is converted to the limit of the nominal adjacent channel nearest to the carrier. Subfilter bandwidths are then added to the 3-dB points until the adjacent channel is covered. The wanted channel always remains in the stopband of the filter during these measurements.

The intermediate results are collected by the computer and stored. The computer calculates the carrier-to-unwanted power ratio from the measured value for the wanted channel and the adjacent channel.

Other measurements if necessary

Upper numeric limit reached
with adjacent-channel
measurements ?

No

Yes

Is it time to
calibrate again ?

No

Yes

5.1.1 800-MHz Fixed Oscillator

(See circuit diagram 803.7832 S, sheet 1)

This part of the circuit contains a broadband phase controlled 800-MHz fixed oscillator (V70). The signal is first divided by 2 (D10) and then by 4 (D30) by coupling out with R67 and then applied to the phase comparator D35. The 100-MHz reference signal is applied to the phase comparator from X911 via line receiver D36. The loop filter N60 provides the control loop with a bandwidth of approx. 100 kHz. The 800-MHz signal from the decoupler R68 and the signal from D10 divided by 2 are applied to the RF relay K100. The 800-MHz or 400-MHz signal is applied to the LO gate of mixer E110.

Transmitter signals with frequencies <200 MHz are applied from X917 to X916 without conversion. Transmitter frequencies of approx. 450 MHz (70-cm band) are converted with 400 MHz to approx. 50 MHz and applied to X916 for further conversion. Corresponding conversion for transmitter frequencies from the 900-MHz band takes place using the 800-MHz fixed frequency. The level at X916 after conversion is the same as that at X917 before conversion.

5.1.2 455-kHz IF Section

(See circuit diagram 803.7832 S, sheet 2)

This part of the circuit receives the IF of 455 kHz with a level of approx. 270 mV which is amplified by V155 to approx. 1 V_{rms}. The ceramic filter with a pass bandwidth of approx. 4 kHz and a blocking of above 80 dB separates the wanted channel and the adjacent channel using the conversion processes carried out by the internal RF synthesizer. The circuit then contains 8 amplifier stages with a gain of 0 or 10 dB in order to drive the input of the rms meter N215 in the correct dynamic range. The rms meter is an active multiplier circuit with the same signal at both inputs (pins 5 and 9). The integration required for the rms measurement is handled by C222. Square-root extraction has been omitted which means that the DC voltage at output X1.A28 corresponds to the square of the rms input voltage at P10. The useful range of the DC voltage at output X1.A28 is between 0.5 and 5 V.

5.2 Testing and Adjustment

5.2.1 Testing the Fixed Oscillator

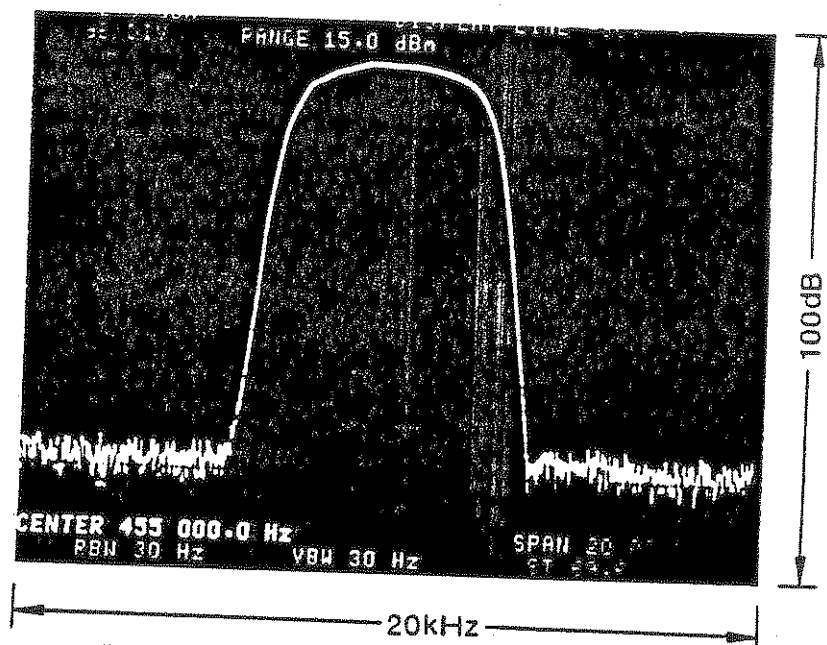
Test equipment: RF synthesizer, e.g. SMPC (at X917)
 Spectrum analyzer (at X916)
 100-MHz crystal oscillator, (at X911)
 e.g. from the basic instrument

- Apply unmodulated signal of 50 mV to X917.
- Switch relays K120 and K121 to the conversion path.
- RF analyzer setting: centre 50 MHz, span 200 kHz
- Connect K100 to the 800-MHz branch (pin 1) and set RF synthesizer to 850 MHz. A 50 MHz, 50 mV (± 1 dB) signal with a high spectral purity must be measured on the RF analyzer.
- Connect K100 to the 400-MHz branch (pin 9) and adjust the RF synthesizer to 450 MHz. The RF analyzer should indicate the same signal as before.

5.2.2 Testing the IF Section

Test equipment: AF synthesizer, e.g. SPN (at X918)
DC-Voltmeter (at X1.A28)

Measure the filter characteristic over its total dynamic range using the selectable amplifiers (0 and 10 dB).



The relationship between the AC voltage and DC is logarithmic because the data are squared in the rms meter:

$$V_{DC} \text{ (logarithmic)} = \text{approx. } 10 \times \log \frac{V_{rms}}{V_{ref}} - \text{gain (dB)}$$

5.2.3 Adjusting the Fixed Oscillator

Test equipment: Spectrum analyzer
Voltmeter
100-MHz crystal oscillator
RF synthesizer

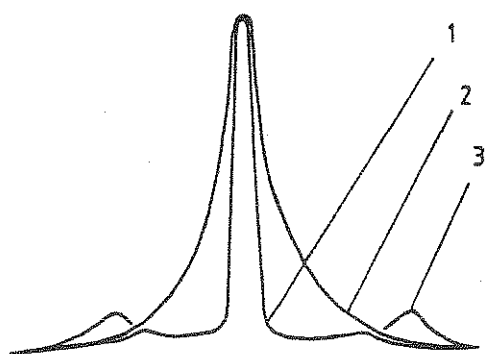
Carry out the adjustment with the cover closed, since with the cover opened other results are obtained. The test setup corresponds to that in Section 5.2.1.

5.2.3.1 Adjusting the Oscillator

- + Apply a 100-MHz reference (ECL) to X911.
- + Apply 850 MHz (50 mV) to X917.
- + Connect spectrum analyzer to X916,
centre 50 MHz, span 500 kHz.
- + Connect voltmeter to P18.
- + Set R78 and R52 to centre positions.
- + Set output frequency to 800 MHz (50 MHz on analyzer)
using C65 and adjust tuning voltage to $12\text{ V} \pm 0.5\text{ V}$ at P18.

5.2.3.2 Adjusting the Phase Control

Adjust the control bandwidth to 100 kHz using R61.



1 = correct

5.2.3.3 Adjusting the Level Converter

If the phase control does not lock when the power supply or the 100-MHz reference is switched on and off, the offset of the level converter must be adjusted.

- Adjust R52 such that the PLL always locks.

5.2.3.4 Adjusting the Oscillator Output Power

- Connect analyzer to K1.
- Measure level of 400-MHz signal.
- Set level of 800-MHz signal to the same value (approx. -7 dBm) using R78.
- Check that both levels are the same.

5.2.4 Adjusting the IF Section

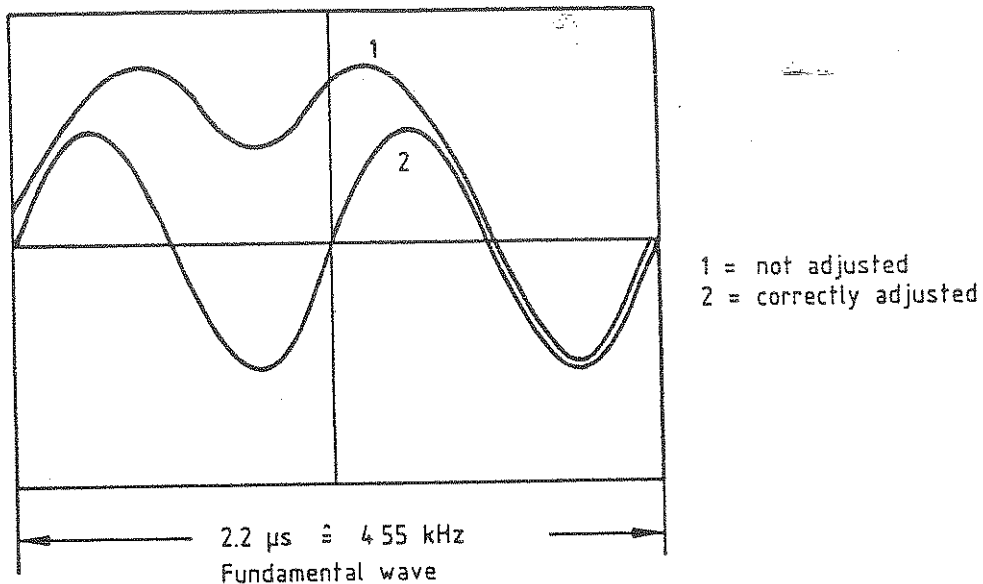
Test equipment:	AF synthesizer	(at X918)
	DC voltmeter	(at X1.A28)
	Oscilloscope	(at P11)

5.2.4.1 Adjusting the Offset

- Apply 0 V to X918.
- Set all amplifiers to 10 dB.
- Adjust to 0 V (+10 mV/-0 mV) using R222.

5.2.4.2 Adjusting the Balance

- Apply 270 mV, 455 kHz.
- Set all amplifiers to 0 dB.
- Remove C222.
- Set the following signal shape on the oscilloscope using R226.



- Insert C222 again.
- Check offset adjustment.

5.3 Interfaces

Connectors	Input Output	De- signation	Value	Tolerance
X917	I	HF	50 mV	±1 dB
X916	O	HF	50 mV	
X911	I	100 MHz	ECL(to +5V)	
X918	I	ZF	270 mV	
X1.A28	O	DC	0.5 to 5V*)	
X1.A8	I	Data	CMOS 5 V	±30 mA
X1.B10/A10	I	Clock	CMOS 5 V	
X1.A3	I	Strobe	CMOS 5 V	
X1.A1/B1	I	+5 V _D	approx. 230 mA	
X1.A13/B13	I	+5 V _A	<25 mA	
X1.A17/B17	I	+15 V	approx. 60 mA	Without relay +60 mA/relay
X1.A19/B19	I	-15 V	approx. 40 mA	±10 mA
X1.A15/B15	I	+24 V	approx. 4 mA	±2 mA

*) Useful range of input voltage



ROHDE & SCHWARZ
MÜNCHEN

Schaltheillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans

**ROHDE & SCHWARZ**

AZ

Datum
Date

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0386

Schaltteilliste für

Parts list for

CMT-B6 NKL-MESSER

CMT-B6 ACP METER

Sachnummer
Stock No.

803.7810.01 SA

Blatt
Page

1

Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

A91

ED NKL-MESSER
ACP METER

803.7832.02

W20

DX HF-KABEL W20
RF CABLE

803.8045

W21

DX HF-KABEL W21
RF CABLE

803.8051

W23

DX HF-KABEL W23
RF CABLE

803.8068

W24

DX HF-KABEL W24
RF CABLE

803.8074

- ENDE -

**ROHDE & SCHWARZ**

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Datum
Date

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0487

Schaltteilliste für
Parts list forED NKL-MESSER
ACP METERSachnummer
Stock No.


803.7832.01 SA

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Page

1

Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

C1	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C2	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C3	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C5	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C6	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C7	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C10	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C11	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C12	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C14	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C15	CK 33NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,033UF/5%	CK 099.2900	
C16	CC 220PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A221JFA	CC 099.8850	
C30	CK 33NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,033UF/5%	CK 099.2900	
C31	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C32	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C35	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C36	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C37	CC 100NF+-10% 50V5K1200 C CAPACITOR VITRAMON VJ1812Y104KFA	CC 082.3473	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in	
C55	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521			
C56	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521			
C59	CC 2,2NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y222KFA	CC 099.8444			
C60	CC 2,2NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y222KFA	CC 099.8444			
C61	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525			
C62	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438			
C63	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525			
C64	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102	CC 022.0784			
C65	CT 9,2PF TAUCHTR.RD 7X12 AIR-TYPE TRIMMER TEKELEC LUFTTRAT5200	CT 025.7367			
C66	CC 0,5PF+-0,25PF50V NPO CERAMIC CHIP CAPACITOR ERIE GR42-6 0,5PF NP050V	099.8650			
C67	CC 12PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A120JFA	CC 099.8744			
C68	CC 12PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A120JFA	CC 099.8744			
C70	CC 7PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A7R0DFA	CC 099.8715			
C71	CC 5PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A5R0DFA	CC 099.8696			
C72	CC 22PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A220JFA	CC 099.8396			
C73	CC 4PF+-0,25PF50V NP01206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A4R0CFA	CC 099.8680			
C75	CC 22PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A220JFA	CC 099.8396			
C80	CC 4,7NF+-10%6X9R2000 CAPACITOR VALVO 2222 63051 472	CC 087.7102			
C90	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438			

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C91	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C92	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C95	CC 47NF+-10%100V5K1200 C CAPACITOR VITRAMON VJ1812Y473KFB	CC 082.3438	
C100	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C101	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C103	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C105	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C106	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C107	CC 4PF+-0,25PF50V NP01206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A4ROCFA	CC 099.8680	
C108	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA		
C110	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC	
C111	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099..	
C115	CC 47NF+-10%100V5K1200 C CAPACITOR VITRAMON VJ1812Y473KFB	CC 082.3438	
C116	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521	
C117	CC 47NF+-10%100V5K1200 C CAPACITOR VITRAMON VJ1812Y473KFB	CC 082.3438	
C120	CC 15PF+-5%50V NP0 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A150JFA	CC 099.8750	
C121	CC 27PF+-5%50V NP0 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A270JFA	CC 099.8409	
C122	CC 27PF+-5%50V NP0 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A270JFA	CC 099.8409	
C123	CC 15PF+-5%50V NP0 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A150JFA	CC 099.8750	

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06		0487		803.7832.01 SA	4
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in
C124	CC 47NF+-10%100V5K1200 C CAPACITOR			CC 082.3438	
C156	VITRAMON VJ1812Y473KFB CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR			803.0580	
C157	MATSUSHITA ECE-A1ESS-101 CC 1NF+-10%63V K2000 CERAMIC CAPACITOR			CC 022.0784	
C158	VALVO 2222 63051 102 CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525	
C159	VALVO 2222 63051 64051103 CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C160	WIMA MKS/2/63/0,1UF/5% CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR			803.0580	
C165	MATSUSHITA ECE-A1ESS-101 CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR			803.0580	
C166	MATSUSHITA ECE-A1ESS-101 CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C167	WIMA MKS/2/63/0,1UF/5% CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR			803.0580	
C168	MATSUSHITA ECE-A1ESS-101 CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C170	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C171	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C172	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C175	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C176	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C177	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C180	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C181	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
C182	WIMA MKS/2/63/0,1UF/5% CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930	
	WIMA MKS/2/63/0,1UF/5%				

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C185	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C186	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C187	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C190	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C191	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C192	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C195	CE 220UF+-20%16V10RDX10 ELEKTROLYTIC CAPACITOR NATIONAL ECE-A1CSS-221	803.0850	
C196	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C197	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-A1ESS-101	803.0580	
C198	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C199	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C200	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C201	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C202	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C205	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C210	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C211	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C212	CC 1,5NF+-10%4X5R2000 CAPACITOR VALVO 2222 63051 152	CC 087.7048	
C214	CC 1,5NF+-10%4X5R2000 CAPACITOR VALVO 2222 63051 152	CC 087.7048	

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		06	0487	ED NKL-MESSER ACP METER	803.7832.01 SA	6
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in		
C220	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR	358.6062				
C221	NCC SRE 22UF/16V+-20% CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930				
C222	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR	358.6062				
C223	NCC SRE 22UF/16V+-20% CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930				
C230	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR	358				
C240	NCC SRE 22UF/16V+-20% CC 100PF+- 5%100V NPO VIE CERAMIC CAPACITOR					
C242	UNIONCARB C052C101J2G1CA CK 470NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,4-					
C250	CC 3,3NF+-10%6X7R200P CAPACITOR VALVO 2222 A					
C251	CC 3,3NF+-10%6X CAPACITOR VALVO					
C255	CE 100UF+					

C285

C286

C287

D10

MATSC

CC 10NF-
CAPACITOR
VALVO

CC 10NF-20+5
CAPACITOR
VALVO 2222

BL SP8605BDG 2:1DI.
DIVIDER
PLESSEY SP8605BDG



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D30	BL CA3199E 4:1 DIVIDER DIVIDER RCA CA3199E	372.1106	
D35	BL MC12040L PLL-PHASE-DET PHASE FREQUENCY DETECTOR MOTOROLA MC12040L	BL 302.5877	
D36	BL MC10116L 3XL. RECEIV LINE RECEIVER MOTOROLA MC10116L	BL 282.3275	
D165	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE	BL 565.3080	
D175	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE	BL 565.3080	
D185	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE	BL 565.3080	
D195	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE	BL 565.3080	
D205	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726	
D206	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726	
E110	BM TFM2 MIXER 1.0GHZ MIXER MCL TFM-2	BM 302.6080	
E160	ER 455KHZ-BANDP.KER.B:3K 455MHZ-BANDPASS, CER., BW3K MURATA CFK455J-A SELEKTIERT	803.0844	
K100	SN HF-RELAIS 12V 1XUM RELAY SDS RF1E-12V	803.0821	
K120	SN HF-RELAIS 12V 1XUM RELAY SDS RF1E-12V	803.0821	
K121	SN HF-RELAIS 12V 1XUM RELAY SDS RF1E-12V	803.0821	
L1	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44	LD 026.4184	
L5	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44	LD 026.4184	
L60	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44	LD 026.4184	
L65	LL INDUKTIVITAET INDUCTOR	803.8080	

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Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in
L70	LD 12,0UH10X2,700HMO,160A CHOKE DELEVAN DROSSEL1025-46		LD 067.2992	
L71	LD SPULE COIL		803.8100	
L73	LD 12,0UH10X2,700HMO,160A CHOKE DELEVAN DROSSEL1025-46		LD 067.2992	
L74	LD SPULE COIL		803.8100	
L80	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44		LD 026.4184	
L90	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44		LD 026.4184	
L105	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44		LD 026.4184	
L106	LD 0,047 UH 10X CHOKE INDUSTRIA BAUREIHE1025,0,047		249.5995	
L107	LD 0,047 UH 10X CHOKE INDUSTRIA BAUREIHE1025,0,047		249.5995	
L108	LD 0,047 UH 10X CHOKE INDUSTRIA BAUREIHE1025,0,047		249.5995	
L109	LD 0,047 UH 10X CHOKE INDUSTRIA BAUREIHE1025,0,047		249.5995	
L115	LD 10,0UH10X3,300HMO,144A CHOKE DELEVAN DROSSEL1025-44		LD 026.4184	
L120	LD 0,10UH10X0,080HM1,400A CHOKE DELEVAN DROSSEL1025-94		LD 067.2740	
L121	LD 0,15UH10X0,100HM1,230A CHOKE DELEVAN DROSSEL1025-00		LD 067.2763	
L122	LD 0,10UH10X0,080HM1,400A CHOKE DELEVAN DROSSEL1025-94		LD 067.2740	
L125	LD 0,12UH10X0,090HM1,300A CHOKE DELEVAN DROSSEL1025-96		LD 067.2757	
L126	LD 0,12UH10X0,090HM1,300A CHOKE DELEVAN DROSSEL1025-96		LD 067.2757	
L127	LD 0,12UH10X0,090HM1,300A CHOKE DELEVAN DROSSEL1025-96		LD 067.2757	
L213	LD 100 UH10X8,000HMO,084A CHOKE DELEVAN DROSSEL1025-68		LD 067.3101	

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L214	LD 100 UH10%8,000HMO,084A CHOKE	LD 067.3101	
L285	DELEVAN DROSSEL1025-68 LD 0,10UH10%0,080HM1,400A CHOKE DELEVAN DROSSEL1025-94	LD 067.2740	
N1	BM OM345 ANTENNEN-VERST ANTENNA AMPLIFIER VALVO OM345	BM 285.1596	
N5	BM OM345 ANTENNEN-VERST ANTENNA AMPLIFIER VALVO OM345	BM 285.1596	
N60	BO SE5534AFE LOW N.OPAMP OPERATIONAL AMPLIFIER SIGNETICS SE5534AFE	301.3335	
N90	BM OM350 ANTENNEN-VERST ANTENNA AMPLIFIER VALVO OM350	BM 334.4953	
N105	BM OM361A ANTENNEN-VERST ANTENNA AMPLIFIER VALVO OM361A	BM 334.5314	
N115	BM OM350R SPEZ. BB.AMPL BROADBAND AMPLIFIER VALVO OM350R SPEZ.	803.0838	
N165	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521	
N175	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N185	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N195	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N215	BO MC1595L MULTIPLIER MULTIPLIER MOTOROLA MC1595L	BO 451.4365	
N230	BO CA1558E 2X OPAMP OPERATIONAL AMPLIFIER RCA CA1558E	BO 083.5570	
N240	BO LM308AH PREC. OPAMP OPERATIONAL AMPLIFIER MOTOROLA LM308AH	BO 257.4788	
N250	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER NSC LF411CN	349.3058	
N280	BO UA7905UC - 5V1A0 VREGL VOLTAGE REGULATOR FAIRCHILD UA7905UC	BO 282.5449	
P2	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542	



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BIS/T0 P18			
R1	RG 42,2 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 42,20HM2% TK	RG 006.8790	
R2	RG 42,2 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 42,20HM2% TK	RG 006.8790	
R3	RG 42,2 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 42,20HM2% TK	RG 006.8790	
R4	RL 0,35W 130 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/130OHM-F-D	RL 082.9888	
R5	RG 56,2 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 56,20HM1% TK	RG 006.8826	
R6	RG 21,5 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 21,50HM2% TK	RG 006.8726	
R7	RG 56,2 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 56,20HM1% TK	RG 006.8826	
R8	RL 0,35W 130 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/130OHM-F-D	RL 082.9888	
R10	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 100OHM1% TK	RG 006.8884	
R11	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 100OHM1% TK	RG 006.8884	
R12	RG 56,2 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 56,20HM1% TK	RG 006.8826	
R13	RL 0,35W 432 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/432OHM-F-D	RL 083.0355	
R14	RL 0,35W 432 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/432OHM-F-D	RL 083.0355	
R35	RL 0,35W 536 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/536OHM-F-D	RL 083.0449	
R36	RL 0,35W 49,9 OHM+-1%TK50 RESISTOR RESISTA MK2	RL 082.9520	
R40	RG 511 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 511OHM1% TK	RG 006.9051	
R41	RG 511 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 511OHM1% TK	RG 006.9051	
R43	RG 511 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 511OHM1% TK	RG 006.9051	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R44	RG 511 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 511OHM1% TK	RG 006.9051	
R50	RG 51,1 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 51,1 OHM1%	RG 006.8810	
R51	RG 750 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 750OHM1% TK	RG 006.9097	
R52	RS 0,5W200 OHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F-1-201	RS 087.7554	
R53	RG 750 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 750OHM1% TK	RG 006.9097	
R54	RG 51,1 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 51,1 OHM1%	RG 006.8810	
R55	RG 90,9 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 90,0OHM1% TK	RG 006.8878	
R56	RG 90,9 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 90,0OHM1% TK	RG 006.8878	
R57	RG 619 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 619OHM1% TK	RG 006.9074	
R58	RG 619 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 619OHM1% TK	RG 006.9074	
R59	RG 619 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 619OHM1% TK	RG 006.9074	
R60	RG 619 OHM+-1%TK100 1206 CHIP RESISTOR DRALORIC CGB3216 619OHM1% TK	RG 006.9074	
R61	RL 0,35W 2,87KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,87K-F-D	RL 083.0949	
R62	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R63	RL 0,35W 2,87KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,87K-F-D	RL 083.0949	
R64	RL 0,35W 316 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/316OHM-F-D	RL 083.0232	
R67	RL 0,35W 75,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/75OHM-F-D	RL 082.9665	
R68	RL 0,35W 75,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/75OHM-F-D	RL 082.9665	
R75	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	

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		06 0487		803.7832.01 SA	12
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in	
R76	RL 0,35W 2,67KOHM+-1%TK50 RESISTOR	RL 083.0910			
R77	DRALORIC SMA0207/2,67K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160			
R78	DRALORIC SMA0207/1K-F-C RS 0,5W500 OHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F-1-501	RS 247.7878			
R79	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR	RL 082.9571			
R80	DRALORIC SMA0207/56,2OHM-F-D RL 0,35W 562 OHM+-1%TK50 RESISTOR	RL 083.0461			
R90	DRALORIC SMA0207/562OHM-F-D RG 42,2 OHM+-2%TK200 1206 CHIP RESISTOR	RG 006.8790			
R91	DRALORIC CGB3216 42,2OHM2% TK RG 46,4 OHM+-2%TK200 1206 CHIP RESISTOR	RG 006.8803			
R92	DRALORIC CGB3216 46,4OHM2% TK RG 42,2 OHM+-2%TK200 1206 CHIP RESISTOR	RG 006.8790			
R93	DRALORIC CGB3216 42,2OHM2% TK RL 0,35W 130 OHM+-1%TK50 RESISTOR	RL 082.9888			
R100	DRALORIC SMA0207/130OHM-F-D RG 162 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8932			
R101	DRALORIC CGB3216 162OHM1% TK RG 90,9 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8878			
R102	DRALORIC CGB3216 90,0OHM1% TK RG 162 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8932			
R103	DRALORIC CGB3216 162OHM1% TK RL 0,35W 127 OHM+-1%TK50 RESISTOR	RL 082.9871			
R105	DRALORIC SMA0207/127OHM-F-D RL 0,35W 130 OHM+-1%TK50 RESISTOR	RL 082.9888			
R110	DRALORIC SMA0207/130OHM-F-D RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884			
R111	DRALORIC CGB3216 100OHM1% TK RG 61,9 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8832			
R112	DRALORIC CGB3216 61,9OHM1% TK RG 100 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.8884			
R115	DRALORIC CGB3216 100OHM1% TK RL 0,35W 130 OHM+-1%TK50 RESISTOR	RL 082.9888			
R125	DRALORIC SMA0207/130OHM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297			
	DRALORIC SMA0207/10K-F-D				

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R130	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R135	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
R155	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410	
R156	RL 0,35W 169 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/169K-F-C	RL 083.2164	
R157	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R158	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926	
R159	RL 0,35W 402 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/402OHM-F-D	RL 083.0326	
R160	RL 0,35W 1,87KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,87K-F-D	RL 083.0790	
R161	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826	
R165	RL 0,35W 215 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/215OHM-F-D	RL 083.0078	
R166	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R170	RL 0,35W 2,15KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,15K-F-D	RL 083.0855	
R171	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R175	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R176	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R180	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R181	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R185	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R186	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R190	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R191	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R195	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R196	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R200	RL 0,35W 2,26KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,26K-F-D	RL 083.0861	
R201	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R210	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410	
R211	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410	
R215	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R216	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R217	RL 0,35W 10,7KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10,7K-F-D	RL 083.1316	
R218	RL 0,35W 10,7KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10,7K-F-D	RL 083.1316	
R219	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R220	RL 0,35W 3,65KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,65K-F-C	RL 082.2260	
R221	RL 0,35W 4,02KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,02K-F-D	RL 083.1045	
R222	RS 0,5W100 OHM+-10%10X10X CERMET POTENTIOMETER BOURNS 3386X-1-101	RS 247.7932	
R223	RL 0,35W 4,02KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,02K-F-D	RL 083.1045	
R230	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R231	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R232	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826	
R233	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R234	RL 0,35W 21,0KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/21,0K-F-C	RL 083.1539	
R235	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R240	RL 0,35W 40,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/40,2K-F-C	RL 083.1751	
R241	RL 0,35W 40,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/40,2K-F-C	RL 083.1751	
R242	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R243	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R244	RL 0,35W 200KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/200K-F-D	RL 083.2235	
R250	RL 0,35W 200KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/200K-F-D	RL 083.2235	
R251	RL 0,35W 200KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/200K-F-D	RL 083.2235	
R252	RL 0,35W 200KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/200K-F-D	RL 083.2235	
R255	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R260	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R265	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410	
R270	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R271	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410	
R272	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
V55	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX	AK 010.3777	



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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
V56	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX	AK 010.3777	
V66	AE BB405B 11/ 2PF CDI TUNING DIODE VALVO BB405B	AE 596.6839	
V70	AK BFR96 NPN 15V 75MA TRANSISTOR VALVO BFR96	AK 093.2738	
V75	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	
V125	AE BZX79/C20 0,5W Z-DI ZENER DIODE VALVO BZX79/C20	AE 012.2584	
V126	AK BC337-40 NPN 45V 800MA TRANSISTOR INTERMETAL BC337-40	303.9524	
V127	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V130	AE BZX79/C20 0,5W Z-DI ZENER DIODE VALVO BZX79/C20	AE 012.2584	
V131	AK BC337-40 NPN 45V 800MA TRANSISTOR INTERMETAL BC337-40	303.9524	
V132	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V135	AE BZX79/C20 0,5W Z-DI ZENER DIODE VALVO BZX79/C20	AE 012.2584	
V136	AK BC337-40 NPN 45V 800MA TRANSISTOR INTERMETAL BC337-40	303.9524	
V137	AD BAY71 35V 0,12A UDI DIODE THOMSON BAY71	012.0575	
V138	AD FD700 20V 0,05A UDI DIODE FAIRCHILD FD700	AD 012.0500	
V155	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	
V206	AD BAY71 35V 0,12A UDI DIODE THOMSON BAY71	012.0575	
V270	AE BZX79/C9V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C9V1	AE 012.2503	
W1	DX KABEL W1 CABLE	803.8097	
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT PANDUIT 100-064-033/999	FP 084.6470	

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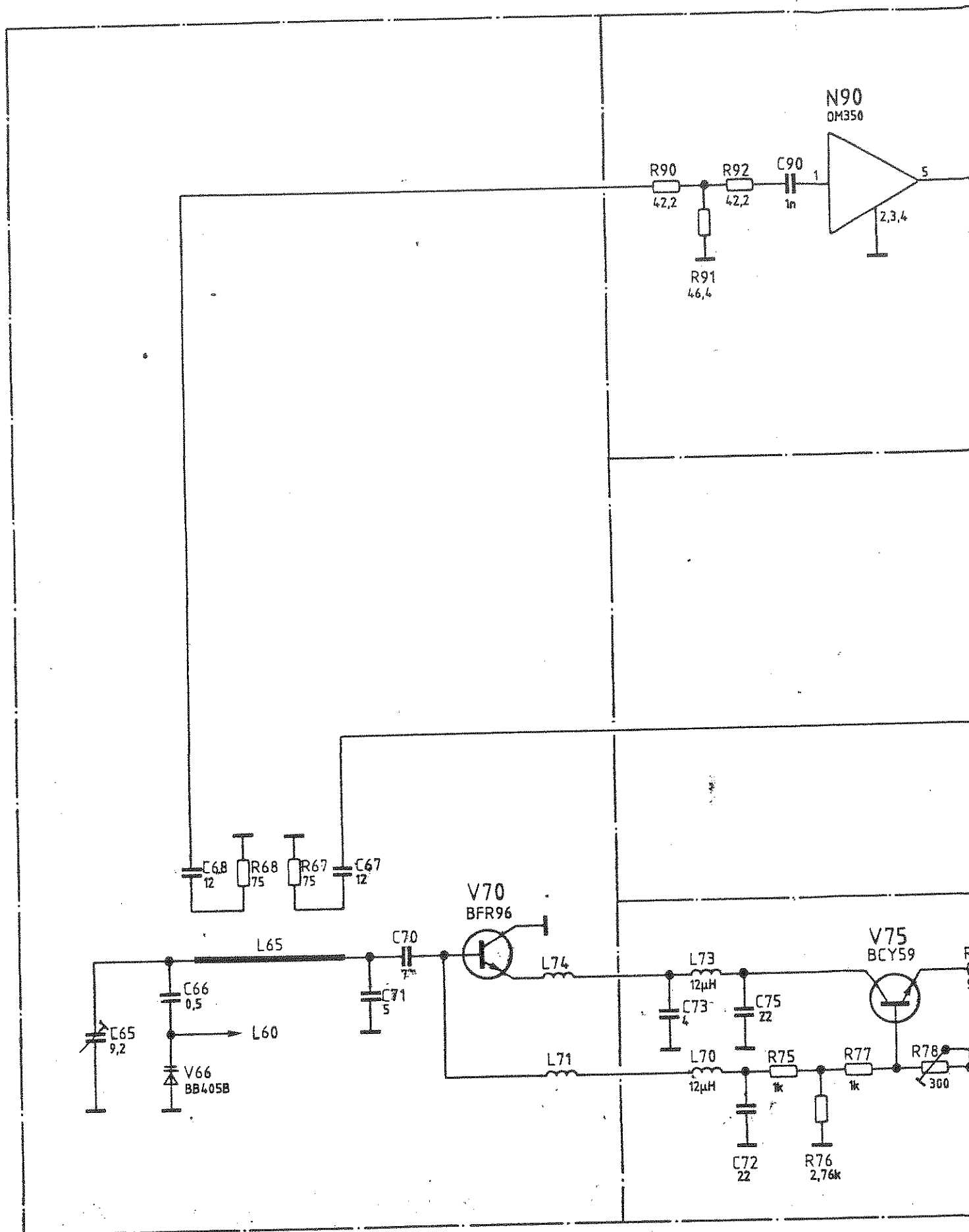
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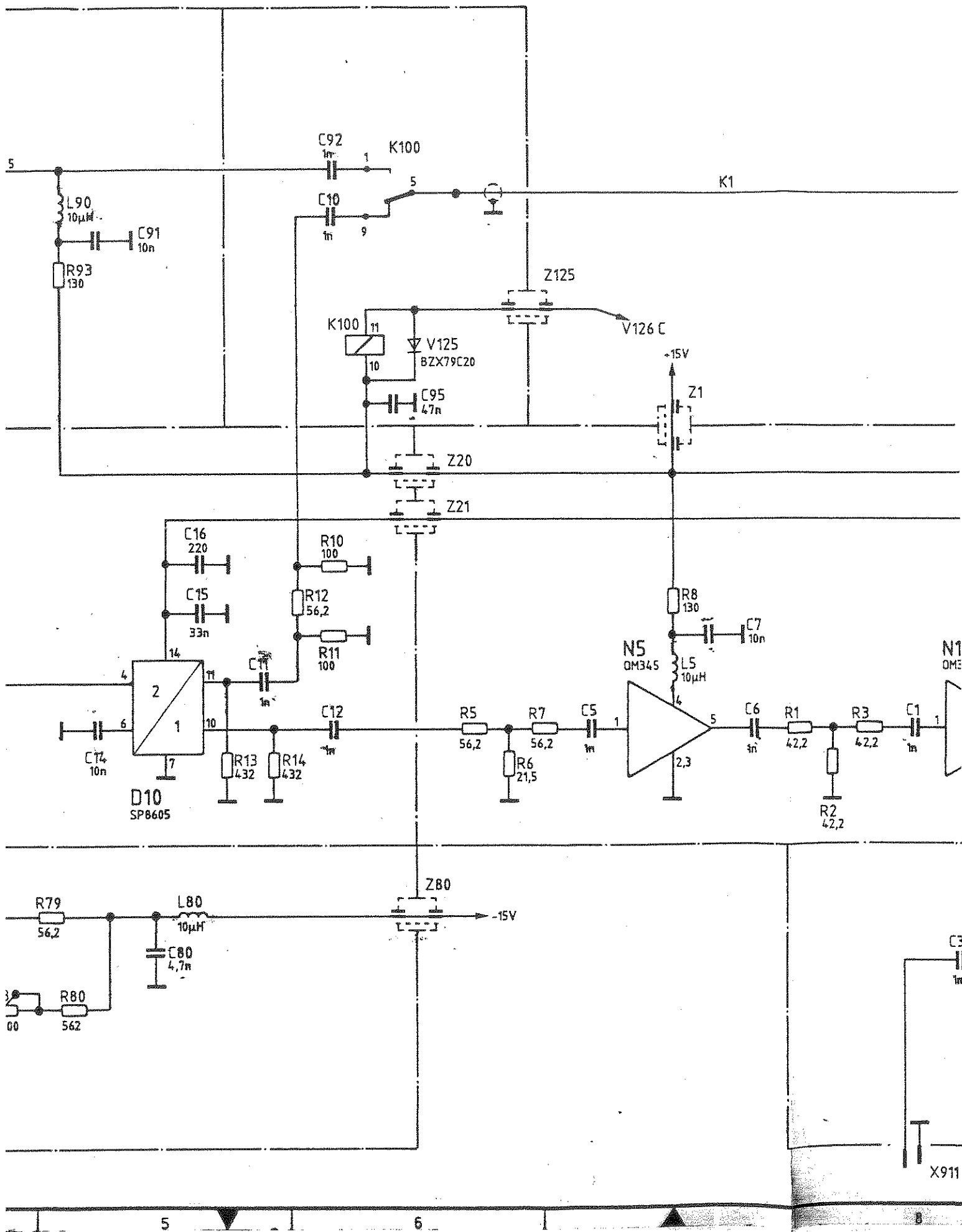
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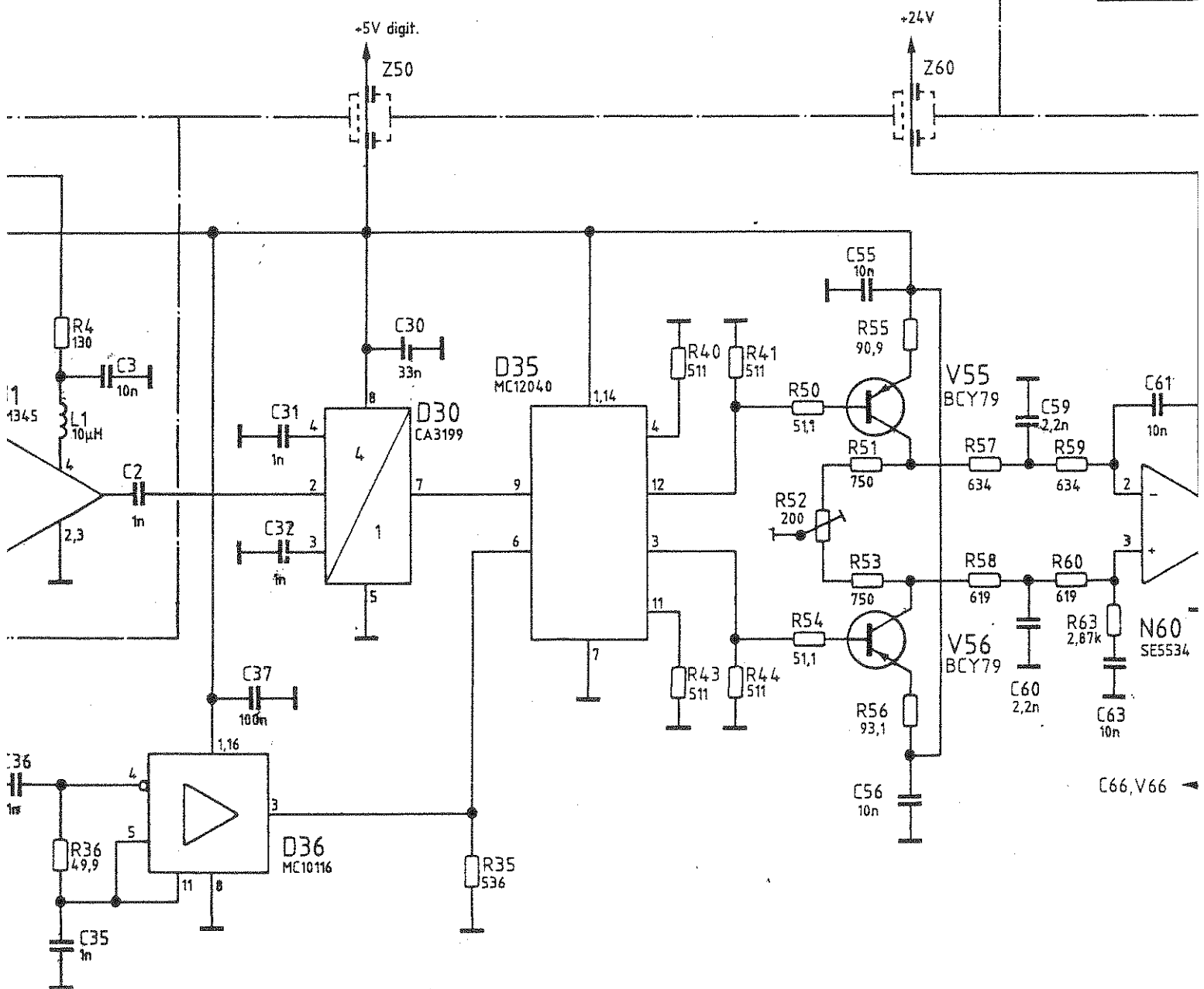
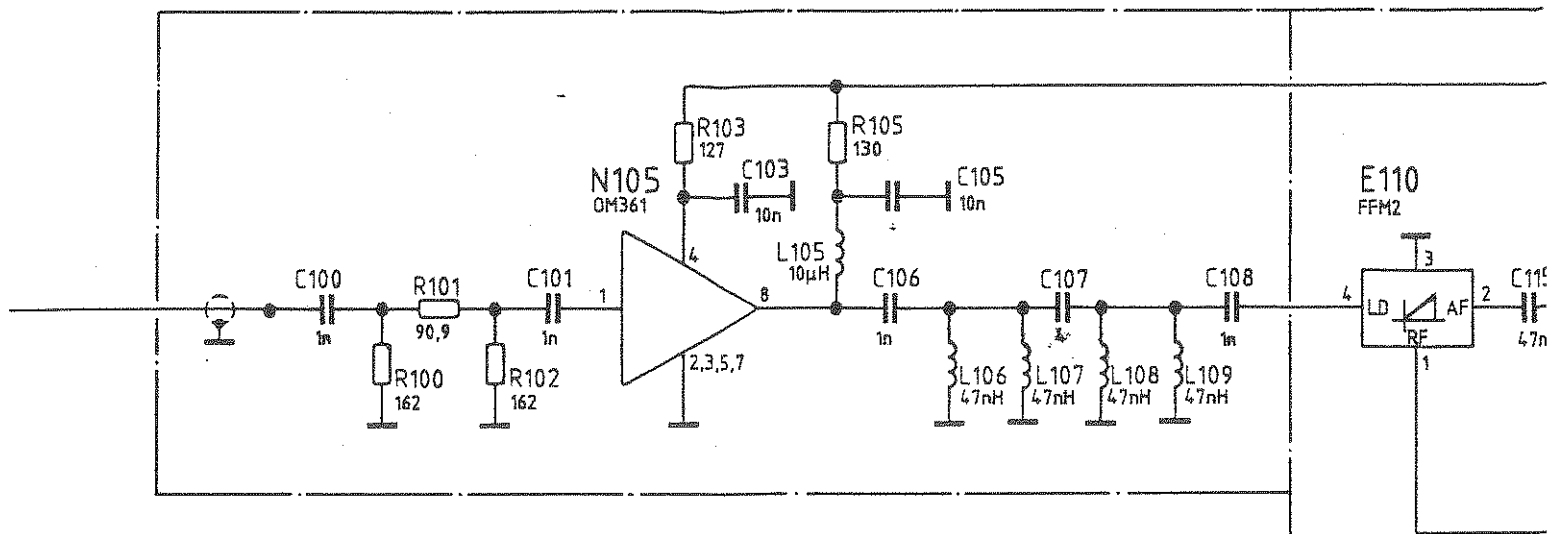
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Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

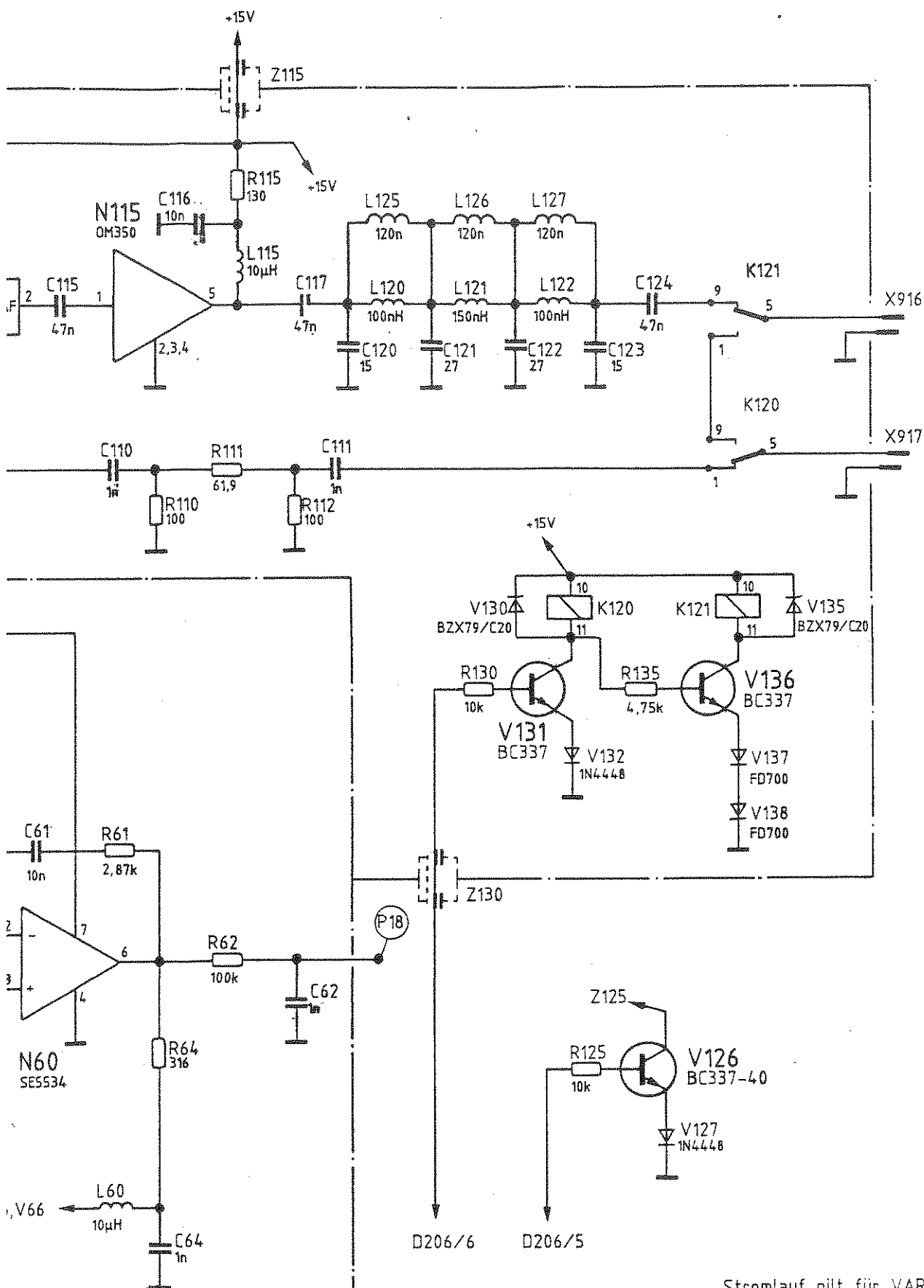
X911	FJ EINBAUSTECKER SYST.SMB ANGLE CONNECTOR ROSENBERG R&S-ZCHNG.602.8804	FJ 602.8804	
X916	FJ EINBAUSTECKER SYST.SMB ANGLE CONNECTOR ROSENBERG R&S-ZCHNG.602.8804	FJ 602.8804	
X917	FJ EINBAUSTECKER SYST.SMB ANGLE CONNECTOR ROSENBERG R&S-ZCHNG.602.8804	FJ 602.8804	
X918	FJ EINBAUSTECKER SYST.SMB ANGLE CONNECTOR ROSENBERG R&S-ZCHNG.602.8804	FJ 602.8804	
Z1	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z20	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z21	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z50	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z60	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z80	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z115	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z125	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
Z130	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	

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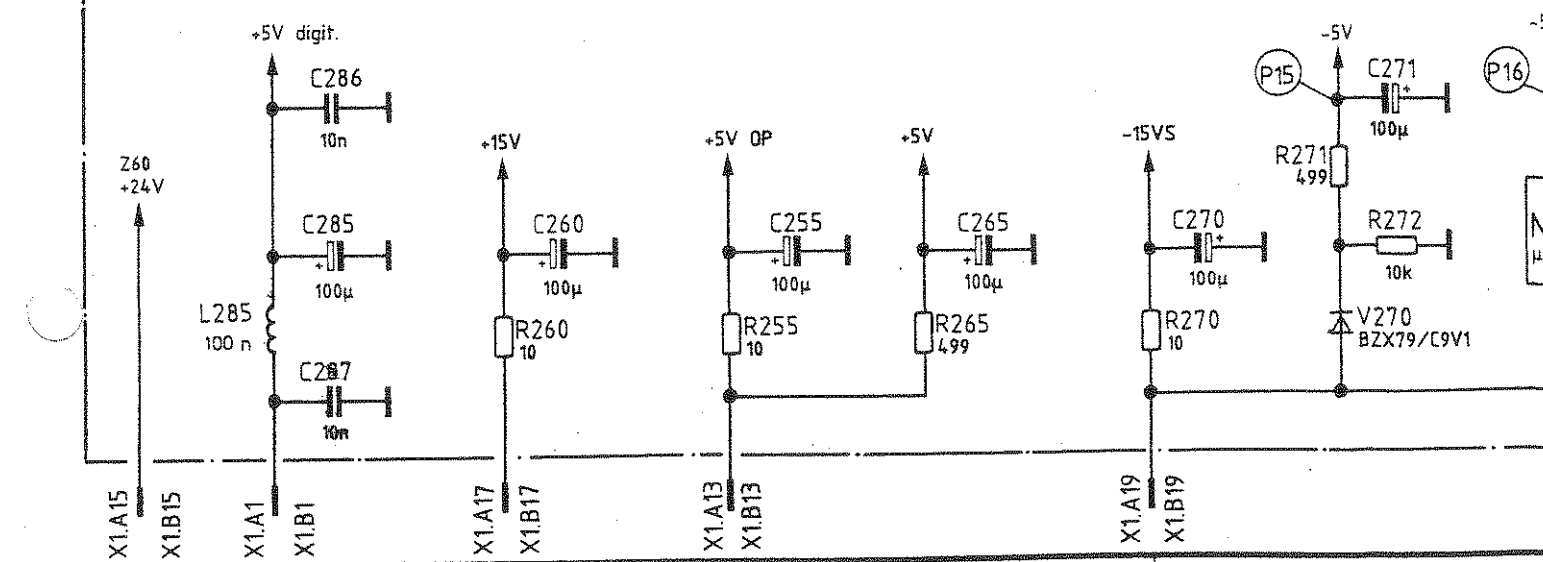
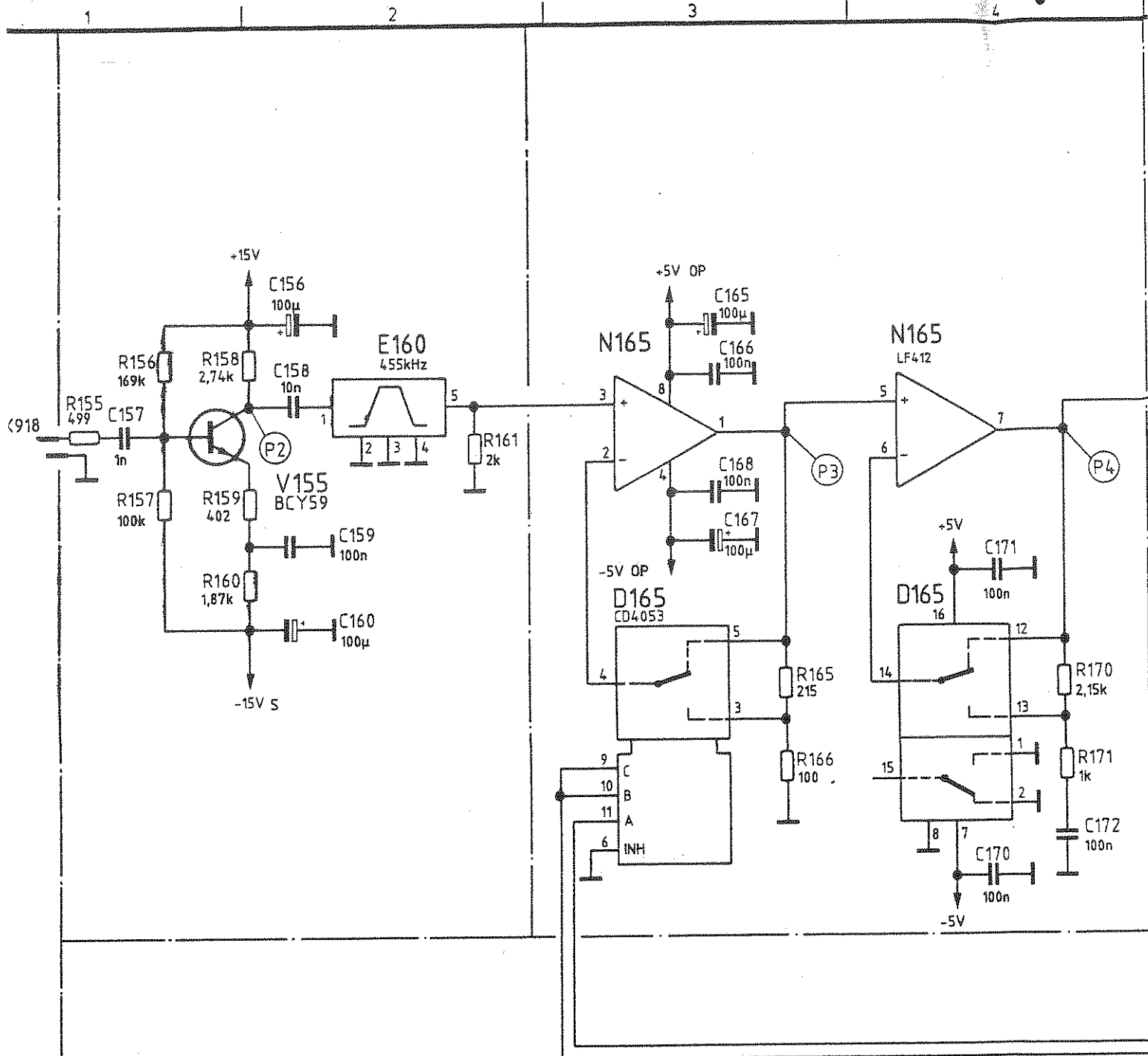


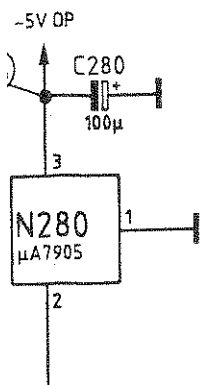
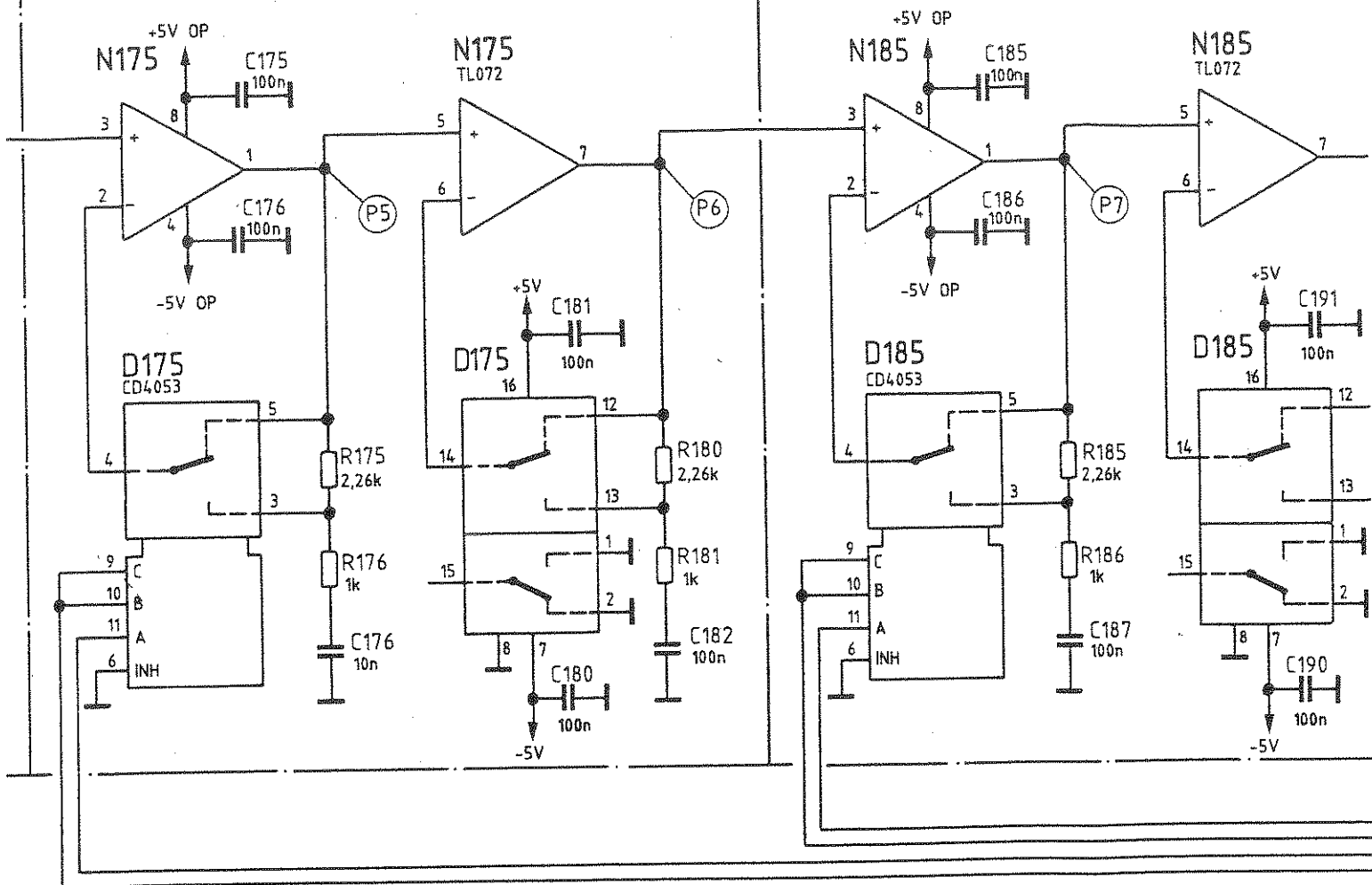


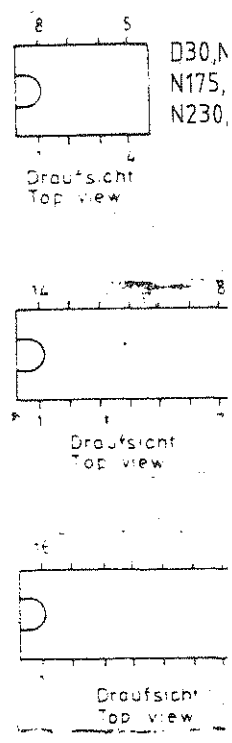
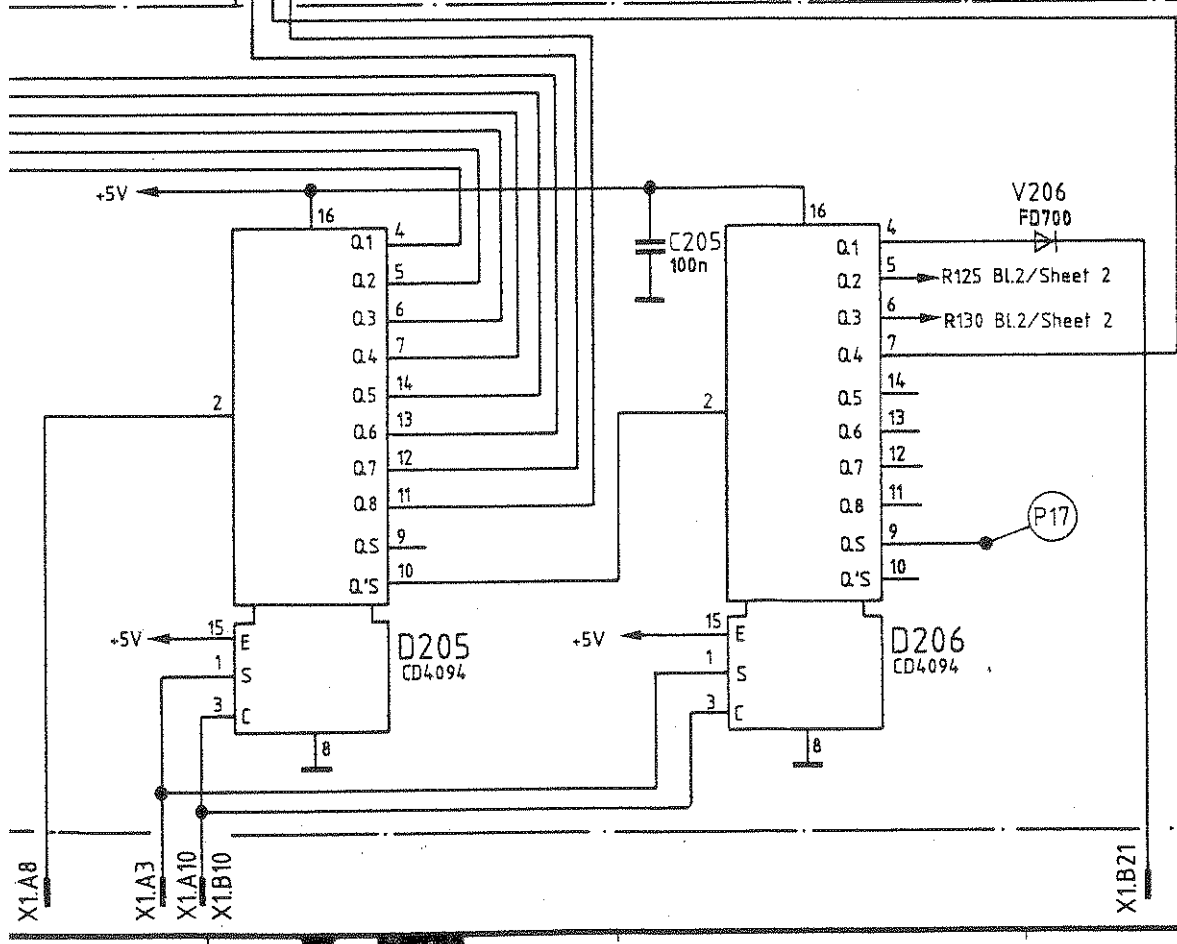
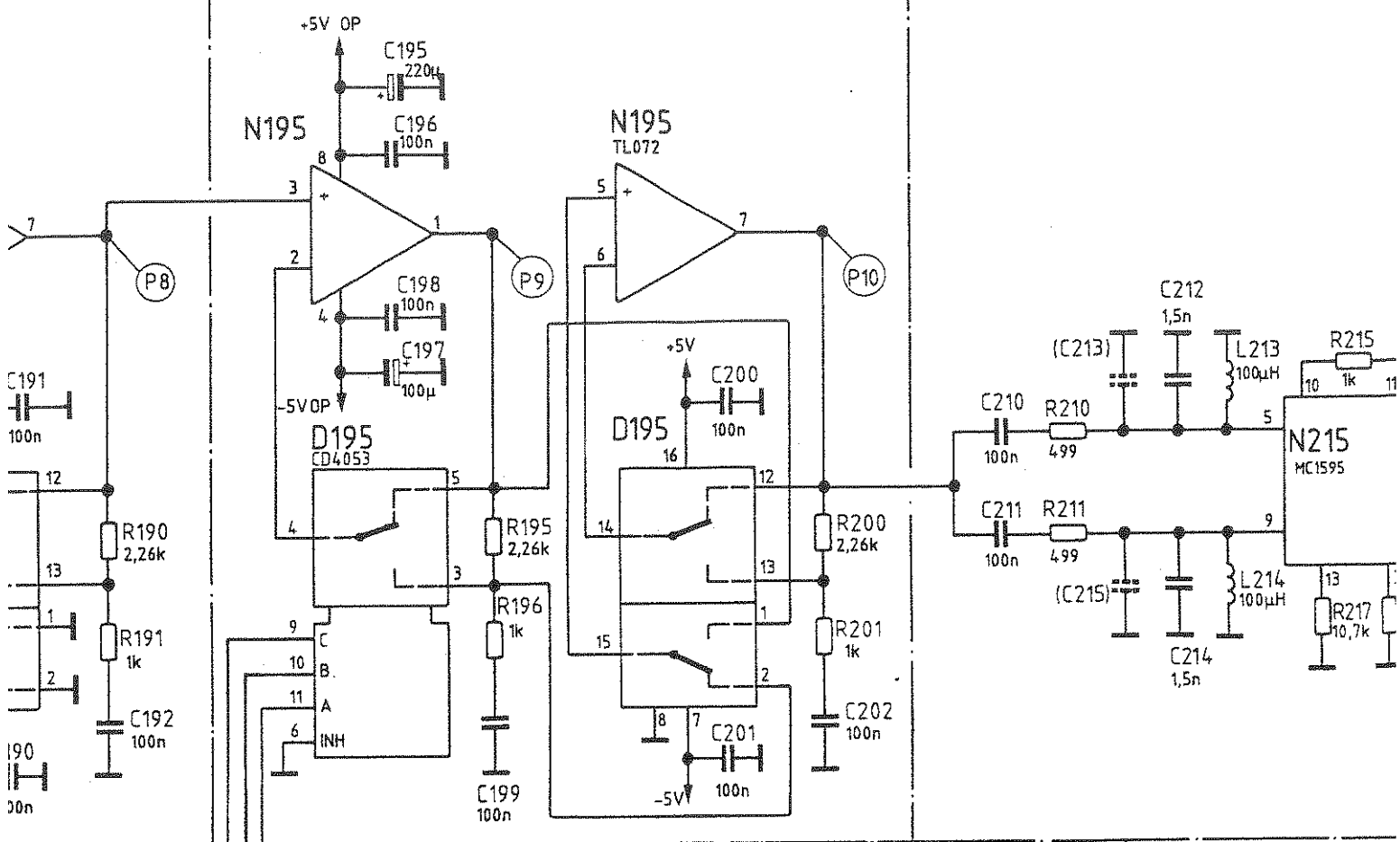


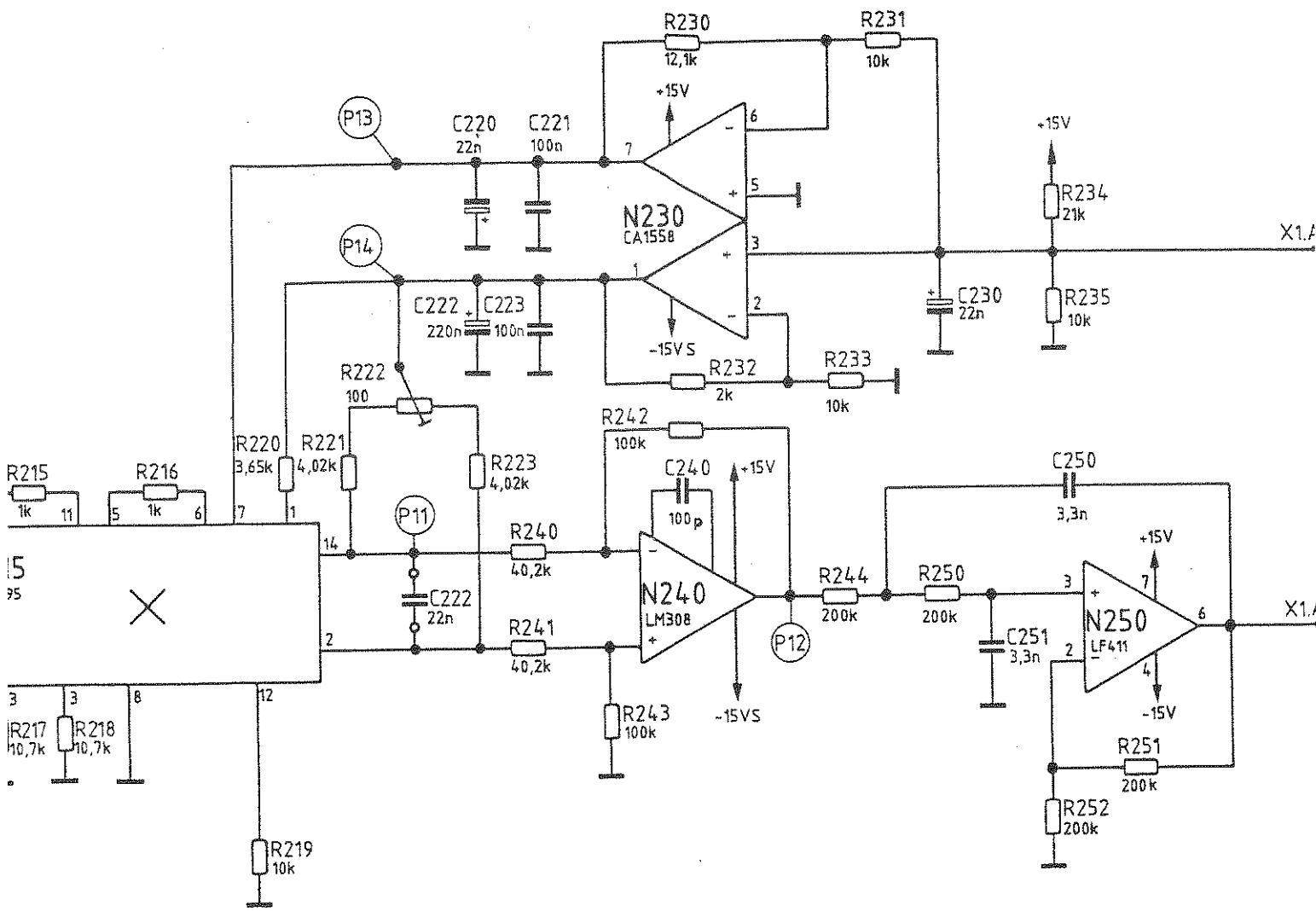
Stromlauf gilt für VAR 02
Circuit diagram is valid for model 02

	Stromlauf zu NK-Leistungsmesser Adjacent-channel power meter	Zeichn.-Nr. 803.7832 S	Blatt v
CMT-B6	reg. i. V. 803.7810 V erste Z 803.7810		

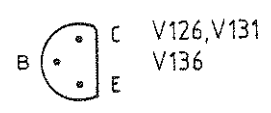
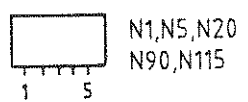




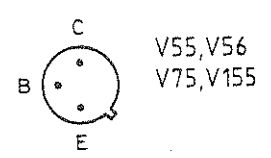
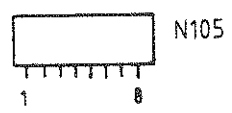




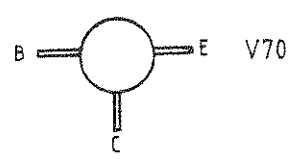
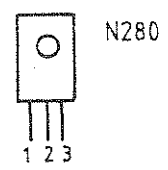
D30,N60,N165
N175,N185,N195
N230,N240,N280



D10,D35,N215
D165,D175,D185
D195,D205,D206



D36



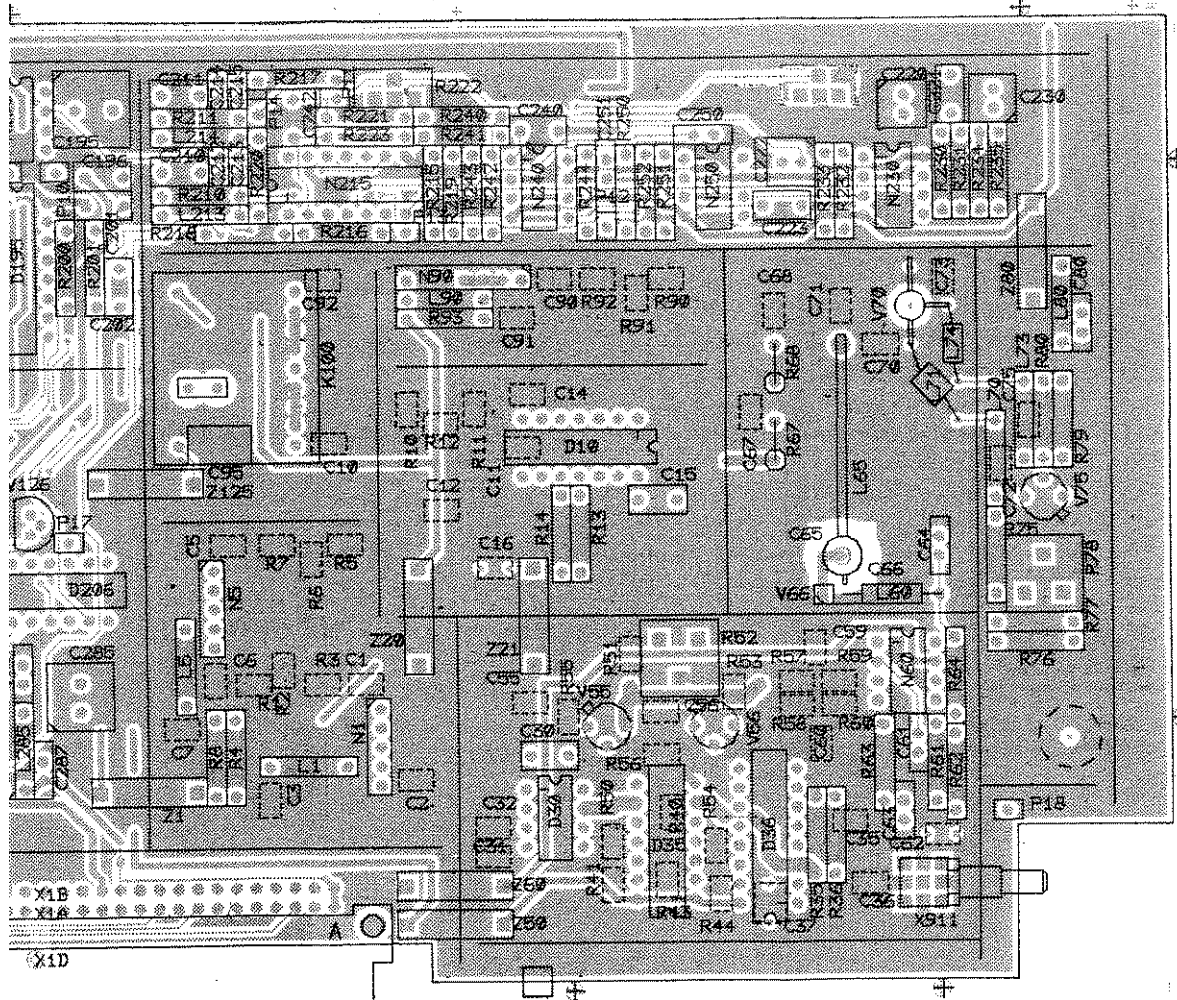
	Stromlauf zu NK-Leistungsmesser Adjacent-channel power meter	Z	Zeichn.-Nr. 803.7832 S
CMT-B6	reg. i. V. 803.7810 V	erste Z. 803.7810	

The logo of the DGVP is a stylized, abstract design. It features a central white shape that resembles a lowercase 'd' or a stylized figure, set against a dark, textured background. The overall shape is roughly triangular, with the 'd' shape filling most of the area.

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

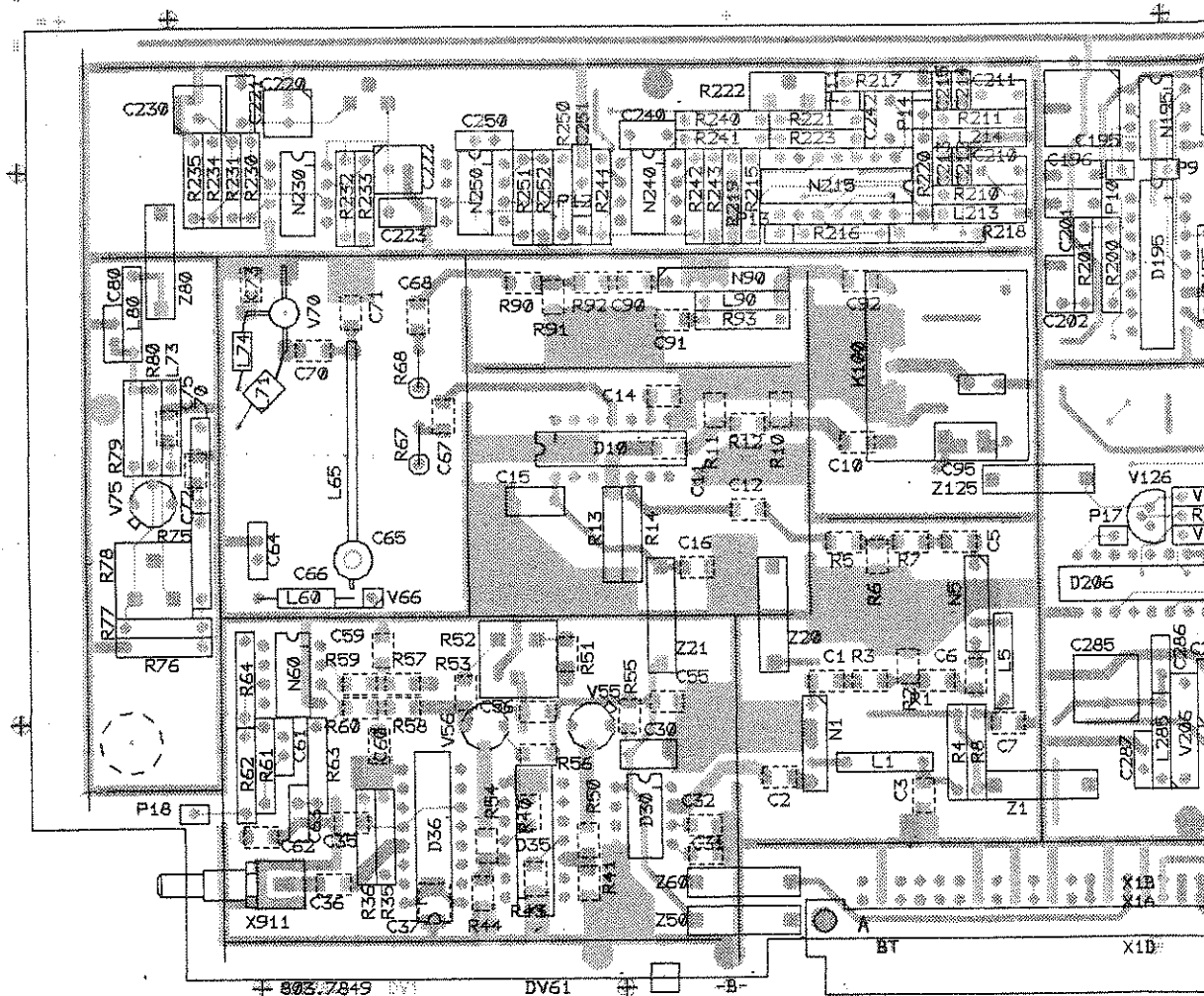
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

ngsführung Bauteilseite
component side



B	32914	12.85	BT	Maße ohne Toleranzangabe	Maßstab 1 : 1		Halbzeug, Werkstoff	
D	35531	11.86	BT					
E	35553	4.87	PR					
F	35553	4.87	PR					
H	38956	9.87	IB	1KSA	Tag	Name	Benennung NK - Leistungsmesser Adjacent-channel power meter	Z
				Bearb.	12.85	BT		
				Gepr.				
				Norm				
				</				

Ansicht und Leitungs View of tracks on soli



(hierzu HVC 350)



ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling

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ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Display/Keyboard Module

802.3662.00

Contents

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Circuit diagrams
Component layout diagrams

5.1 Function Description

The display/keyboard module consists of five units:

- + Key detection
- + Rotary pulse generator (spinwheel)
- + Display control
- + LED/illumination control
- + Loudspeaker amplifier

5.1.1 Key Detection

All keys on the front panel (except the STANDBY key) are combined into a matrix.

In the reset state, the columns (KQ0 to KQ9) are held Low (static) by a port of the main controller, the flip-flop D7.I being reset by a pulse on line RESKFF (active High).

The signal REPEAT (active High) is produced by ANDing (D6) when any key is pressed and leads to an interrupt of the main controller on the digital unit module (KEYINT, active High, edge-triggered). The number of the pressed key is determined by the software as follows:

- a) All column inputs KQ1 to KQ9 to High, KQ0 to Low.
If one of the row outputs KA0 to KA7 is Low, the pressed key is at position KQ0/KAx ($0 < x < 7$).
- b) Repetition of a).
For all columns (KQ1 to KQ9 in succession to Low).
- c) The value is only processed further if unequivocal pressing of a key has been detected; the interrupt is otherwise ignored (contact bounce or simultaneous pressing of several keys).
- d) The keyboard is activated again following key detection, i.e. all columns are set to Low and the flip-flop is reset.

Key debouncing is also handled by the software, i.e. the key detection routine only starts 20 ms after the interrupt has been generated (switch-on bounce) and resetting of flip-flop D7.I 20 ms after the signal REPEAT has dropped out (switch-off bounce).

5.1.2 Rotary Pulse Generator

The rotary pulse generator is a magnetic disk with 12 north and south poles, two permanent magnets for latching in and two Hall generators with associated logic to detect movements and directions (24 pulses per rotation).

When the spinwheel is rotated, two squarewave signals with a mark-to-space ratio of 1:1 are present at test points P6 and P7 offset in phase by 90 degrees. Each rising and falling edge at P7 generates an interrupt for the controller via D4.IV, D3.I, D3.II, D2.III, D4.I and D4.II (DREINT, active High, edge-triggered) provided that flip-flops D3.I and D3.II have been reset by pulse DRERES (active Low). The direction information provided by D1.I, D1.II, D2.I and D2.II is transferred by the reset pulse (DRERES) to flip-flop D5.I and is available at connection DREDIR (High corresponds to clockwise).

Evaluation sequence:

1. Reset rotary pulse generator (Low pulse at DRERES).
2. Second reset following interrupt by DREINT (High) + direction information available at DREDIR. Buffer counter (software) is incremented or decremented by main controller.
3. DREINT is enabled on the digital unit module.

5.1.3 Display Control

The LCDs are driven in multiplex mode by special drivers (D10 to D18). The multiplex depth is 4 (backplanes), the multiplex frequency approx. 200 Hz.

The drivers are in the basic status following the switch-on reset (>100 ms !) at connection RESET (active High), i.e. all LCD segments are dark. The drivers must first be initialized (COMMAND mode, LCDCD High) via the lines LCDSI (data, active High), LCDCK (clock, active Low) and LCDCD (command/data switchover). The internal memory of the drivers is then loaded with the contents of the display via the same lines (now in DATA mode) in the form of a 16-byte string. The line OPTPOL is used to synchronize the slower drivers with the main controller, i.e. this line becomes High following each byte and stops the processor until the data have been processed.

The individual drivers are selected by the shift registers D20 and D21 via the serial channel LCD-SEL (strobe) in conjunction with DO-L and CPS-L (data/clock).

All drivers are provided with a system clock of approx. 100 kHz (P5) from D18 via buffer D26.II/D26.III.

The display contrast depends on voltage V11 which is generated by V1/N1.I.

5.1.4 LED/Illumination Control

All LEDs (except the STANDBY LED) are controlled by shift registers D22, D23 and D24 via the serial channel LED (strobe) in conjunction with DO-L (data) and CPS-L (clock). Since LEDs of different luminosity are used, an additional driver (D25) is required for the green LEDs. The display illumination is controlled via a buffer (V2) and a delay element (R30/C30) in order to compensate for the PTC effect of the lamps.

5.1.5 Loudspeaker Amplifier

The AF to be amplified is coupled to X11.A8 at low impedance (impedance $\approx 0 \Omega$). The control circuit for N100.I is on the analog unit and is identical to the control of N100.II. The lamps are used at this point for dynamic compression because of their PTC effect. The complementary output stages V100/V101 or V104/V105 enable the high output currents which are required because of the low circuit impedance.

5.2 Testing and Adjustment

5.2.1 Key Detection

- Test:**
1. Apply Low to KQ0 to KQ9.
 2. The line REPEAT must become High when each key is pressed. If not: key faulty.
 3. After resetting the flip-flop D7.I (pulse >500 ns at connection RESKFF, active High), a High must be present at connection KEYINT following pressing of any key until the next reset. If not: D7.I faulty (or control lines).

Adjustment: none

5.2.2 Rotary Pulse Generator

Test: When moving the spinwheel, a squarewave voltage with a mark-to-space ratio of 1:1 and a frequency 12 x rpm/3600 Hz must be measured at test points P6 and P7 with a phase offset of 90 degrees. Deviations from TTL level at test points P6 and P7 indicate a fault in the Hall generator B1 or B2. The Hall generators are maladjusted if the phase offset varies greatly from 90 degrees.

After resetting flip-flops D3.I and D3.II (Low pulse at input DRERES >500 ns, TTL level), the interrupt output DREINT must assume a High level each time the spinwheel is moved and the direction of rotation (High with clockwise rotation) following reset of output DREDIR.

Adjustment: none

5.2.3 Display Control

Test: Correct operation of the display driver largely depends on the initialization and data transmission by the controller. It is therefore recommendable to carry out the test in the instrument using the firmware test aids (e.g. D 12 SPEC) (see Section 4).

Adjust-

ment: All drivers are supplied by D18 with a system clock of approx. 100 kHz (P5) via buffer D26.II/D26.III. Potentiometer R29 can be used to compensate for component tolerances. Since the write speed directly depends on this clock, R29 is set such that flickering of the display is just no longer visible (or set to 100 kHz at P5).

The display contrast depends on voltage V11 generated by V1/N1.I. The controller R26 can be used to optimally adjust the contrast (for the respective viewing angle, generally viewed below 30 degrees from above).

5.2.4 LED/Illumination Control

Test: All LCD segments and all LEDs must light up simultaneously when the instrument is switched on.

Adjustment: none

5.2.5 Loudspeaker Amplifier

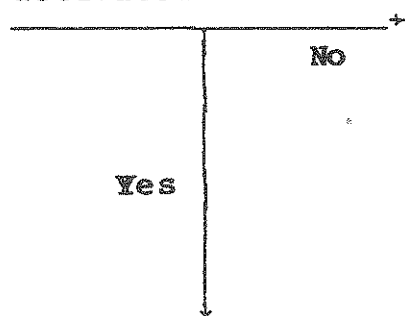
Test: Apply an AC voltage with 1 kHz/10 mV to 1 V to X11.A8 (AC coupling as result of bias of -7.5 V, internal resistance of source corresponding to lamp H 100 or 100 Ω as substitute).

Check the output signal depending on the position of the loudspeaker control and the input level using an oscilloscope or loudspeaker (AC coupling since a bias of -7.5 V!).

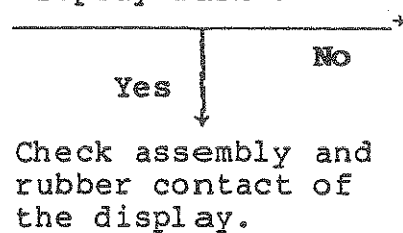
Adjustment: none

5.3 Troubleshooting

All segments
activated ?

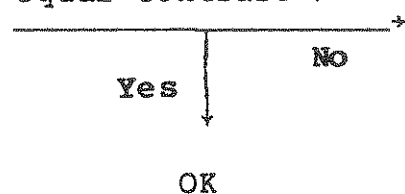


Large parts of a
display dark ?



Check solder
contacts on
LCD drivers.

All segments of
equal contrast ?



Check assembly and
rubber contact of
the display.



ROHDE & SCHWARZ
MÜNCHEN

Schalteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
A10	ED ANZEIGE / TASTATUR NUR VAR/ONLY MOD: 02 DISPLAY KEYBOARD	802.3662.02			
A10	ED ANZEIGE/TASTATUR NUR VAR/ONLY MOD: 06 DISPLAY KEYBOARD	802.3662.06			
B1	EL LAUTSPR.0,5W RD50 SPEAKER	803.0509	VALVO	AD 2099 Z25	
C1	CE 470UF+-20%25V12,5X12,5 ELECTROLYTIC CAPACITOR	803.0715	MATSUSHITA	ECE-A1ESS-471U	
W45	DX KABEL (W45) CABLE (W45)	803.0367			
					- ENDE -

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
	ZUGEH. STROML./CIRC.DIAGR. 802.3410S				
B1	BS UGN3020T HALL-EFF.SW. HALL-EFF.SWITCH	BS 336.4750	SPRAGUE	UGN-3020T	
B2	BS UGN3020T HALL-EFF.SW. HALL-EFF.SWITCH	BS 336.4750	SPRAGUE	UGN-3020T	
C1 ..8	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR	CC 022.0784	VALVO	2222 63051 102	
C10	CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930	WIMA	MKS/2/63/0,1UF/5%	
C11	CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930	WIMA	MKS/2/63/0,1UF/5%	
C12	CE 10 UF+-20%16V 7X 4X 8 ELECTROLYTIC CAPACITOR	CE 022.8085	ROEDERSTEI	ETR 2 10/16 20%	
C13	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR	358.6062	NCC	SRE 22UF/16V+-20%	
C30	CE 4,7UF+-20%10V 5X 4X 7 ELECTROLYTIC CAPACITOR	CE 022.8056	ROEDERSTEI	ETR 1 4,7/10 20%	
C100	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 099.8521	VITRAMON	VJ1206Y103KFA	
C101	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
C103	CC 100NF+-10% 50V5K1200 C CAPACITOR	CC 082.3473	VITRAMON	VJ1812Y104KFA	
C201 ..207	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
C220 ..226	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525	VALVO	2222 63051 64051103	
D1	BL SN74LS74AN 2/D-FLIPFL. IC FLIP-FLOP SN74LS74N	266.7934	TEXAS	SN74LS74N	
D2	BL SN74LS32N 4/2INP.OR IC OR GATE SN74LS32N	266.4687	TEXAS	SN74LS32N	
D3	BL SN74LS74AN 2/D-FLIPFL. IC FLIP-FLOP SN74LS74N	266.7934	TEXAS	SN74LS74N	
D4	BL SN74LS00N 4/2INP.NAND IC NAND GATE SN74LS00N	266.4641	TEXAS	SN74LS00N	
D5	BL SN74LS76AN 2/JK-MS-FLP IC FLIP FLOP SN74LS76N	266.2026	TEXAS	SN74LS76AN	
D6	BL CD4068BE 1X8IN.NANDG NAND GATE	BL 569.3161	RCA	CD4068BE	
D7	BL CD4013BE 2XD- FLIPFL FLIPFLOP	BL 086.7021	RCA	CD4013BE	
D8	ZM DREHIMPULSGEBER NUR VAR/ONLY MOD: 02 04 MOVING PULSE GENERATOR	EM 336.3348			
D10 ..16	BJ UPD7225G-00 LCD DRIV ALPHANUM.LCD CONTR/DRIVER	BJ 392.5320	NEC ELECTR	UPD7225G	
D17	BJ UPD7225G-00 LCD DRIV NUR VAR/ONLY MOD: 02 04 ALPHANUM.LCD CONTR/DRIVER	BJ 392.5320	NEC ELECTR	UPD7225G	
D18	BJ UPD7225G-00 LCD DRIV NUR VAR/ONLY MOD: 02 04 ALPHANUM.LCD CONTR/DRIVER	BJ 392.5320	NEC ELECTR	UPD7225G	
D20 ..24	BL CD4094BE 8BIT SH.REG SHIFT REGISTER	BL 586.7726	RCA	CD4094BE	
D25	BL SN7406N 6XINVERTER IC HEX INVERTER SN7406N	237.0487	TEXAS	SN7406N	
D26	BL CD4069UBE 6XINVERTER HEXINVERTER	BL 086.9999	RCA	CD40690BE	
H1 ..6	AF HLMP1503 LED GN RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 252.5570	GEN. INSTR.	HLMP1503-1503-18/19	
H7	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
H8	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
H9	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
H10	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
ROHDE & SCHWARZ		Alt Date	Sachteiliste für Parts list for		Blatt Page
		25.11.87	ED ANZEIGE / TASTATUR DISPLAY KEYBOARD		802.3662.01 SA 1+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
H11	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
H12	AF HLMP1700 LED RT RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9134	HP	HLMP1700	
H13	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H14	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H15	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 06 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H16	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 06 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H17	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 02 04 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
..21 H22	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 04 FUER VAR 04/FOR MOD 04 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H80	AF HLMP1719 LED GE RD3 NUR VAR/ONLY MOD: 06 LED	AF 099.9140	GEN.INSTR.	HLMP-1719	
H100	EF 6V 0,02A OHNE SOCKEL LAMP 6V	EF 803.0815	BUERKLIN	33 G112	
H101	EF 28V 24MIL.A DRAHTANS. LAMP	EF 455.2238	MGG	1280-00	
..106 H107	EF 28V 24MIL.A DRAHTANS. NUR VAR/ONLY MOD: 02 04 LAMP	EF 455.2238	MGG	1280-00	
H108	EF 28V 24MIL.A DRAHTANS. NUR VAR/ONLY MOD: 02 04 LAMP	EF 455.2238	MGG	1280-00	
N1	BO CA3240AE 2XMOS OPAMP OPERATIONAL AMPLIFIER	302.7040	RCA	CA3240AE	
N100	BO TLO72ACD 2XFET OPAMP FUER VAR 04/FOR MOD.04 ***** LF353 B0342.2291 FUER VAR 02/FOR MOD 02 OPERATIONAL AMPLIFIER	803.1057	TEXAS	TLO72ACD	
P1	BP LCD 10X 7SEGM.11MM TFL LC-DISPLAY	803.0521	VARITRONIX	R&S-ZCHNG.803.0521"D	
P2	BP LCD 4X 7SEGM.11MM TFL LC-DISPLAY	803.0515	VARITRONIX	LCD 4X	
P3	BP LCD 4X 7SEGM.11MM TFL LC-DISPLAY	803.0515	VARITRONIX	LCD 4X	
P4	BP LCD 4X 7SEGM.11MM TFL NUR VAR/ONLY MOD: 02 04 LC-DISPLAY	803.0515	VARITRONIX	LCD 4X	
P5	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
P6	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
P7	VL WIRE-WRAP PIN WIRE-WRAP PIN	VL 088.4542	BERG	NR. 75 403-003	
R1	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477	DRALORIC	SMA 0207/2,21K-F-C	
R2	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477	DRALORIC	SMA 0207/2,21K-F-C	
R3	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR	RL 083.1400	DRALORIC	SMA0207/15K-F-D	
R4	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR	RL 083.0990	DRALORIC	SMA0207/3,32K-F-D	
R5	RN 7X3,3KOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 291.4387	BOURNS	4308R-101-332	
R10	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	DRALORIC	SMA0207/10K-F-D	
..21 R22	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR	RL 083.1545	DRALORIC	SMA/207/22,1K-F-C	

ROHDE & SCHWARZ	AI	Datum Date	Schaltteilleiste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	25	1187	ED ANZEIGE / TASTATUR DISPLAY KEYBOARD	802.3662.01 SA	2+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in	
R23	RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	DRALORIC	SMAO207/100K-F-C		
R24	RL 0,35W 681 KOHM+-1%TK50 RESISTOR	RL 083.2735	DRALORIC	SMAO207/381K-F-C		
R25	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR	RL 083.1800	DRALORIC	SMA/207/47,5K-F-C		
R26	RS 0,5W5KOHM+-10%10X10X5 CERMET POTENTIOMETER T	RS 247.7890	BOURNS	3386F-1-502		
R27	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR	RL 082.2190	DRALORIC	SMAO207/5,62K-F-C		
R28	RL 0,35W 200KOHM+-1%TK50 RESISTOR	RL 083.2235	DRALORIC	SMAO207/200K-F-D		
R29	RS 0,5W200KOHM+-10%10X10X CERMET POTENTIOMETER T	RS 087.7590	BOURNS	3386F-1-204		
R30	RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	DRALORIC	SMAO207/100K-F-C		
R31	RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	DRALORIC	SMAO207/100K-F-C		
R40 ..44	RN 4X120 OHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 291.4470	BOURNS	4308R-102-121		
R45	RL 0,35W 121 OHM+-1%TK50 RESISTOR	RL 082.9859	DRALORIC	SMAO207/121OHM-F-D		
R46	RL 0,21W 1,00KOHM+-1%TK50 RESISTOR	RL 092.1444	RESISTA	MK1 1K00 1% TK50		
R47	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMAO207/1K-F-C		
R49 ..52	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMAO207/1K-F-C		
R53	RG 121 OHM+-1%TK100 1206 NUR VAR/ONLY MOD: 04 FUER VAR04/FOR MOD 04 CHIP RESISTOR	RG 006.8903	DALE	CRCW1206 121OHM F T		
R60 ..62	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMAO207/1K-F-C		
R100	RS POTENTIOMETER POTENTIOMETER	802.3704				
R101	RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	DRALORIC	SMAO207/1K-F-C		
R102	RL 0,35W 221 OHM+-1%TK50 RESISTOR	RL 083.0084	DRALORIC	SMAO207/221OHM-F-D		
R103	RG 215 OHM+-2%TK200 1206 TRIMMWERT/SELECTED CHIP RESISTOR	006.8961	DRALORIC	CGB3216 215OHM2% TK		
R104	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR	RG 006.7271	DALE	CRCW1206 1,0KOHM F T		
R105	RG 4,64KOHM+-2%TK200 1206 CHIP RESISTOR	007.0712	DRALORIC	CGB 3216 4,64KOHM 2%		
R106	RL 0,35W4,64KOHM+-1%TK50 RESISTOR	RL 082.1687	DRALORIC	SMAO207/4,64K-F-C		
S1 ..9	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S11	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S12	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S13	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S14	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S15	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S16 ..19	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S21	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S22	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S23	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
S24	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN		
ROHDE & SCHWARZ		Al	Datum Date	Schaltteilleiste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		25	1187	ED ANZEIGE / TASTATUR DISPLAY KEYBOARD	802.3662.01 SA	3+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
S25	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S26	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
..29					
S31	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S32	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S33	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S34	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S35	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S36	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S37	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S38	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S39	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S41	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
..45					
S46	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
..49					
S53	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S54	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S55	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S56	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S57	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S58	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S59	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S61	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S62	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 06 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S63	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S64	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S65	SB TASTER 1XA OHNE KNOPF PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S66	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
..69					
S75	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 04 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
..79					
S80	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 02 06 PUSHBUTTON SWITCH	SB 238.3850	SIEMENS	STB11 M.LED-LOECHERN	
S80	SB TASTER 1XA OHNE KNOPF NUR VAR/ONLY MOD: 04 PUSH BUTTON SWITCH	834.9020	SIEMENS	V42263-DOO11-A009	

ROHDE & SCHWARZ	AI	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	25	1187	ED ANZEIGE / TASTATUR DISPLAY KEYBOARD	802.3662.01 SA	4+

Kennz. Comp.No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
V1	AK BCY59IX · NPN 45V 200MA TRANSISTOR	AK 010.5163	SIEMENS	BCY59IX	
V2	AM 2N6659 NKAN 35V FET MOS-FET	AM 303.9324	SILICONIX	2N6659	
V4	AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	TEXAS INST	1N4448 GEGURTET	
V100	AK BC337-40 NPN 45V 800MA TRANSISTOR	303.9524	INTERMETAL	BC337-40	
V101	AK BC327-40 PNP 45V 800MA TRANSISTOR	303.9518	INTERMETAL	BC327-40	
V104	AK BC337-40 NPN 45V 800MA TRANSISTOR	303.9524	INTERMETAL	BC337-40	
V105	AK BC327-40 PNP 45V 800MA TRANSISTOR	303.9518	INTERMETAL	BC327-40	
X13	FR IC-FASSUNG 20POL.DIL SOCKET	FR 092.7142	PRECICONT	US020T	
X14	FP WINKELSTECKERLEIST.36P 3-POLIG/3 PINS	FP 243.3578	BERG	75168-113-36	
X14	ANGLE PIN CONNECTOR DX BUCHSENEINHEIT X14 NUR VAR/ONLY MOD: 04 CONNECTOR X14	834.9614			
X15	FM BUCHSENLEISTE 9P.W.WP. NUR VAR/ONLY MOD: 02 04 CONNECTOR	FM 614.3760	FCT	F 9S4	
X11A	FP WINKELSTECKERLEIST.36P 8-POLIG/8 PINS	FP 243.3578	BERG	75168-113-36	
X11B	ANGLE PIN CONNECTOR FP STECKERL.ABGEW.36-POL. 8-POLIG/8 PINS	FP 087.9105	BERG	75168-114-36	
X12A	ANGLE PIN CONNECTOR FP STECKERL.ABGEW.36-POL. 10-POLIG/10 PINS	FP 087.9105	BERG	75168-114-36	
X12B	ANGLE PIN CONNECTOR FP WINKELSTECKERLEIST.36P 10-POLIG/10 PINS	FP 243.3578	BERG	75168-113-36	
	ANGLE PIN CONNECTOR				
					- ENDE -
ROHDE & SCHWARZ		Äl Datum Date	Schaltteilleiste für Parts list for		Blatt Page
		25 1187	ED ANZEIGE / TASTATUR DISPLAY KEYBOARD		5-
		Sachnummer Stock Nr.		802.3662.01 SA	

Zuordnung Taste → Funktion
siehe Blatt 3

o) nur für VAR 06
only for model 06

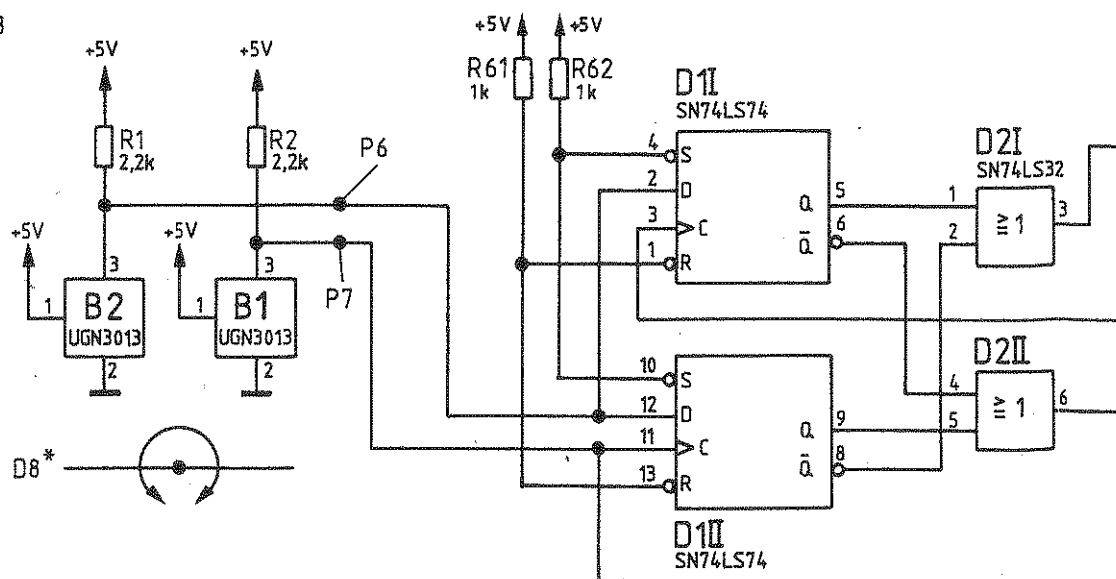
*) nicht für VAR 06
not for model 06

A10
802.3662

X12

KQ.9 B10
KQ.8 B9
KQ.7 B8
KQ.6 B7
KQ.5 B6
KQ.4 B5
KQ.3 B4
KQ.2 19
KQ.1 5
KQ.0 4
RESKFF 2

X13

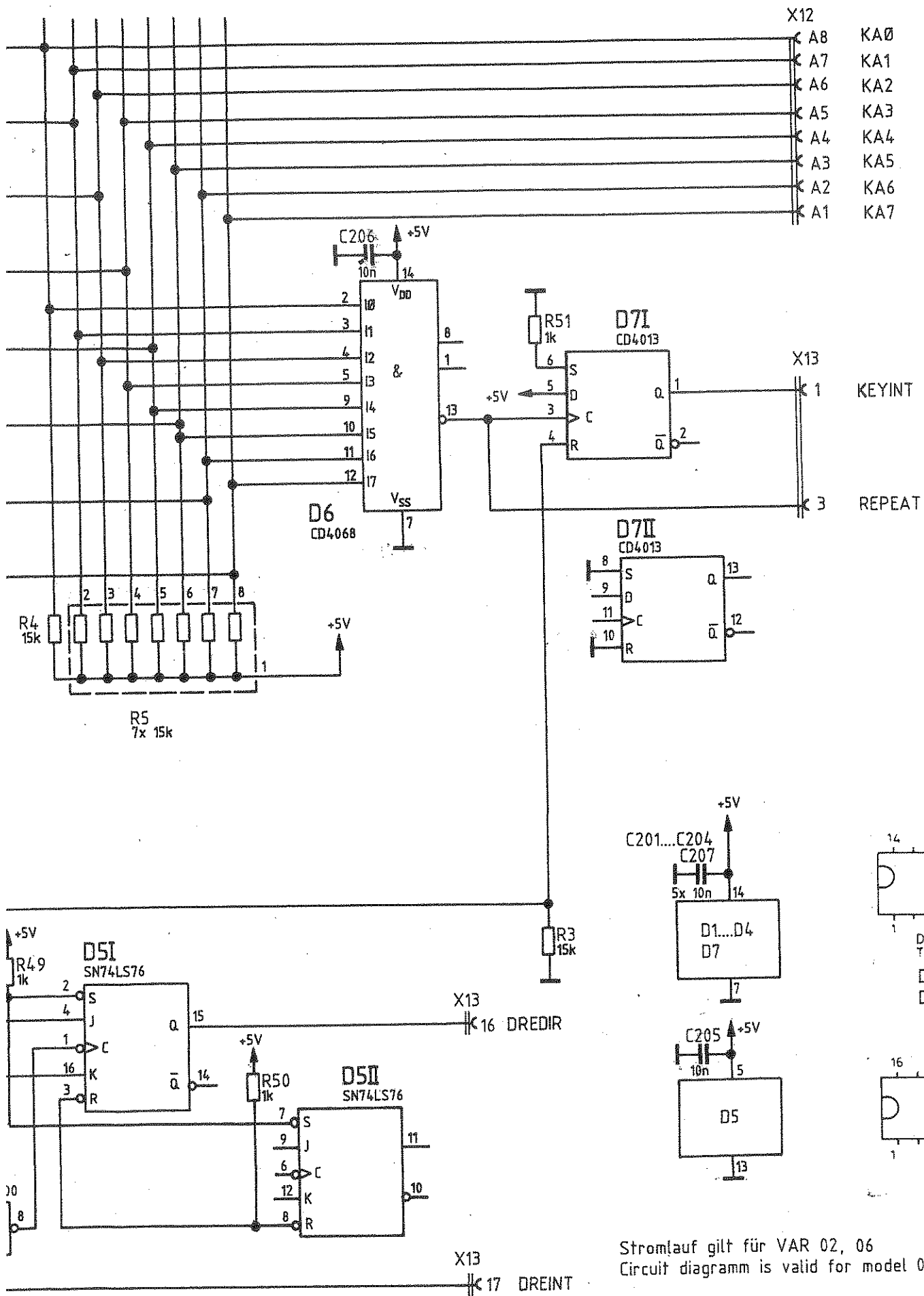



X13

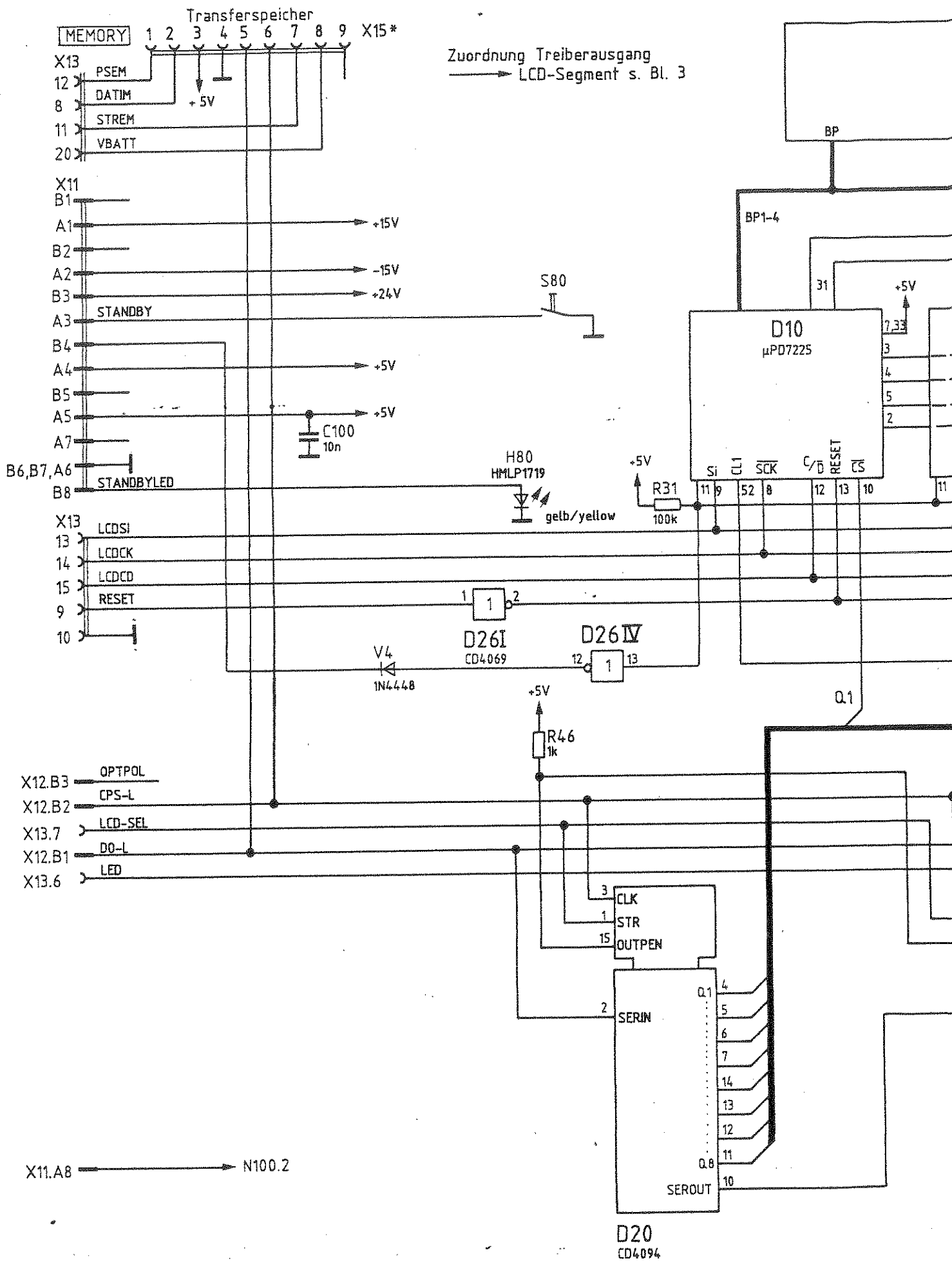
DRERES 18

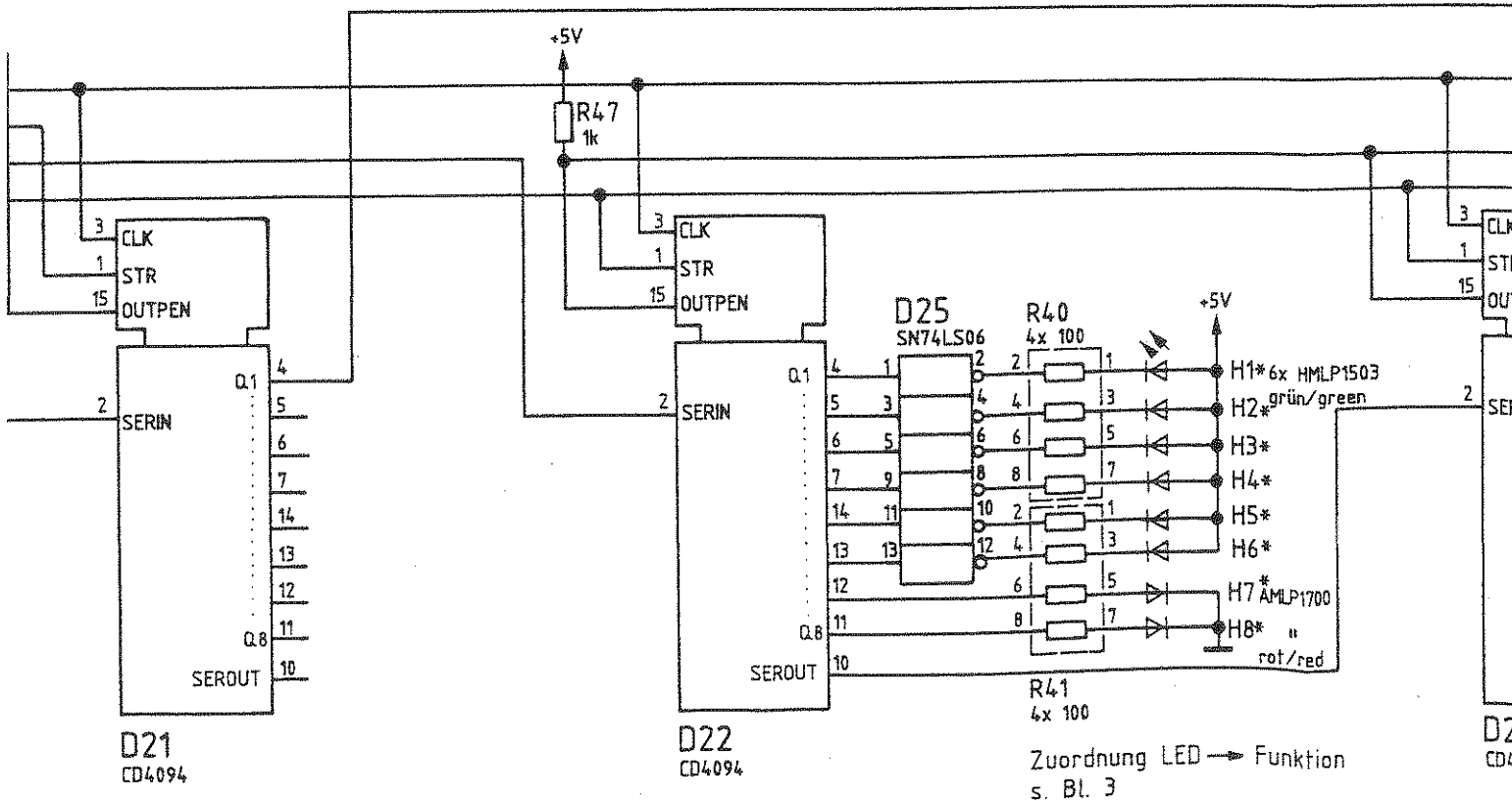
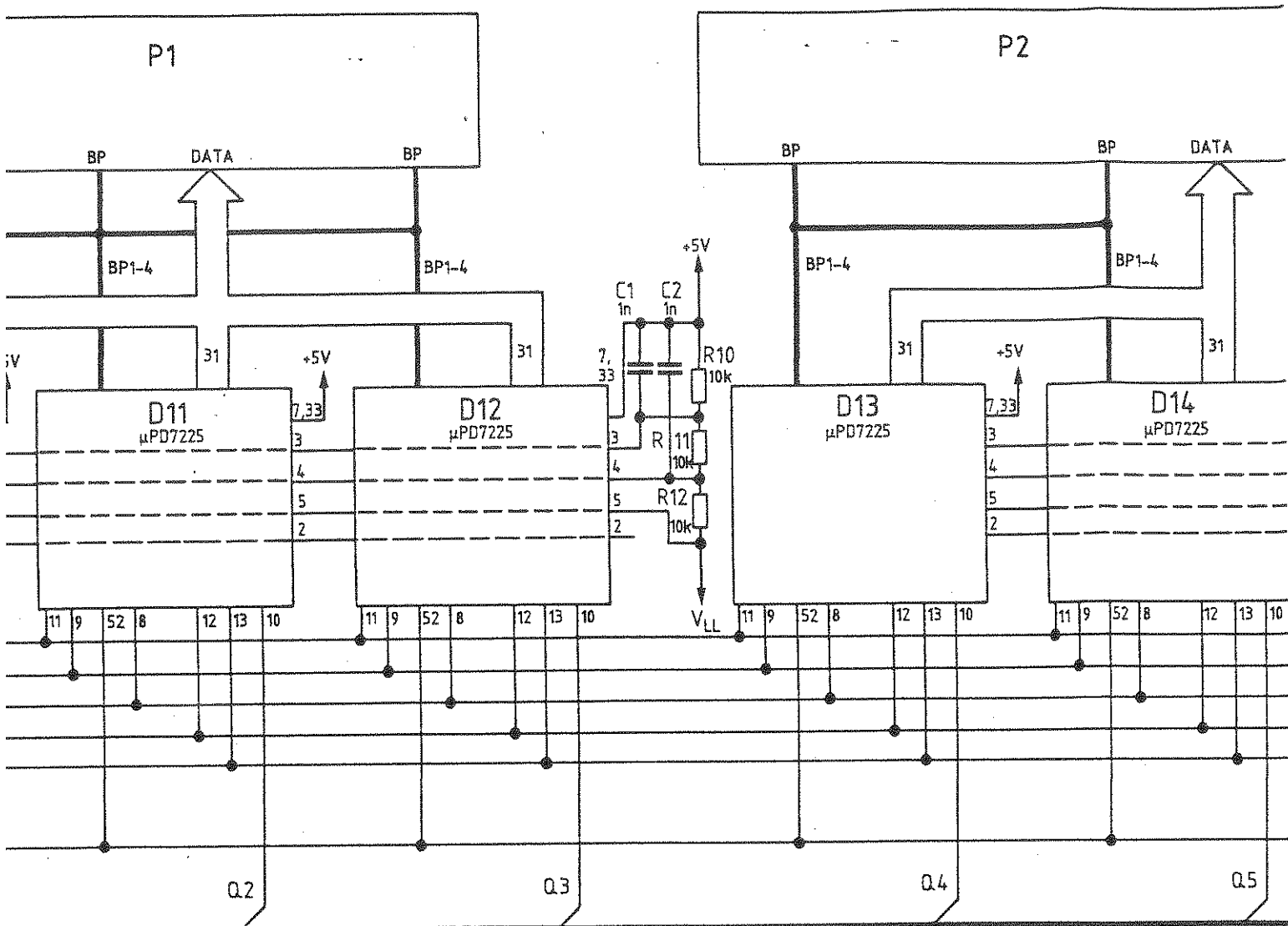
ROHDE & SCHWARZ

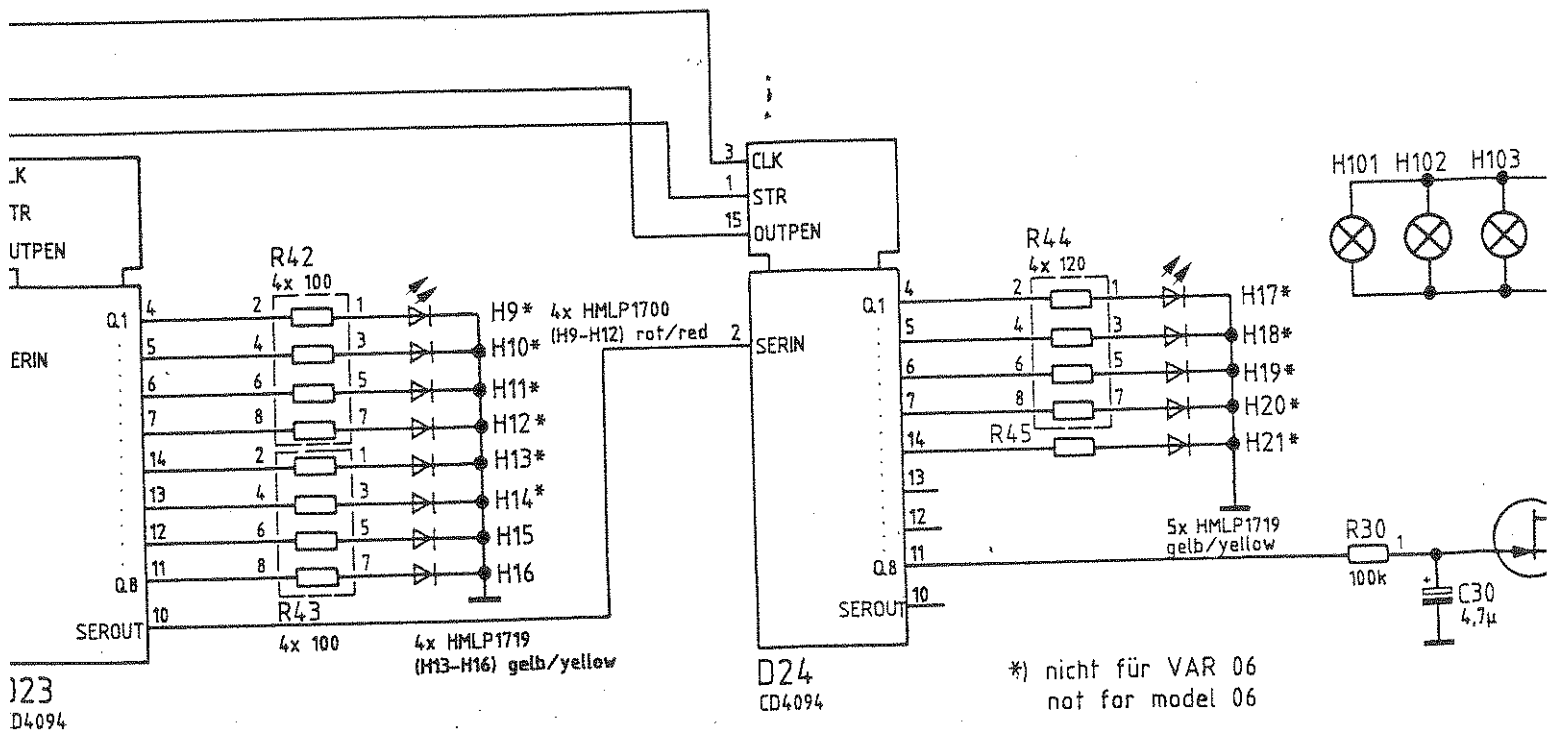
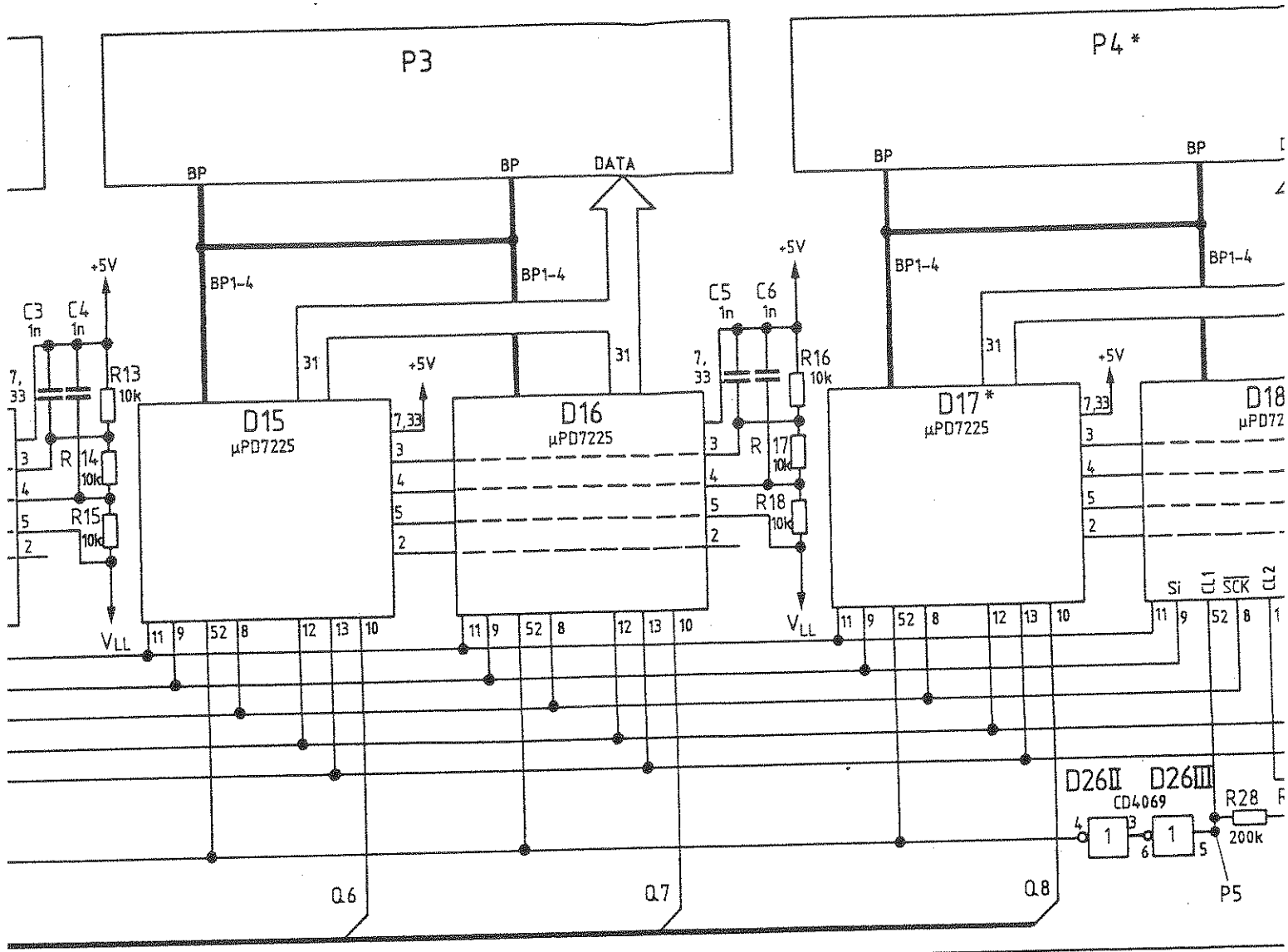
gezeichnet	10.84	GU	B	32954	4.86	CO
bearbeitet	10.84	CO	E	38951	11.87	IB
geprüft						
normgepr.						



 Stromlauf zu	Frontplatte / Front panel	Z	Zeichn.-Nr. 802.3410 S	Blatt 1
CMT	reg. i. V. 802.2020 V	erste Z. 802.3410		v.

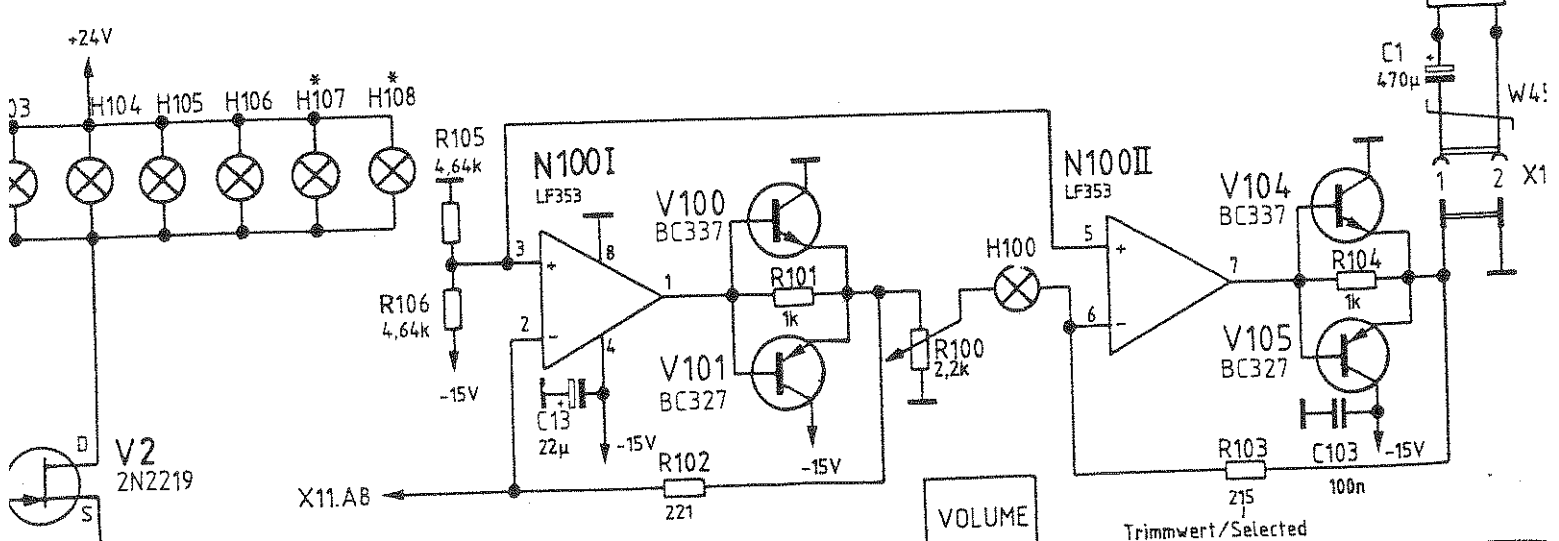
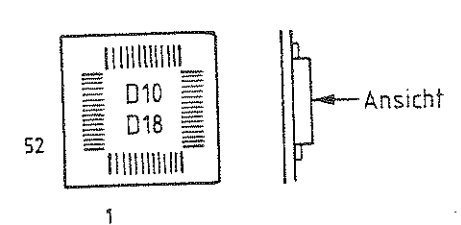
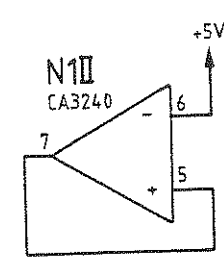
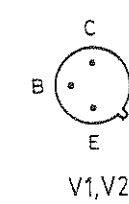
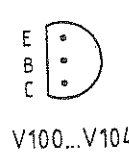
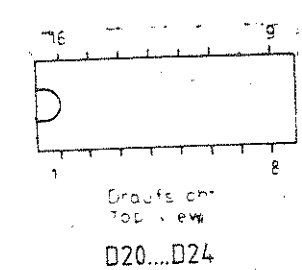
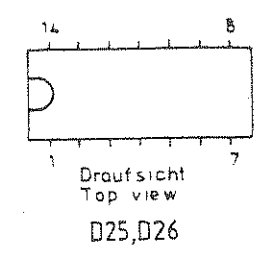
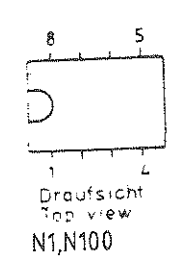
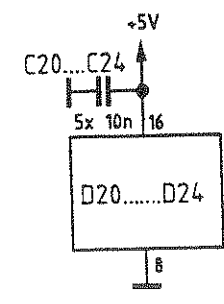
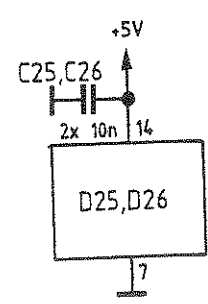
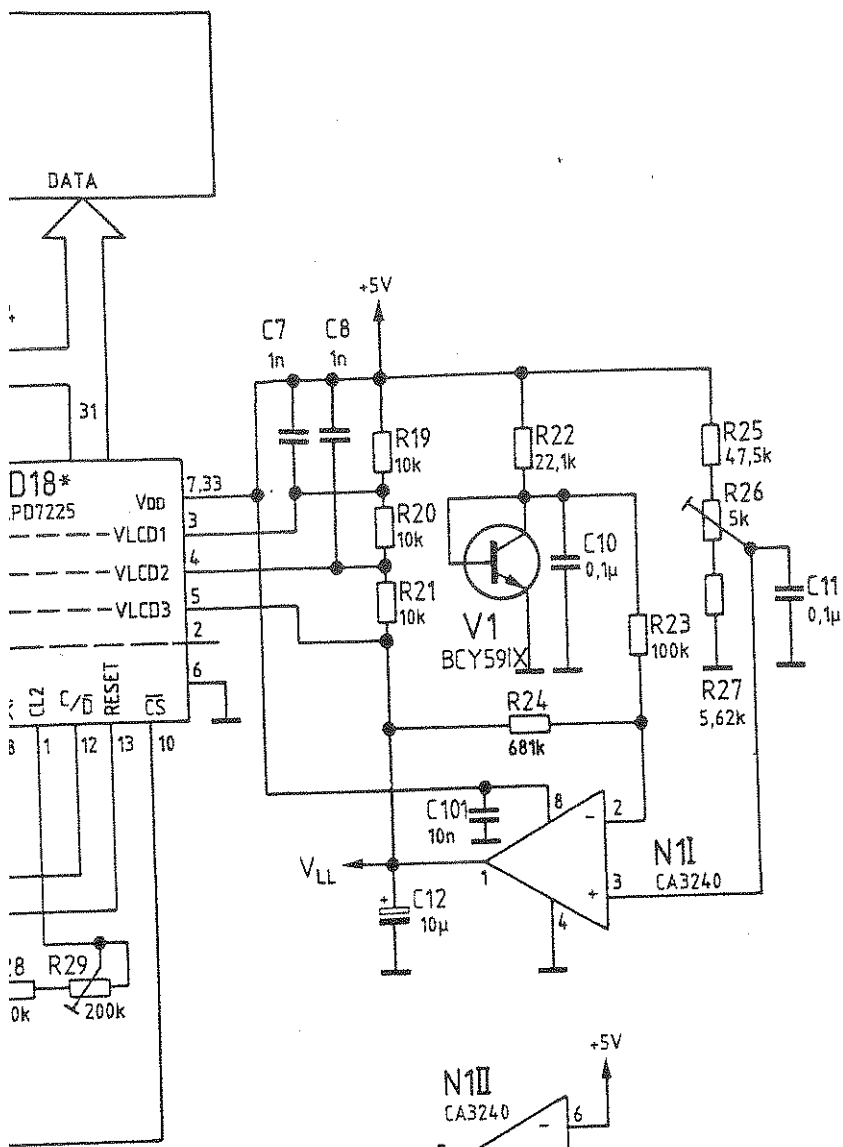




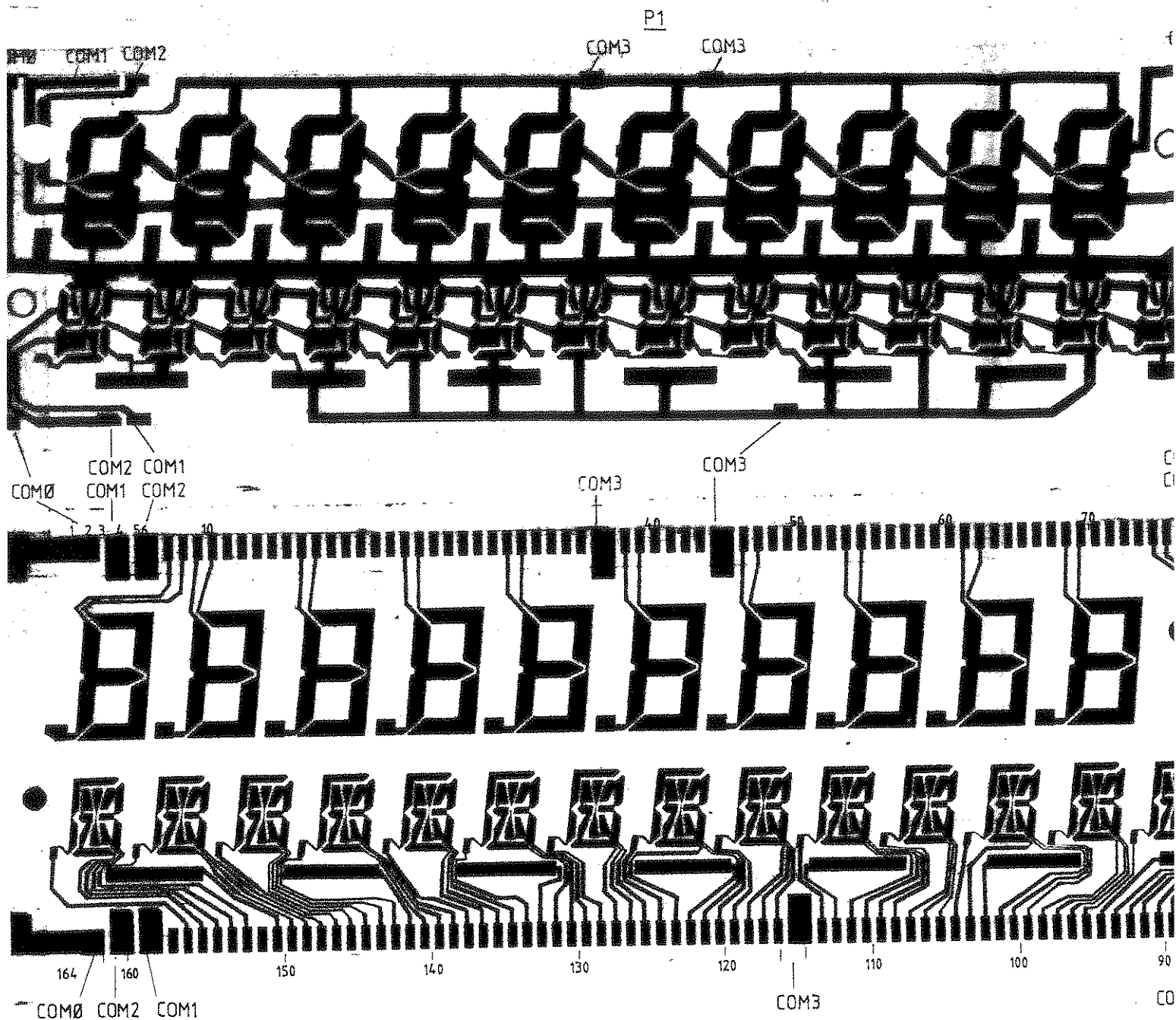


123
D4094

*) nicht für VAR 06
not for model 06

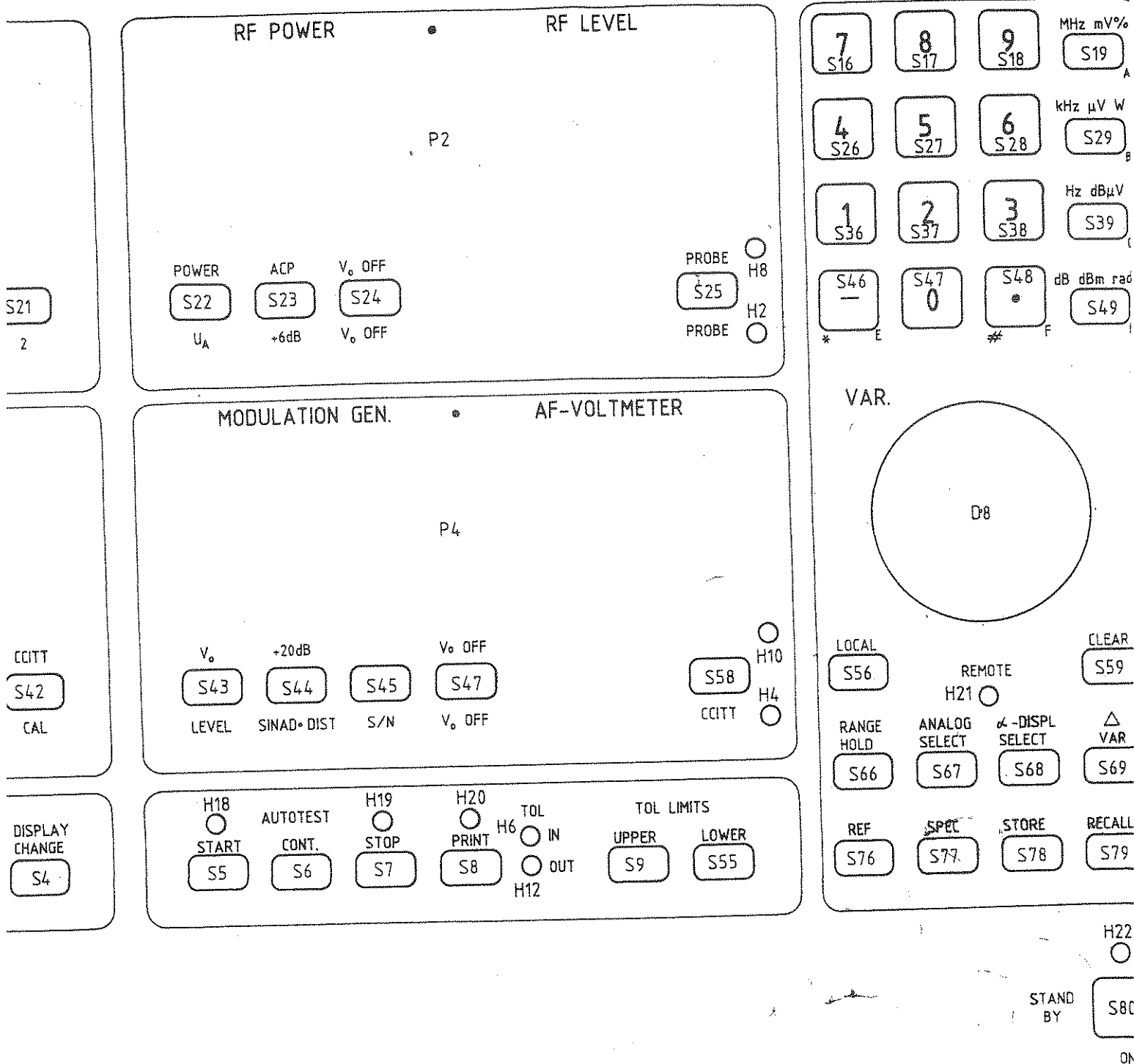


Stromlauf zu	Frontplatte / Front panel		Zeichn.-Nr. 802.3410 S
CMT	reg. i. V. 802.2020 V	erste Z. 802.3410	PF 095 4115-0480 15



P 1	Treiber/Driver				P 1	Treiber/Driver				P 1	Treiber/Driver				P 1	Treiber/Driver				P 1	T
	D10	D11	D12	PIN		D10	D11	D12	PIN		D10	D11	D12	PIN		D10	D11	D12	PIN		D
1,2	X	X	X	15	46		X		31	89			X	48	106			X	35	125	
3,4	X	X	X	16	47		X		32	90			X	49	107			X	34	126	>
5,6	X	X	X	17	53		X		34	91		X		50	108			X	32	127	>
7		X		19	54		X		35	92			X	47	109			X	31	128	>
8		X		20	61		X		36	93			X	46	110			X	30	129	>
9		X		21	62		X		37	94			X	45	111			X	29	130	>
10		X		22	68		X		38	95		X		49	112			X	28	131	>
16		X		23	69		X		39	96			X	44	113		X		47	132	>
17		X		24	74		X		40	97			X	43	114			X	27	133	
23		X		25	75		X		41	98			X	42	115, 116	X	X	X	18	134	
		X		26	76		X		42	99			X	41	117			X	26	135	
30		X		27	77, 78	X	X	X	17	100			X	40	118			X	25	136	
31		X		28	79, 80	X	X	X	16	101			X	39	119			X	24	137	
36, 37	X	X	X	18	81, 82	X	X	X	15	102			X	38	120			X	23	138	
38		X		29	83, 84	X	X	X	17	103		X		48	121			X	22	139	
39		X		30	85, 86	X	X	X	16	104			X	37	122			X	21	140	
44, 45	X	X	X	18	87, 88	X	X	X	18	105			X	36	123		X		46	141	
															124			X	19		

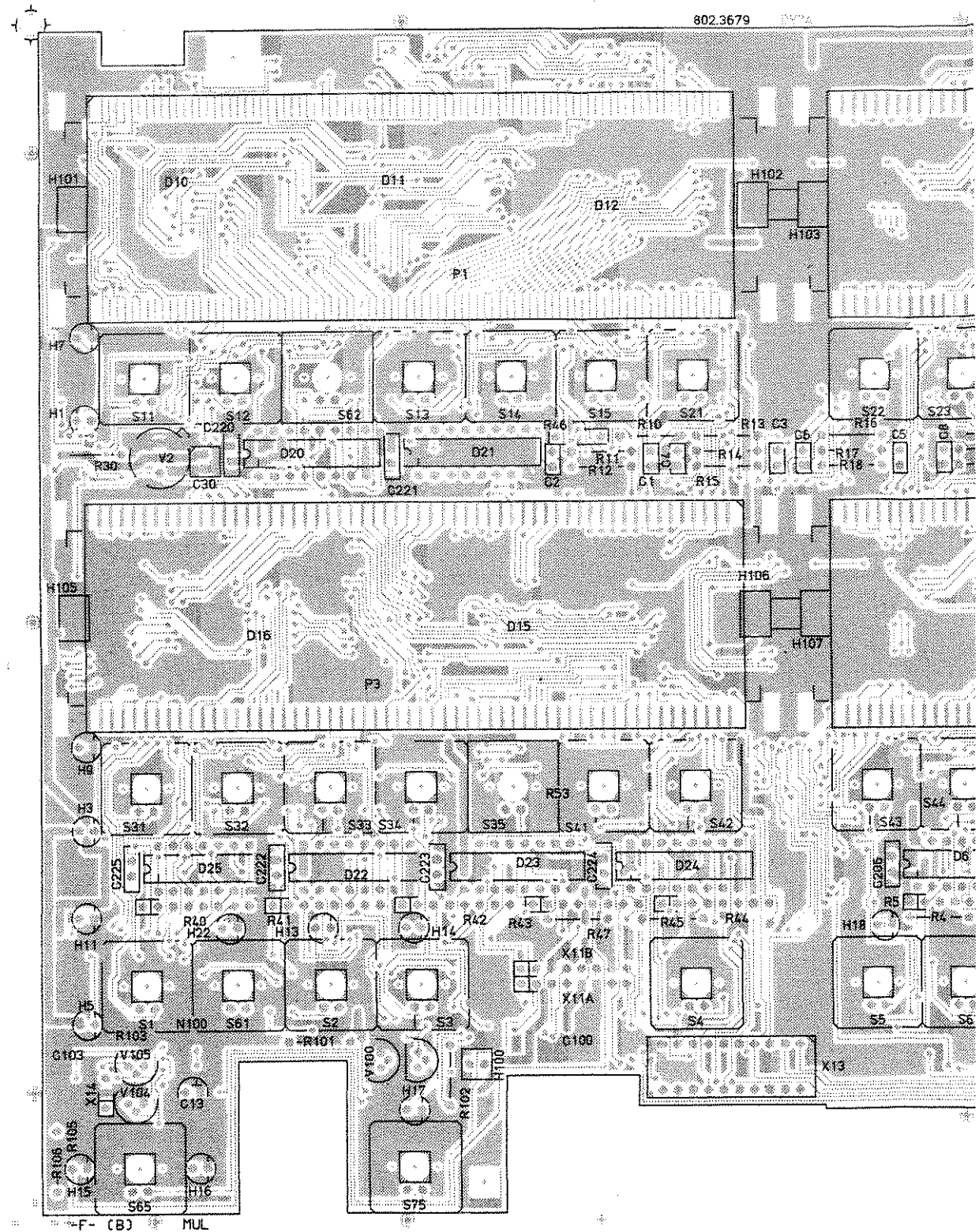
r/Driver			P 1	Treiber/Driver					P 2	Treiber/Driver				P 2	Treiber/Driver				P 2	Treiber/Driver						
11	D12	PIN		D10	D11	D12	PIN		P 2	D13	D14	PIN		P 2	D13	D14	PIN		P 2	D13	D14	PIN				
X	X	19	142		X		44		1, 2	X	X	18		22	X		30		40		X	23	65		X	32
		47	143	X			31		3, 4	X	X	17		23	X		29		41		X	24	66		X	34
		46	144	X			30		5, 6	X	X	16		24	X		28		42		X	25	70		X	35
		45	145	X			29		7, 8	X	X	15		25	X		27		43		X	26	71		X	36
		44	146	X			28		9	X		44		26	X		26		44		X	27	72		X	37
		43	147	X			27		10	X		43		27	X		25		45		X	28	73		X	38
		42	148	X			26		11	X		42		28	X		24		46		X	29	77	X		46
		41	149	X			25		12	X		41		29	X		23		47		X	30	82		X	39
		45	150	X			24		13	X		40		30	X		22		48		X	31	85		X	40
		40	151		X		43		14	X		39		31	X		21		49, 50	X	X	15	86	X		47
		39	153	X			23		15	X		38		32	X		20		51, 52	X	X	16	87	X		48
		38	154	X			22		16	X		37		33	X		19		53, 54	X	X	17	88	X		49
		37	155	X			21		17	X		36		35	X		45		55, 56	X	X	18	89		X	41
		36	156	X			20		18	X		35		36		X	19		57, 58	X	X	18	93		X	42
		35	157	X			19		19	X		34		37		X	20		59, 60	X	X	17	94	X		47
		34	159, 160	X	X	X	16		20	X		32		38		X	21		61, 62	X	X	16	95	X		48
		32	161, 162	X	X	X	17		21	X		31		39		X	22		63, 64	X	X	15	96	X		49
			163, 164	X	X	X	15																			




Stromlauf gilt nur für VAR 02
Circuit diagramm is valid only for model 02


	Stromlauf zu	Frontplatte / Front panel	Z	Zeichn.-Nr. 802.3410 S
CMT	reg. i. V.	802.2020 V	erste Z.	802.3410

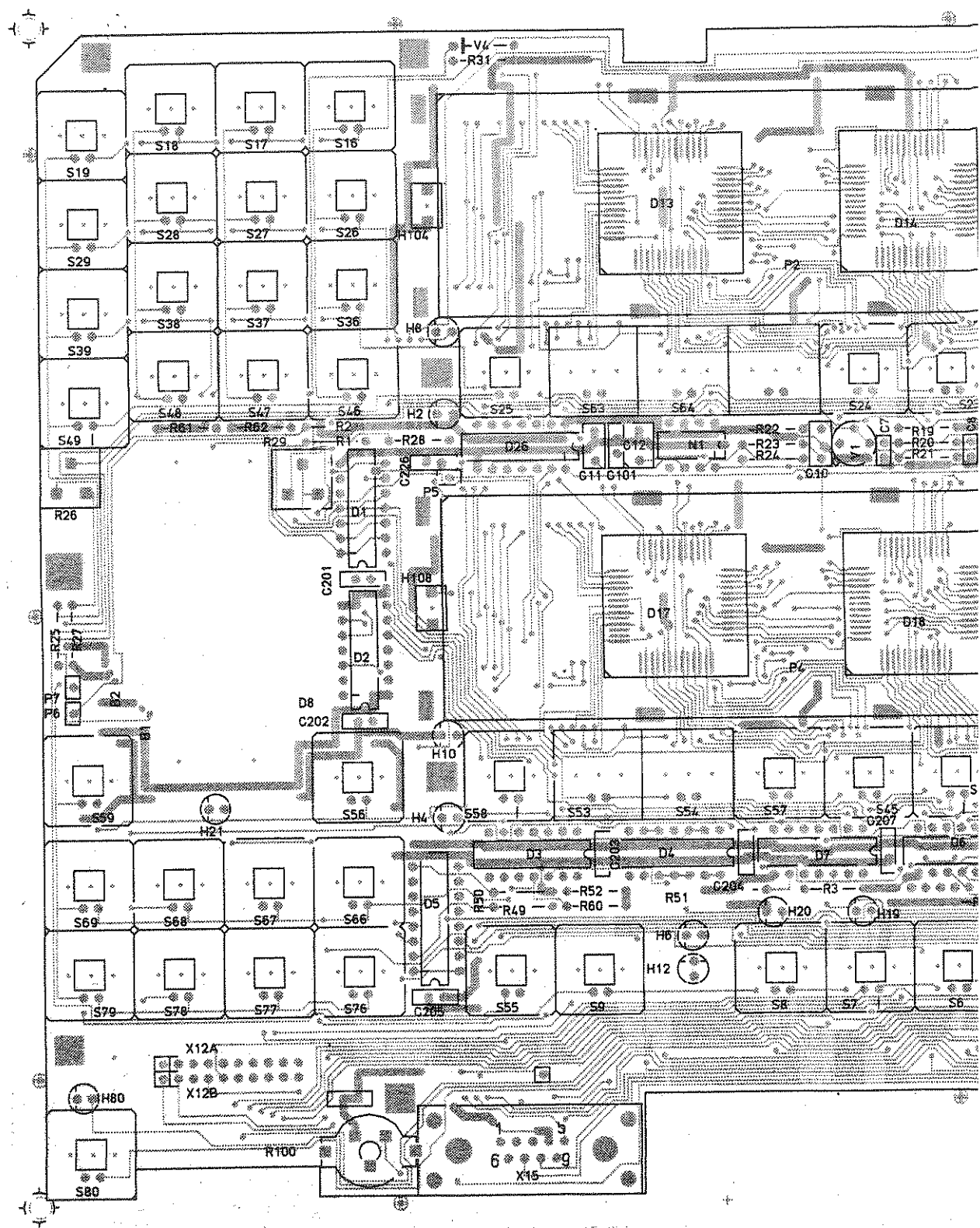
Ansicht und Leitung
View of tracks on co



(herzu HVC 350)

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



I	32954	03.86	CO	Maße ohne Toleranzangabe	Maßstab 1 : 1		
					Halbzeug, Werkstoff		
					Benennung		
					Anzeige / Tastatur Display / Keyboard		
				1KSA	Tag	Name	
				Bearb.	03.86	CO	
				Gepr.			
				Norm			
				 ROHDE & SCHWARZ	Zeichn.-Nr.		Bla
					802.3662.01		EE
Änd. Zust.	Änderungs- Mitteilung	Tag	Name	zu Gerät	CMT	reg. i. V.	erste Z.




hierzu HVC 250.)



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

ATTENTION ESD!
Electrostatic sensitive
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handling.

I	32954	03.86	CO	Maße ohne Toleranzangabe		Maßstab	1 : 1			
						Halbzeug, Werkstoff				
				1KSA	Tag	Name	Benennung Anzeige / Tastatur Display / Keyboard			Z
				Bearb.	03.86	CO				
				Gepr.						
				Norm						
				 ROHDE & SCHWARZ			Zeichn.-Nr.	Blatt-Nr.		
								802.3662.01 EE		3
							v.		Bl.	
Änd. Zust.	Änderungs- Mitteilung	Tag	Name	zu Gerät CMT			reg. i. V.	802.2020 V	erste Z.	



ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Oscilloscope Module

803.1111.00

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Component lists
Circuit diagrams
Component layout diagrams

5.1 Function Description

The oscilloscope module can be divided into three subgroups:

- + Power pack, blanking amplifier and deflection amplifier
- + Preamplifier
- + X/Y character generation, triggering

5.1.1 Power Pack, Blanking Amplifier and Deflection Amplifier

The power pack generates from a +24-V DC voltage the voltages required for the deflection amplifier (140 V) and the blanking amplifier (+33 V) as well as the acceleration voltage (-1.7 kV) and the filament voltage (6.3 V) for the CRT. The DC voltage is converted to the required values by a pulsewidth-controlled DC push-pull converter.

The HT voltage for the CRT is regulated in order to prevent picture distortions as a result of varying beam acceleration. Since the other voltages are also controlled at the same time, the filament voltage can be adjusted by adjusting the HT voltage. The control voltage is generated using a high-impedance voltage divider from which the voltages for the intensity and focus are also tapped.

The blanking amplifier supplies the voltage required to suppress the flyback and undesired signals. A transistor switches a voltage generated by the DC converter to the cathode of the CRT for this purpose. An opto-isolator is used for the control of the cathode voltage since the cathode is at a high negative potential. The blanking frequency is increased by additional capacitive coupling of the blanking signals.

The deflection amplifier applies the voltages required for beam deflection to the CRT plates. The differential cascode amplifiers have a high cut-off frequency with a low working current. The amplifiers for X and Y deflection are almost identical in design. The X and Y positions of the beam can be adjusted by superimposing an adjustable DC voltage.

5.1.2 Preamplifier

The preamplifier adjusts the amplitude of the signals to be displayed for the Y amplifier. The signals can be applied either externally with AC or DC coupling or internally with fixed AC coupling. A total of 15 different gain settings can be selected corresponding to the signals to be displayed.

5.1.3 X/Y Character Generation and Triggering

With the oscilloscope in operation the X and Y deflection coefficients are output on the screen with the corresponding units (mV, kHz, %) in order to provide the user with information on the operating status. For this purpose the RAMs are written by the instrument processor and cyclically read out by the oscilloscope. The characters are controlled in the X direction via a 7-bit D/A converter and in the Y direction via a 3-bit D/A converter. One bit of the RAMs is used for blanking.

The characters are basically written during the flyback; the characters are thus synchronized with the standard screen display so that no gaps are produced in the individual displays as can occur in chop mode.

Triggering is automatic. Part of the signal applied to the Y amplifier controls a selectable current source via a comparator. The current source charges a capacitor which results in a linearly increasing voltage used for the X deflection. If no voltage is applied to the Y amplifier, a self-oscillating oscillator is selected which then drives the trigger circuit.

5.2 Testing and Adjustment

Note: Care must be taken when testing and adjusting the oscilloscope because of the high voltages present.

5.2.1 Adjusting the Filament Voltage and the Intensity

- Settings:**
- Switch on instrument
 - Set intensity control R28 to minimum (fully counterclockwise)
 - Allow approx. 5 min to warm up
- Checkpoints:**
- Cathode of V18 (-)
 - Cathode of V15 (+)
- Adjustments:**
- Adjust R29 so that a picture is just no longer visible
 - Adjust filament voltage to 6.2 V using R6
 - Set R28 to maximum (fully clockwise)
 - Adjust R27 until the filament voltage is 6.35 V
 - Check the dark position of R29

5.2.2 Adjusting the Astigmatism

- Settings:**
- Switch on instrument
 - Set average intensity
- Checkpoint:**
- Screen
- Adjustment:**
- Optimize the picture sharpness in the centre and at the edges alternately using the R25 (focusing) and the R43 (astigmatism)

5.2.3 Adjusting the Blanking

- Settings:**
- Switch on instrument
 - Set maximum brightness
 - Select maximum deflection frequency
 - Apply a 20-kHz sinewave signal to the external input
- Checkpoint:**
- Screen
- Adjustment:**
- Suppress the flyback using R36

5.2.4 Adjusting the Time Base and the Deflection Amplifiers

- Settings:**
- Switch on instrument
 - Apply 1 V, 1 kHz to the external input
- Checkpoint:**
- Screen
- Adjustments:**
- Position the arrow on the screen using R61 and R64 such that it is located above the labelling of the selected function
 - Adjust the X deflection coefficient corresponding to the applied frequency using R208
 - Adjust the Y position of the arrow using R84 such that it is just visible above the bottom edge of the screen
 - Adjust the Y deflection coefficient corresponding to the applied amplitude using R81

5.2.5 Adjusting the Preamplifier

- Settings:**
- Switch on instrument
 - Set maximum Y sensitivity
 - Select internal or external input
 - Set R146 (Y position) to centre position
- Checkpoint:**
- Screen
- Adjustment:**
- Position the beam in the center of the screen using R101 (internal) or R112 (external).

5.3 Logic Tables for Oscilloscope Settings

Function		D202				
		7	14	13	12	11
Time base in ms/div	20	L	L	L	H	L
	10	H	L	L	H	L
	5	L	H	L	H	L
	2	H	H	L	H	L
	1	L	L	H	H	L
	0.5	H	L	H	H	H
	0.2	L	H	H	H	H
	0.1	L	L	H	L	H
	0.05	H	L	H	L	H
	0.02	L	H	H	L	H
	0.01	H	H	H	L	H

Function		D5						
		4	5	6	7	14	13	12
X deflection in V/div (external)	10	H	H	H	H	H	H	L
	5	H	H	H	H	H	H	H
	2	H	H	H	H	L	H	H
	1	H	H	H	L	L	H	H
	0.5	H	H	H	H	H	L	H
	0.2	H	H	H	H	L	L	H
	0.1	H	H	H	L	L	L	H
	0.05	L	L	H	L	L	L	H
	0.02	L	H	L	L	L	L	H
	0.01	H	L	L	L	L	L	H
	0.005	L	L	L	L	L	L	H

Function		D5	D1		
		11	4	5	6
Switchover	Internal	L	H		
	External	H	L		
Coupling	External AC			L	
	External DC			H	
LED	On				L
	Off				H

Function	D203						
	4	5	6	7	14	13	12
X coordinate	0	0	0	0	0	0	0
	LSB						MSB
	1	1	1	1	1	1	1

Function	D203	D204			
	11	4	5	6	7
Y coordinate	0	0	0	0	
	LSB			MSB	
	1	1	1	1	
Z signal On					0
Off					1
Reset address counter	<u>RESET</u>	0			
	<u>RESET</u>	1			
Chip select	<u>CS</u>		0		
	<u>CS</u>		1		
Load RAM	<u>LADEN</u>			0	
	<u>LADEN</u>			1	

5.5 Troubleshooting

no picture

Current drain of
+24 V < 0.2 A ?

Yes

No

HT voltage present ?

Yes

No

Remove V1,
picture present ?

Yes

No

Blanking amplifier,
deflection amplifier

N1, V1, V2, transformer

No or incorrect
character generation

Control logic
according to table,
Section 5.4 ?

Yes

No

D202, D203

Address
counter (P207) OK ?

Yes

No

D209, D225

Switchover pulses
at D222/12 ?

Yes

No

N200, N201, D223, D225

Blanking OK ?

Yes

No

N207, blanking amplifier

RAMs D206, D207, D208



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MÜNCHEN

Schaltteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans

**ROHDE & SCHWARZ**AZ
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Date
07 0885Schaltteilliste für
Parts list for
ZE OSCILLOSCOPESachnummer
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803.1111.01 SA

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Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

A24

ED OSCILLOSCOP-TASTATUR
KEYBOARD

803.1170.02

A25

ED SCOPE

803.1211.02

A26

ED X/Y ZEICHENERZEUGUNG
X/Y MARKER GENERATION

803.1257.02

V1

AT C312P31B OSC.ROE
CATHODE RAY TUBE
NEC C312P31B

803.0873

W52

DX KABEL (W52)
CABLE (W52)

803.2053

W55

DX COAX-KABEL (W55)

803.2076

X216

FR ROEHRENFASSUNG 14P(12)
TUBESOCKET
VALVO 55589/55594

288.5934

803.2053

- ENDE -

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Datum
Date

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0985

Schaltteilliste für
Parts list forED OSCILLOSCOPE-TASTATUR
KEYBOARDSachnummer
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Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

H7

AF HLMP1401 LED GE RD3
LED
HEWLETT-P. HLMP-1401

AF 235.4604

R1

RS 10K 10%LIN 0,5W L9
POT. 10K 10%LIN 0,5W

803.2047

S1

SB TASTER 1XA OHNE KNOPF
PUSHBUTTON SWITCH
SIEMENS STB11 M.LED-LOECHERN

SB 238.3850

BIS/TO
S7

X210

DX STECKEREINHEIT
CONNECTOR UNIT

803.2030

X212

FR JC-FASSUNG 16 POLIG
16-PIN IC-SOCKET
PRECICONT US016T

FR 249.6091

X214

FR IC-FASSUNG 20POL
SOCKET
PRECICONT US020T

FR 092.7142

- ENDE -

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		19	0787	ED SCOPE	803.1211.01 SA	1
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
C1	CE 220UF+-20%25VRD10X12,5 ELECTROLYTIC CAPACITOR	801.8331				
C2	PANASONIC ECE-A1ESS-221 CC 1NF+-10%63V K2000 CERAMIC CAPACITOR	CC 022.0784				
C5	VALVO 2222 63051 102 CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7142				
C10	ROEDERST EK 00 CB 247 G CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998				
C11	WIMA MKS2/50/1UF/10% CC 10NF+50-20%HDK6000RD19 CERAMIC CAPACITOR	CC 022.0710				
C12	RESISTA QBX619/10NF/2KV CC 10NF+50-20%HDK6000RD19 CERAMIC CAPACITOR	CC 022.0710				
C13	RESISTA QBX619/10NF/2KV CC 10NF+50-20%HDK6000RD19 CERAMIC CAPACITOR	CC 022.0710				
C14	RESISTA QBX619/10NF/2KV CE 100UF-10+50% 16V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7165				
C15	ROEDERST EK 00CB 310 D CK 100NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR	CK 006.5033				
C16	ROEDERST MKT1822-410/0 CK 100NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR	CK 006.5033				
C17	ROEDERST MKT1822-410/0 CK 100NF+-20%400V QUADER PLASTIC-FOIL CAPACITOR	CK 006.5256				
C18	ERO MKT 1822-410-40-6 CC 47PF+-10%6KV15N750 CERAMIC CAPACITOR	CC 022.1051				
C19	RESISTA QFU615-47PF+10% CC 47PF+-10%6KV15N750 CERAMIC CAPACITOR	CC 022.1051				
C20	RESISTA QFU615-47PF+10% CC 47PF+-10%6KV15N750 CERAMIC CAPACITOR	CC 022.1051				
C21	RESISTA QFU615-47PF+10% CC 1NF+50-20%2KV9RD K6000 CERAMIK DISC CAPACITOR	570.7744				
C22	RESISTA SDRU RBX609 100OP2KV CK 100NF+-20%250V QUADER PLASTIC-FOIL CAPACITOR	CK 006.5179				
C23	ROEDERST MKT1822-410/2 CK 100NF+-20%250V QUADER PLASTIC-FOIL CAPACITOR	CK 006.5179				
C24	ROEDERST MKT1822-410/2 CC 1NF+50-20%2KV9RD K6000 CERAMIK DISC CAPACITOR	570.7744				
	RESISTA SDRU RBX609 100OP2KV					

803.1211 01 SA

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		19	0787	ED SCOPE	803.1211.01 SA	2
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
C30	CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930				
C31	WIMA MKS/2/63/0,1UF/5% CC 1,2NF+-10%4X5R2000 CAPACITOR	CC 087.7031				
C32	VALVO 2222 63051 122 CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930				
C33	WIMA MKS/2/63/0,1UF/5% CC 1NF+-10%63V K2000 CERAMIC CAPACITOR	CC 022.0784				
C40	VALVO 2222 63051 102 CC 33NF+-10%50V5K1200VIE CERAMIC CAPACITOR	CC 084.5315				
C41	UNION CARB CK05BX333K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C42	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C50	UNION CARB CK05BX104K CK 220NF+-5%63V5RM MKT CAPACITOR	CK 099.2952				
C51	WIMA MKS2/63/0,22UF/5% CC 18PF+-2%3X4NPO CAPACITOR	CC 087.6458				
C52	VALVO 2222 678 10189 CC 68PF+-2%6X7NPO CAPACITOR	CC 087.6529				
C53	VALVO 2222 678 10689 CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580				
C54	MATSUSHITA ECE-ALESS-101 CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C55	UNION CARB CK05BX104K CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580				
C56	MATSUSHITA ECE-ALESS-101 CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C57	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C60	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C61	UNION CARB CK05BX104K CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR	803.0580				
C62	MATSUSHITA ECE-ALESS-101 CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C63	UNION CARB CK05BX104K CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-ALESS-101	803.0580				
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		19	0787	ED SCOPE	803.1211.01 SA	3
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
C64	CC 100NF+-10%50V5K1200VIE CAPACITOR			CC 084.5350		
C65	UNION CARB CK05BX104K CC 680PF+-10%4X5R2000 CAPACITOR			CC 087.7019		
C66	VALVO 2222 63051 681 CC 680PF+-10%4X5R2000 CAPACITOR			CC 087.7019		
C70	VALVO 2222 63051 681 CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR			803.0580		
C71	MATSUSHITA ECE-ALESS-101 CC 100NF+-10%50V5K1200VIE CAPACITOR			CC 084.5350		
C72	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR			CC 084.5350		
C73	UNION CARB CK05BX104K CE 100UF+-20%25V RD8X9,5 ELECTROLYTIC CAPACITOR			803.0580		
C74	MATSUSHITA ECE-ALESS-101 CC 100NF+-10%50V5K1200VIE CAPACITOR			CC 084.5350		
C75	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR			CC 084.5350		
	UNION CARB CK05BX104K					
D1	BL CD4094BE 8BIT SH.REG SHIFT REGISTER			BL 586.7726		
D2	RCA CD4094BE BL CD4051BE 8CH. MUX MULTIPLEXER			BL 339.4174		
D3	RCA CD4051BE BL CD4051BE 8CH. MUX MULTIPLEXER			BL 339.4174		
D4	RCA CD4051BE BL CD4053BE 3X2CH. MUX MULTIPLEXER			BL 565.3080		
D5	RCA CD4053BE BL CD4094BE 8BIT SH.REG SHIFT REGISTER			BL 586.7726		
	RCA CD4094BE					
K1	SR 5V360OHM1MAL1RH-JC-GEH RELAY			SR 412.0027		
	CLARE PRME 15.005					
L1	LD 50UH BEI 0,3A 2,9 OHM CHOKE			LD 026.4649		
L2	SIEMENS B82111-A-C17 LD 50UH BEI 0,3A 2,9 OHM CHOKE			LD 026.4649		
L3	SIEMENS B82111-A-C17 LD 270 UH10%25,0OHM0,047A CHOKE			LD 067.3153		
	DELEVAN DROSSEL1025-78					

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		19	0787	ED SCOPE	803.1211.01 SA	4
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in		
L4	LD 270 UH10%25,00HM0,047A CHOKE DELEVAN DROSSEL1025-78	LD 067.3153				
N1	BO SG3524BN 0A1 SCH.REGL REG.PULSE WIDTH MODULATOR SILICON GE SG3524BN	BO 099.8596				
N2	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521				
N3	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521				
N10	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER NSC LF411CN	349.3058				
N11	BJ TL607CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL607CP	BJ 339.6160				
N12	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER NSC LF411CN	349.3058				
N13	BJ TL607CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL607CP	BJ 339.6160				
N14	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199				
N15	BO NE5532AFE 2XL.N.OPAMP OPERATIONAL AMPLIFIER VALVO NE5532AFE	BO 356.0450				
N16	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER NSC LF411CN	349.3058				
N17	BO RC4558DN 2X OPAMP OPERATIONAL AMPLIFIER RAYTHEON RC4558DN	BO 475.1672				
O109	VL STECKLOETOESE 7,5X1,1 PLUG-IN SOLDERING LUG - R&S-ZCHNG.078.2747	VL 078.2747				
BIS/TO O114 O212	VL STECKLOETOESE 7,5X1,1 PLUG-IN SOLDERING LUG - R&S-ZCHNG.078.2747	VL 078.2747				
P1	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-001	VL 088.4507				
BIS/TO P8						
R1	RL 0,35W 9,09KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/9,09K-F-C	RL 082.2177				
803.1211.01 SA						BL 4-

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R2	RL 0,35W 6,04KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/6,040HM-F-C	RL 082.6089	
R3	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116	
R4	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R5	RL 0,35W22,6KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,6K-F-C	RL 082.2219	
R6	RS 0,5W20KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-203	RS 087.7577	
R7	RL 0,35W 4,12KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,12K-F-D	RL 083.1051	
R8	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R9	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R21	RF 0,5 W 3,9 MOHM +-5% DEPOS.-CARBON RESISTOR RESISTA SK4/3,9M5%	007.1802	
R22	RF 0,5 W 3,9 MOHM +-5% DEPOS.-CARBON RESISTOR RESISTA SK4/3,9M5%	007.1802	
R23	RL 0,35W2,21MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,21MOHM 1% TK50	RL 099.8173	
R24	RL 0,35W2,21MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,21MOHM 1% TK50	RL 099.8173	
R25	RS 0,25W 2,2MOHM+-30%LIN. POTENTIOMETER RUF 0473-300 2,2MOHM+-30	803.0973	
R26	RL 0,35W1,82MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 1,82MOHM 1% TK50	RL 099.8150	
R27	RS 0,5W1MOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-105	RS 087.7602	
R28	RS 0,25W 1MOHM+-20%LIN. POTENTIOMETER RUF 0473-300 1MOHM+-20%	803.0967	
R29	RS 0,5W1MOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-105	RS 087.7602	
R30	RL 0,35W1,50MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 1,50MOHM 1% TK50	RL 099.8138	
R31	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	

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		19	0787	ED SCOPE	803.1211.01 SA	6
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
R33	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R34	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270				
R35	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R36	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103	RS 247.7903				
R37	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R38	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R39	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R40	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270				
R41	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270				
R42	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-C	RL 082.2231				
R43	RS 0,5W50KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-503	RS 247.7910				
R44	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-C	RL 082.2231				
R45	RL 0,35W 150 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/150K-F-C	RL 083.2129				
R46	RL 0,35W 150 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/150K-F-C	RL 083.2129				
R47	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R48	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R49	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R50	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R51	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116				
803.1211.01 SA BL 6+						

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		19	0787	ED SCOPE	803.1211.01 SA	7
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R52	RL 0,35W 20,0KOHM+-1%TK50 RESISTOR			RL 083.1522		
R53	DRALORIC SMA/207/20K-F-C RL 0,35W25,5KOHM+-1%TK50 RESISTOR			RL 083.1580		
R57	DRALORIC SMA0207/25,5K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
R58	DRALORIC SMA0207/1K-F-C RL 0,35W 1,74KOHM+-1%TK50 RESISTOR			RL 083.0784		
R60	DRALORIC SMA0207/1,74K-F-D RL 0,35W 49,9KOHM+-1%TK50 RESISTOR			RL 082.6114		
R61	DRALORIC SMA 0207/49,9K-F-C RS 0,5W50KOHM+-10%10X10X5 CERMET POTENTIOMETER T			RS 247.7910		
R62	BOURNS 3386F-1-503 RL 0,35W 13,0KOHM+-1%TK50 RESISTOR			RL 083.1368		
R63	DRALORIC SMA0207/13,0K-F-D RL 0,35W5,76KOHM+-1%TK50 RESISTOR			RL 083.6824		
R64	DRALORIC SMA0207/5,76K-F-C RS 0,5W2KOHM+-10%10X10X5 CERMET POTENTIOMETER T			RS 247.7884		
R65	BOURNS 3386F-1-202 RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R66	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R67	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R68	DRALORIC SMA0207/10K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
R69	DRALORIC SMA0207/1K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
R70	DRALORIC SMA0207/1K-F-C RL 0,35W 150 KOHM+-1%TK50 RESISTOR			RL 083.2129		
R71	DRALORIC SMA/207/150K-F-C RL 0,35W 150 KOHM+-1%TK50 RESISTOR			RL 083.2129		
R72	DRALORIC SMA/207/150K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R73	DRALORIC SMA0207/10K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
R74	DRALORIC SMA0207/1K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
	DRALORIC SMA0207/1K-F-C					

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		19	0787	ED SCOPE	803.1211.01 SA	8
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
R75	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R76	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116				
R77	RL 0,35W 20,0KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/20K-F-C	RL 083.1522				
R78	RL 0,35W 20,0KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/20K-F-C	RL 083.1522				
R80	RL 0,35W 57,6KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/57,6K-F-C	RL 083.6830				
R81	RS 0,5W50KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-503	RS 247.7910				
R82	RL 0,35W 13,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/13,0K-F-D	RL 083.1368				
R83	RL 0,35W 5,90KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,90K-F-D	RL 083.1145				
R84	RS 0,5W1KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-102	RS 087.7560				
R85	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R86	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R87	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R88	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R89	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R100	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862				
R101	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103	RS 247.7903				
R102	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571				
R103	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543				
R104	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
803.1211.01 SA						BL 8+

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		19	0787	ED SCOPE	803.1211.01 SA	9
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
R105	RL 0,35W 1,02KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,02K-F-D	RL 083.0610				
R106	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571				
R110	RL 0,35W 806 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/806K-F-C	RL 083.2806				
R111	RL 0,35W 200KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/200K-F-D	RL 083.2235				
R112	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103	RS 247.7903				
R113	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571				
R114	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543				
R115	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R116	RL 0,35W 1,02KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,02K-F-D	RL 083.0610				
R117	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571				
R118	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800				
R120	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764				
R121	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764				
R122	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764				
R123	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D	RL 083.0490				
R124	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116				
R125	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R126	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826				
R127	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				

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		19	0787	ED SCOPE	803.1211.01 SA	10
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
R128	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410				
R129	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543				
R130	RL 0,35W 200 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/200OHM-F-D	RL 083.0049				
R131	RL 0,35W 200 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/200OHM-F-D	RL 083.0049				
R135	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D	RL 083.0490				
R136	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R137	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826				
R138	RL 0,35W 3,01KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,01K-F-D	RL 083.0961				
R139	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R140	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826				
R141	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R142	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410				
R143	RL 0,35W 499 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/499OHM-F-D	RL 083.0410				
R144	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R145	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545				
R150	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D	RL 082.9536				
R151	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D	RL 082.9536				
R152	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R153	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D	RL 082.9536				
803.1211.01 SA BL10-						

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		19	0787	ED SCOPE	803.1211.01 SA	11
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R154	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D			RL 082.9536		
R155	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D			RL 083.1297		
R156	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D			RL 083.1116		
R157	RL 0,35W 3,48KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,48K-F-D			RL 083.1016		
R158	RL 0,35W 6,49KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/6,49K-F-D			RL 083.1168		
R160	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
T1	LU HOCHSP.TRAFO TRANSFORMER			803.1305		
U1	BP SFH601-2 OPT.KOPPL.5KV OPTO COUPLER SIEMENS Q68000-A5058			346.5795		
V1	AM BUZ20 N 100V PMOSF POWER MOSFET SIEMENS BUZ20 C67078-H1302H2			586.8580		
V2	AM BUZ20 N 100V PMOSF POWER MOSFET SIEMENS BUZ20 C67078-H1302H2			586.8580		
V10	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
V11	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
V12	AG BY709 GL 12KV 4MA RECTIFIER VALVO BY709			254.2761		
V13	AG BY709 GL 12KV 4MA RECTIFIER VALVO BY709			254.2761		
V14	AG 1N5804 GL 100V 2A5 RECTIFIER UNITRODE 1N5804			AG 453.4762		
V15	AG 1N5804 GL 100V 2A5 RECTIFIER UNITRODE 1N5804			AG 453.4762		
V16	AG BYV96E GL1000V 0A8 RECTIFIER VALVO BYV96E			AG 099.9034		
V17	AG BYV96E GL1000V 0A8 RECTIFIER VALVO BYV96E			AG 099.9034		

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		19	0787	ED SCOPE	803.1211.01 SA	12
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
V18	AE BZX79/C68 0,5W Z-DI ZENER DIODE VALVO BZX79/C68			AE 289.4731		
V19	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
V20	AE BZX79/C33 0,5W Z-DI ZENER DIODE VALVO BZX79/C33			AE 012.2632		
V21	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
V22	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX			AK 010.3777		
V23	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V24	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V30	AK BF420 NPN300V 100MA TRANSISTOR VALVO BF420			AK 346.5837		
V31	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V32	AK BF420 NPN300V 100MA TRANSISTOR VALVO BF420			AK 346.5837		
V33	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V35	AK BF420 NPN300V 100MA TRANSISTOR VALVO BF420			AK 346.5837		
V36	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V37	AK BF420 NPN300V 100MA TRANSISTOR VALVO BF420			AK 346.5837		
V38	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
V40	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1			AE 012.2449		
BIS/TO						
V43						
V44	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
V45	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163		
					803.1211.01 SA BL12+	

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	19	0787	ED SCOPE	803.1211.01 SA	13
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
V50	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1		AE 012.2449		
BIS/TO V53					
V54	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET		AD 012.0700		
X210	FR IC-FASSUNG 16 POLIG 16-PIN IC-SOCKET PRECICONT US016T		FR 249.6091		
X211	FR IC-FASSUNG 16 POLIG 16-PIN IC-SOCKET PRECICONT US016T		FR 249.6091		
X213	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 3-POLIG/3 PINS		FP 242.3600		
X215	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36		FP 242.3600		
X217	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 3-POLIG/3PINS		FP 242.3600		
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C200	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C201	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C202	CK 56NF+-1,25%63V7,5QUAD CAPACITOR SIEMENS B33531-A5563-F	CK 213.4399	
C203	CK 6,2NF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5622-F	CK 340.9053	
C204	CC 10PF+-0,25PF3X4NPO CAPACITOR VALVO 2222 678 09109	CC 087.6429	
C205	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
BIS/TO			
C211			
C212	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,1UF/5%	CK 099.2930	
C213	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-A1ESS-101	803.0580	
C214	CK 47NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,047UF/5%	CK 099.2917	
C215	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-A1ESS-101	803.0580	
C216	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,1UF/5%	CK 099.2930	
C217	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102	CC 022.0784	
C220	CK 470NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,47UF/5%	CK 099.2975	
C221	CC 220PF+-2%6X7N750 CAPACITOR VALVO 2222 678 58221	CC 087.6941	
C222	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C223	CC 100PF+-2%6X9NPO CAPACITOR VALVO 2222 678 10101	CC 087.6541	
C224	CC 5,6PF+-0,25PF3X4NPO CAPACITOR VALVO 2222 678 09568	CC 087.6393	
C225	CC 5,6PF+-0,25PF3X4NPO CAPACITOR VALVO 2222 678 09568	CC 087.6393	

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11		0387		803.1257.01 SA	2
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
C226	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K		CC 084.5350		
BIS/TO					
C229					
C230	CK 22NF+-5%63V5RM MKT CAPACITOR WIMA MKS2/63/0,022UF/5%		CK 099.2881		
C233	CC 82PF+-2%6X7NPO CAPACITOR VALVO 2222 678 10829		CC 087.6535		
D200	BL CD4051BE 8CH. MUX MULTIPLEXER RCA CD4051BE		BL 339.4174		
D201	BL HEF4104BP 4XCONV. 3S LEVEL CONVERTER VALVO HEF4104BP		BL 252.7395		
D202	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D203	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D204	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D205	BL CD4040BE 12B.COUNTER COUNTER RCA CD4040BE		BL 086.7180		
D206	BC TC5514P 1KX4B.SRAM SRAM TOSHIBA TC5514P		344.1411		
D207	BC TC5514P 1KX4B.SRAM SRAM TOSHIBA TC5514P		344.1411		
D208	BC TC5514P 1KX4B.SRAM SRAM TOSHIBA TC5514P		344.1411		
D209	BL CD4047BE MULTIVIBR. MULTIVIBRATOR RCA CD4047BE		BL 349.2980		
D220	BL CD4001BE 4X2INP.NORG NOR GATE RCA CD4001BE		BL 086.6960		
D221	BL CD4093BE 4XSCHM.TRIG SCHMITT-TRIGGER RCA CD4093BE		BL 516.3338		
D222	BL CD4069UBE 6XINVERTER HEXINVERTER RCA CD4069UBE		BL 086.9999		
D223	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE		BL 565.3080		
D224	BL CD4053BE 3X2CH. MUX MULTIPLEXER RCA CD4053BE		BL 565.3080		
803.1257.01 SA BL 2+					

 ROHDE & SCHWARZ	AI Datum Date 11 0387	Schalteilliste für Parts list for ED X/Y ZEICHENERZEUGUNG X/Y MARKER GENERATION	Sachnummer Stock No. 803.1257.01 SA	Blatt Page 3
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
D225	BL MC14538BCP 2X MONOFLOP MONOSTABLE MULTIVIBRATOR MOTOROLA MC14538BCP	BL 252.7389	
N200	B0 LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521	
N201	B0 LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521	
N202	B0 LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521	
N203	B0 LF351N BIFET OPAMP OPERATIONAL AMPLIFIER NSC LF351N	B0 301.6105	
N204	B0 LF351N BIFET OPAMP OPERATIONAL AMPLIFIER NSC LF351N	B0 301.6105	
N205	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199	
N206	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199	
N207	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199	
N208	B0 ICM7555IPA TIMER TIMER INTERSIL ICM7555IPA	B0 303.9260	
P200	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36	FP 242.3600	
P201	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542	
BIS/TO P207 P208	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36	FP 242.3600	
BIS/TO P210			
R200	RL 0,35W 681 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/381K-F-C	RL 083.2735	
R201	RL 0,35W 340 KOHM+-1%TK50 RESISTOR RESISTA MK2	RL 083.2458	
R202	RL 0,35W 165 KOHM+-1%TK50 RESISTOR RESISTA MK2	RL 083.2158	

 ROHDE & SCHWARZ		Al Datum Date	Schaltteilliste für Parts list for ED X/Y ZEICHENERZEUGUNG X/Y MARKER GENERATION	Sachnummer Stock No. 803.1257.01 SA	Blatt Page 4
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in	
R203	RL 0,35W 66,5KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/66,5K-F-C	RL 083.1874			
R204	RL 0,35W 32,4KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/32,4K-F-C	RL 083.1668			
R205	RL 0,35W 16,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/16,2K-F-D	RL 083.1439			
R206	RL 0,35W 6,34KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/6,34K-F-D	RL 083.1151			
R207	RL 0,35W 3,09KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,09K-F-D	RL 083.0978			
R208	RS 0,5W2KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-202	RS 247.7884			
R209	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477			
R210	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-C	RL 082.2231			
R211	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764			
R212	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764			
R213	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764			
R214	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297			
R215	RL 0,35W 15,2KOHM+-0,1%T25 RESISTOR DRALORIC SMA0207	RL 084.3412			
R216	RL 0,35W 18,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/18,2K-F-C	RL 083.1480			
R217	RL 0,35W 21,5KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/21,5K-F-C	RL 082.1741			
R218	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190			
R219	RL 0,35W 4,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,32K-F-D	RL 082.6572			
R220	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297			
R221	RL 0,35W 4,02KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,02K-F-D	RL 083.1045			



ROHDE & SCHWARZ

AI

Datum
Date

11 0387

Schaltteilliste für
Parts list forED X/Y ZEICHENERZEUGUNG
X/Y MARKER GENERATIONSachnummer
Stock No.

803.1257.01 SA

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Page

5

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R222	RL 0-WIDERSTAND DIN 0204 0-OHM RESISTOR DRALORIC 0MA 0204	RL 069.0000	
R223	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-C	RL 082.2231	
R224	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545	
R225	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R226	RL 0,35W 18,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/18,2K-F-C	RL 083.1480	
R230	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R231	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R232	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R233	RL 0,35W 150 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/150K-F-C	RL 083.2129	
R234	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R235	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116	
R236	RL 0,35W 475 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/475K-F-C	RL 083.2593	
R237	RL 0,35W 562 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/562K-F-C	RL 083.2664	
R238	RL 0,35W 9,09KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/9,09K-F-C	RL 082.2177	
R240	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116	
R241	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R242	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R243	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R250	RL 0,35W 50,5KOHM+-0,1%T25 RESISTOR DRALORIC SMA0207	RL 084.4419	



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Datum
Date

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Schaltteilliste für
Parts list for

ED X/Y ZEICHENERZEUGUNG

X/Y MARKER GENERATION

Sachnummer
Stock No.

803.1257.01 SA

Blatt
Page

6

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R251	RL 0,35W 681 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/381K-F-C	RL 083.2735	
R252	RL 0,35W 332 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/332K-F-C	RL 083.2441	
R253	RL 0,35W 162KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/162K-F-C	RL 082.2154	
R254	RL 0,35W 82,5KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/82,5K-F-C	RL 082.2302	
R255	RL 0,35W 41,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/41,2K-F-C	RL 082.2319	
R256	RL 0,35W 20,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/20,5K-F-C	RL 082.2325	
R257	RL 0,35W 10,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/10,2K-F-C	RL 082.2331	
R258	RL 0,35W 681 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/381K-F-C	RL 083.2735	
R259	RL 0,35W 332 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/332K-F-C	RL 083.2441	
R260	RL 0,35W 162KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/162K-F-C	RL 082.2154	
R261	RL 0,35W 59,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/59,0K-F-C	RL 083.1845	
R262	RL 0,35W 14,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/14K-F-D	RL 083.1374	
R263	RL 0,35W 6,49KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/6,49K-F-D	RL 083.1168	
R264	RL 0,35W 14,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/14K-F-D	RL 083.1374	
R265	RL 0,35W 6,49KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/6,49K-F-D	RL 083.1168	
V200	AE BZX79/C4V3 0,5W Z-DI ZENER DIODE VALVO BZX79/C4V3	AE 012.2426	
V201	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX	AK 010.3777	
V202	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	



ROHDE & SCHWARZ

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Datum
Date

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0387

Schaltteilliste für
Parts list forED X/Y ZEICHENERZEUGUNG
X/Y MARKER GENERATIONSachnummer
Stock No.

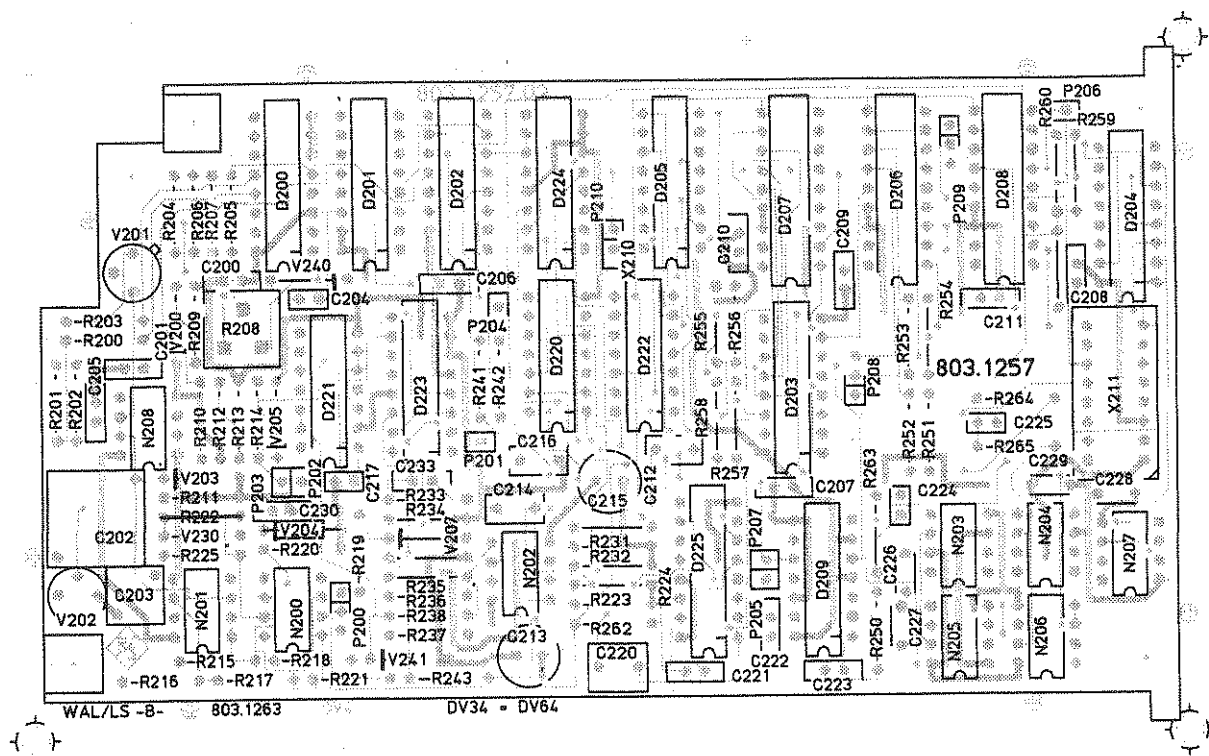
803.1257.01 SA

Blatt
Page

7

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
V203	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V204	AE BZX79/C4V7 0,5W Z-DI ZENER DIODE VALVO BZX79/C4V7	AE 012.2432	
V205	AE BZX79/C4V7 0,5W Z-DI ZENER DIODE VALVO BZX79/C4V7	AE 012.2432	
V207	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V230	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V240	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V241	AE BZX79/C4V7 0,5W Z-DI ZENER DIODE VALVO BZX79/C4V7	AE 012.2432	
X211	DX STECKEREINHEIT	803.2060	- ENDE -

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



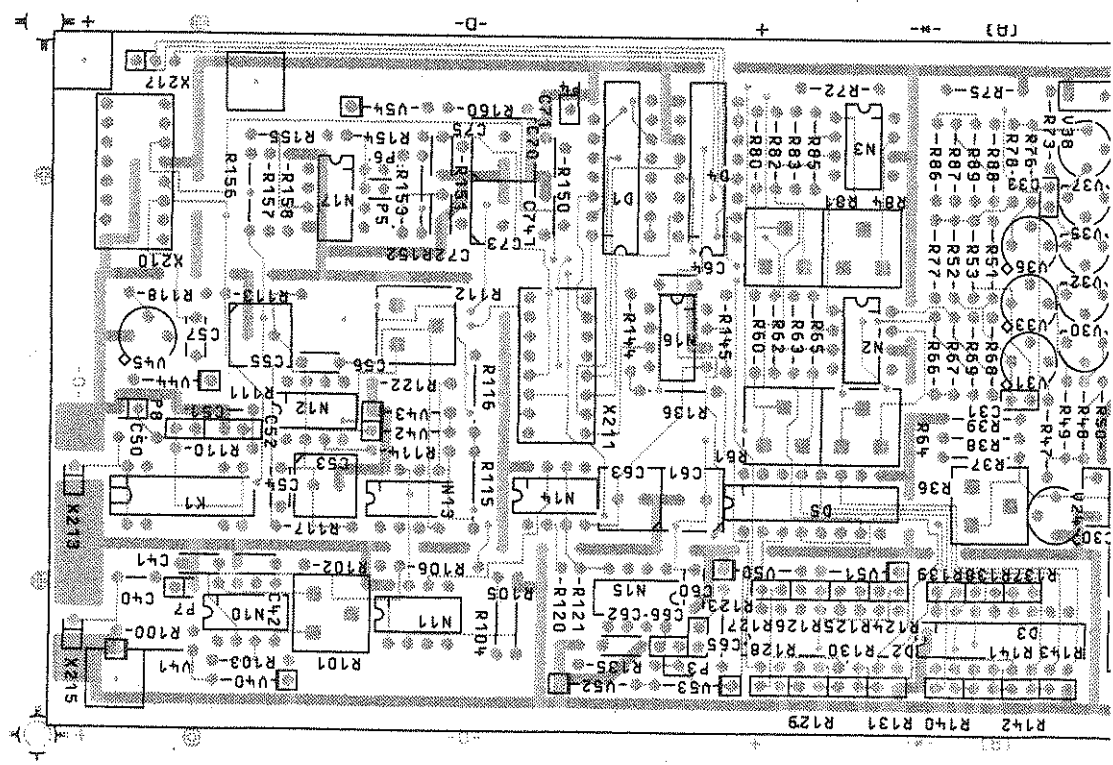
(hierzu HVC 250)



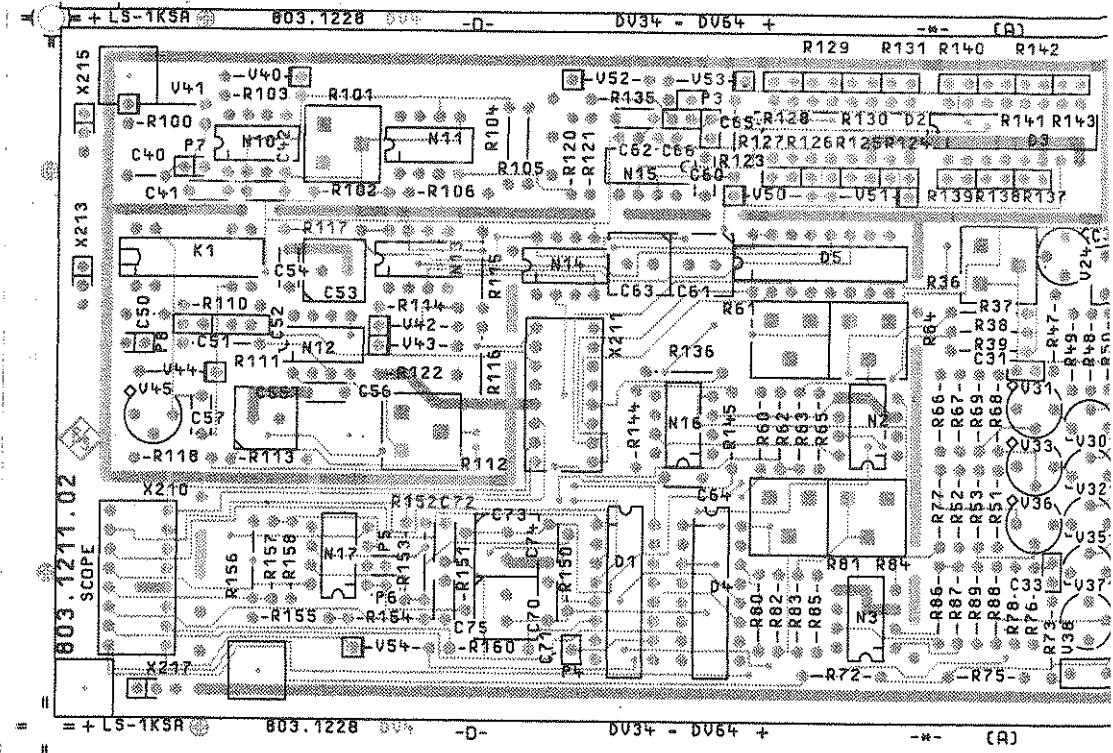
ACHTUNG: EGB!
Elektrostatisch gefährlich!
Bauelemente erfordern
besondere Handhabung
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

[illegible]

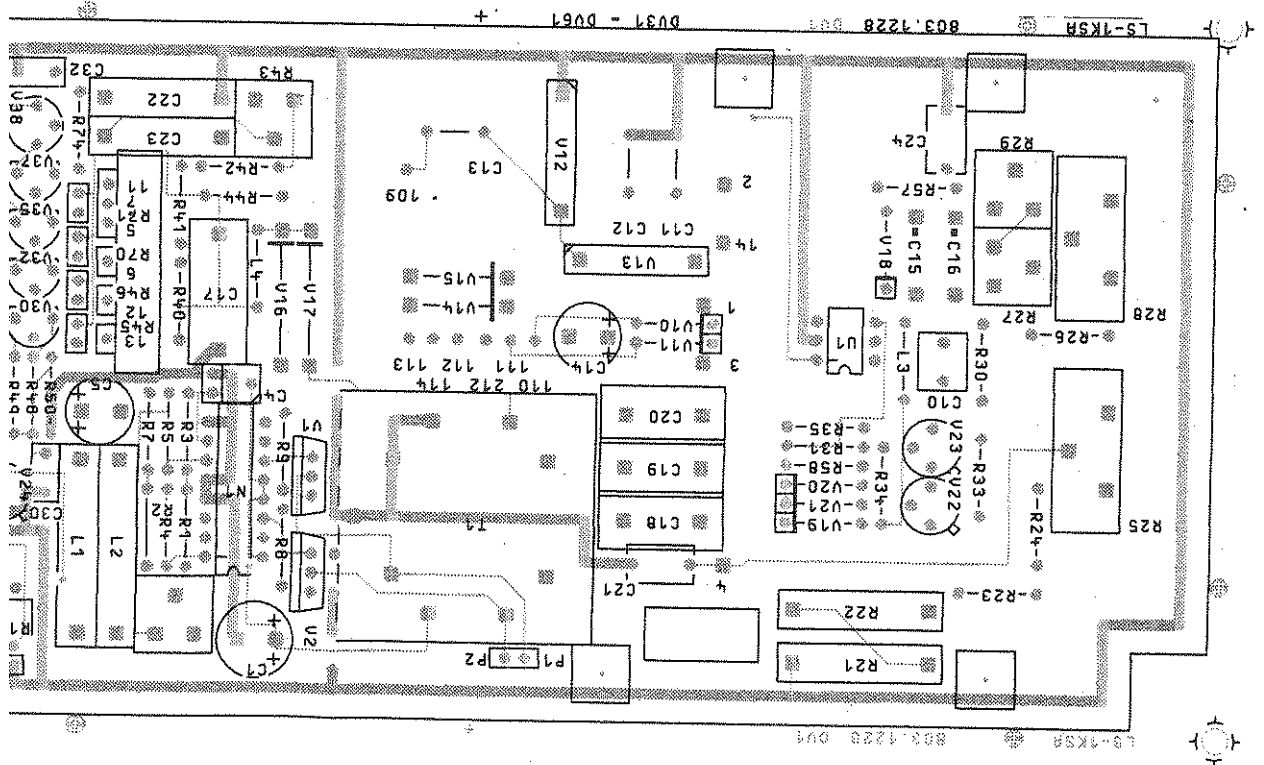
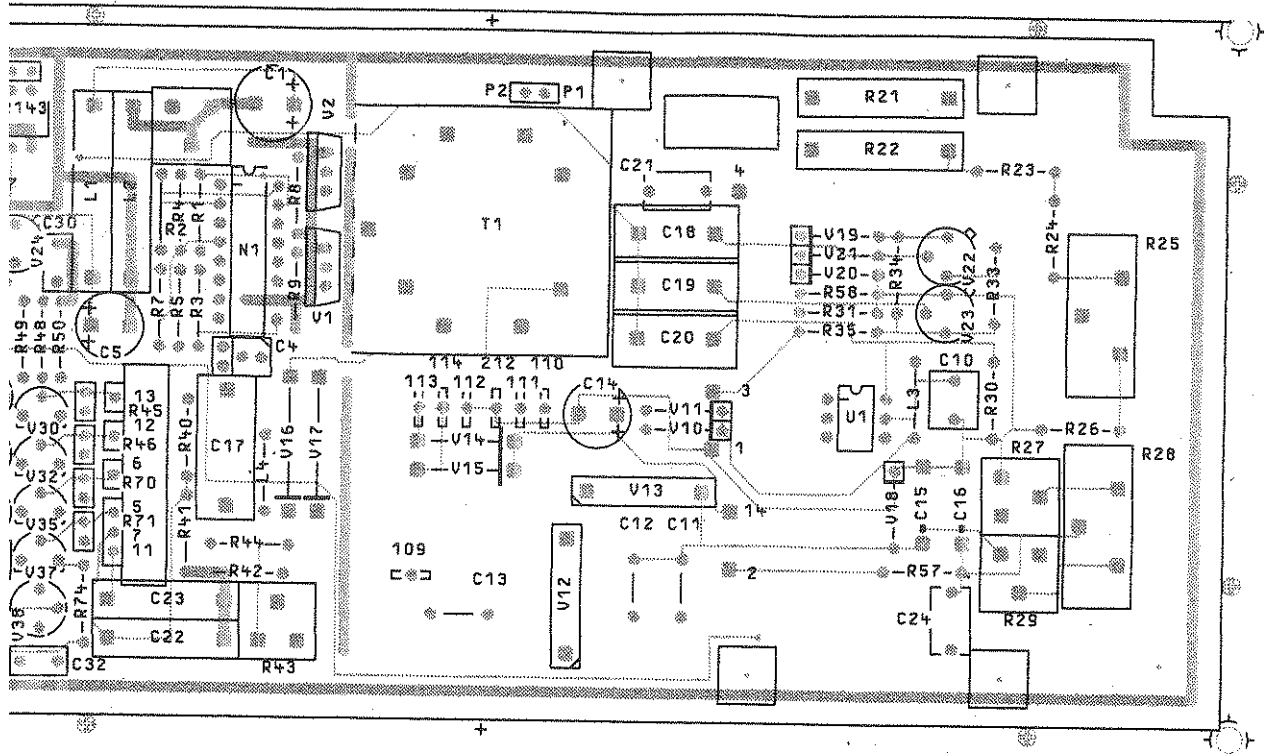
Ansicht und Leitungsführung Lötseite
View of tracks on solder side



Ansicht und Leitungsführung Bauteilseite
View of tracks on component side

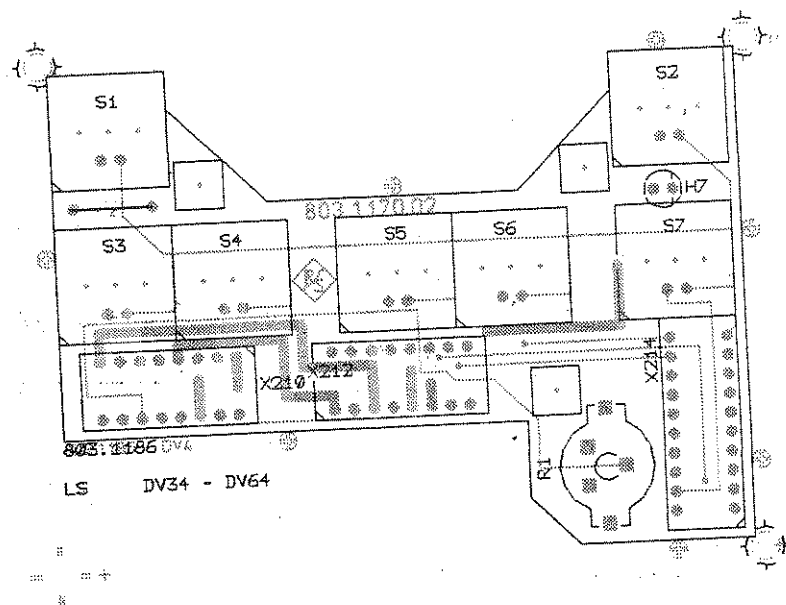


ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.



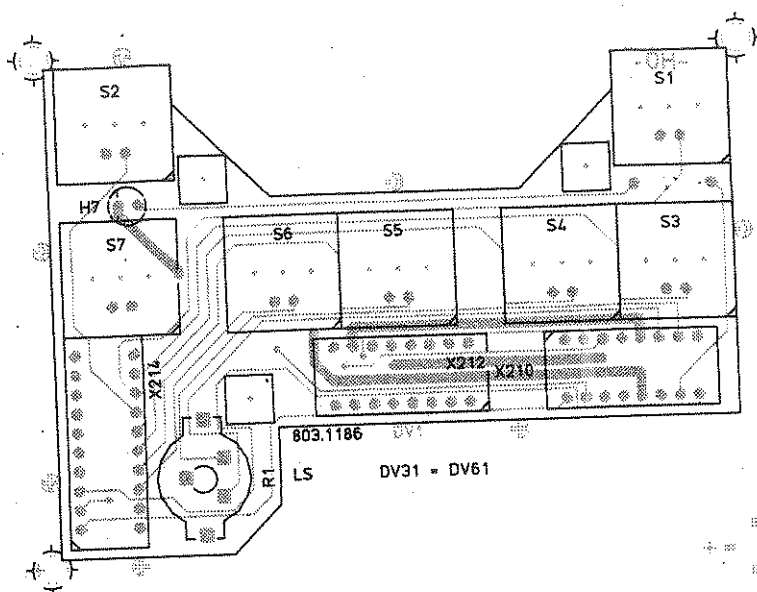
C	38951	05.87	LS	Maße ohne Toleranzangabe		Maßstab 1 : 1			
						Halbzeug, Werkstoff			
				1KSA	Tag	Name	Benennung		Z
				Bearb.	05.87	LS	SCOPE		
				Gepr.					
				Norm					
						Zeichn.-Nr.		Blatt-Nr.	
						803.1211.01		2	
And. Zust.	Änderungs-Mitteilung		Tag	Name	zu Gerät CMT		reg. i. V. 802.2020V		erste Z.
				ROHDE & SCHWARZ				ED	
								v. Bl.	

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



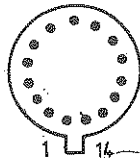
Achtung! MOS-Bauteile
Caution. MOS components

Ansicht und Leitungsführung Lötseite View of tracks on solder side



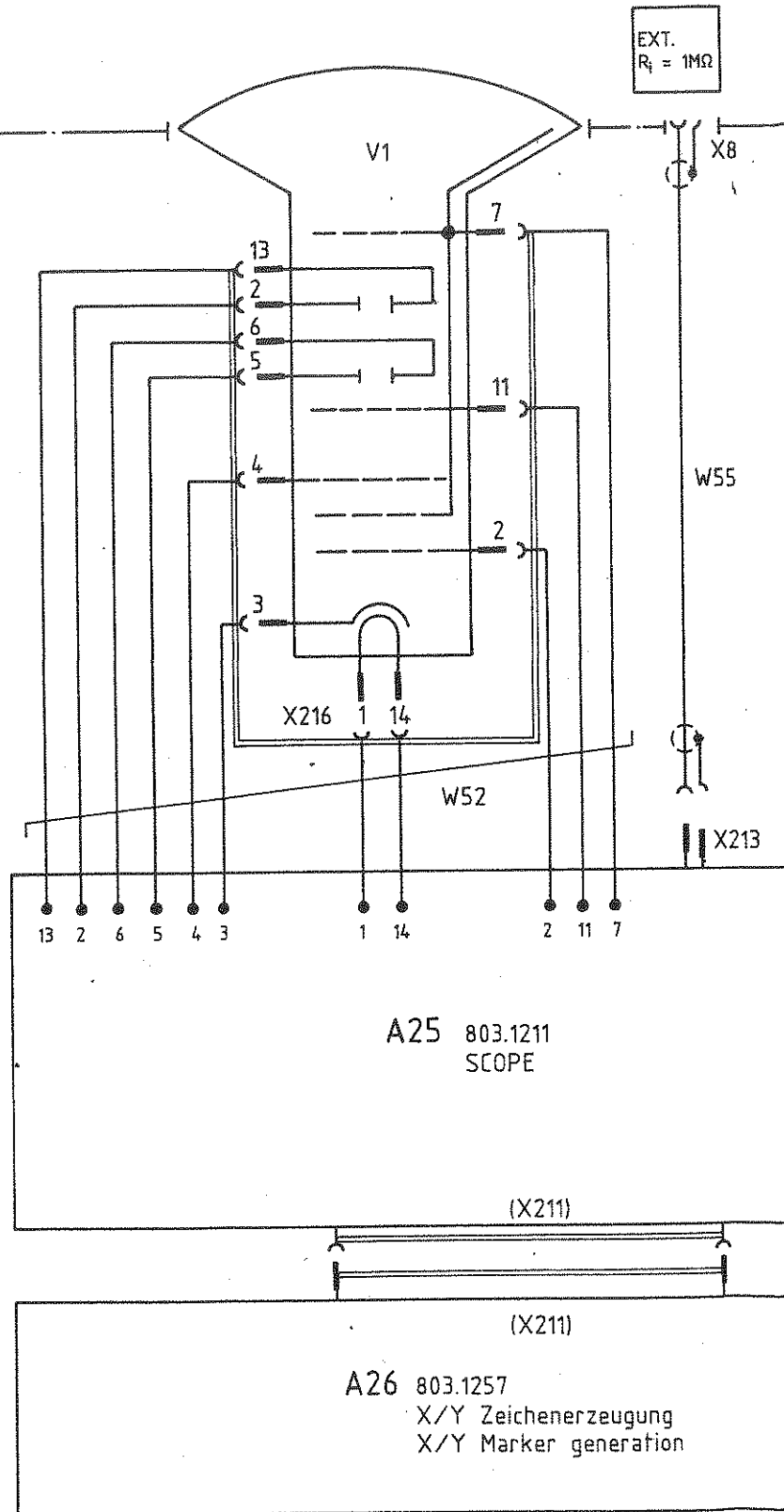
A	32910	8.85	CO	Maße ohne Toleranzangabe		Maßstab 1 : 1	
						Halbzeug, Werkstoff	
				1KGA	Tag	Name	Benennung Oszilloskop - Tastatur Oscilloscope keyboard
				Bearb.	10.84	LS	
				Gepr.			
				Norm			
				ROHDE & SCHWARZ		Zeichn.-Nr. 803.1170	
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CMT		reg. i. V. 802.2020 V	erste Z. 803.1111
						Blatt-Nr. 2	
						v. Bl.	

Frontplatte
Front panel



Untersicht
Bottom view

V1



A24 803.1170
Oszilloskop/Tastatur
Oscilloscope/keyboard

X214

X212

(W4.2)

X12.A10

(W4.4)

X11.A10

X210

X217

X215

(W56)

X605.A6

Stromlauf gilt für VAR 02
Circuit diagramm is valid for model 02

Stromlauf zu



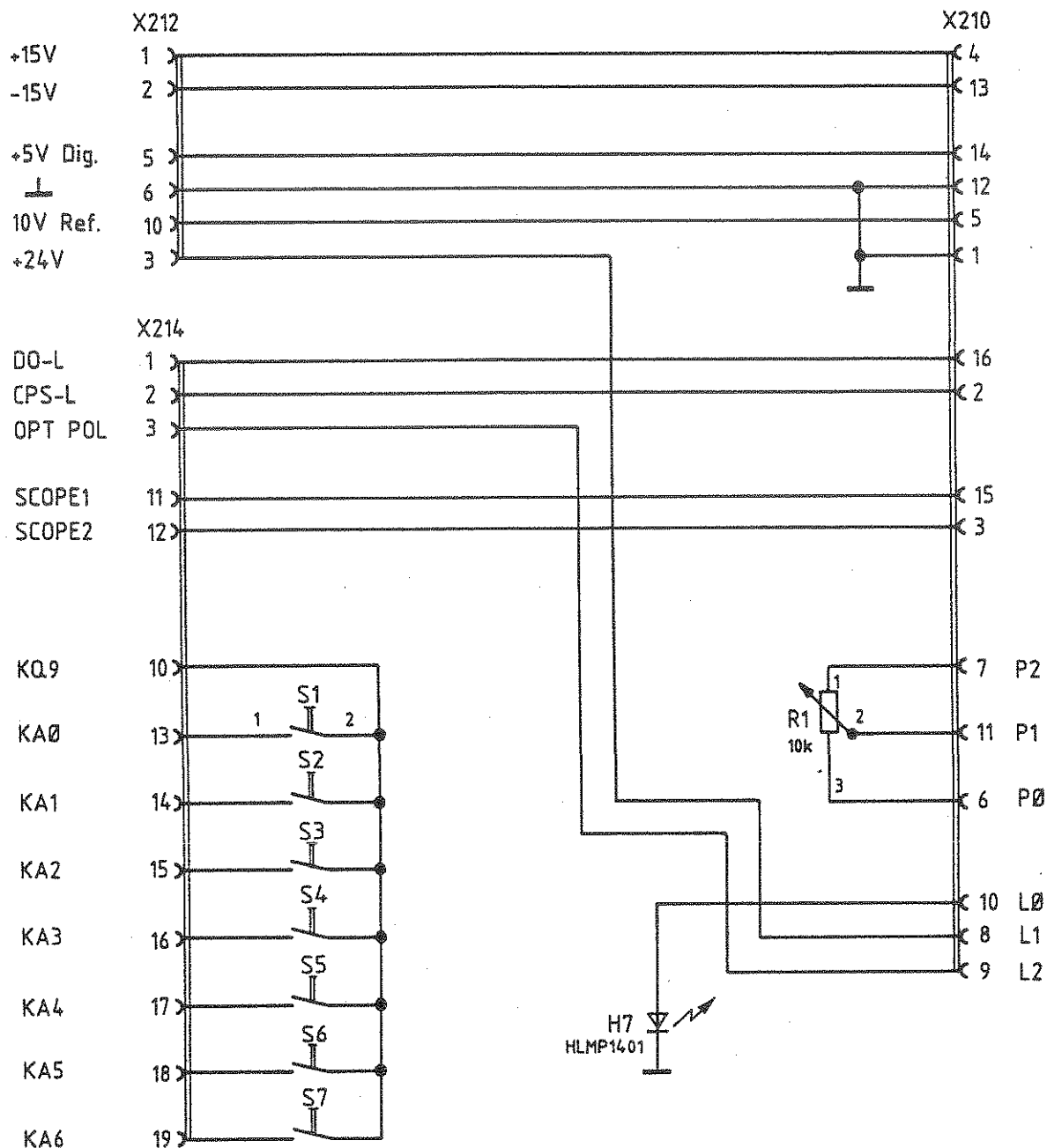
CMT Oszilloskop / CMT Oscilloscope

Z


Zeichn. Nr. 803.1111 S

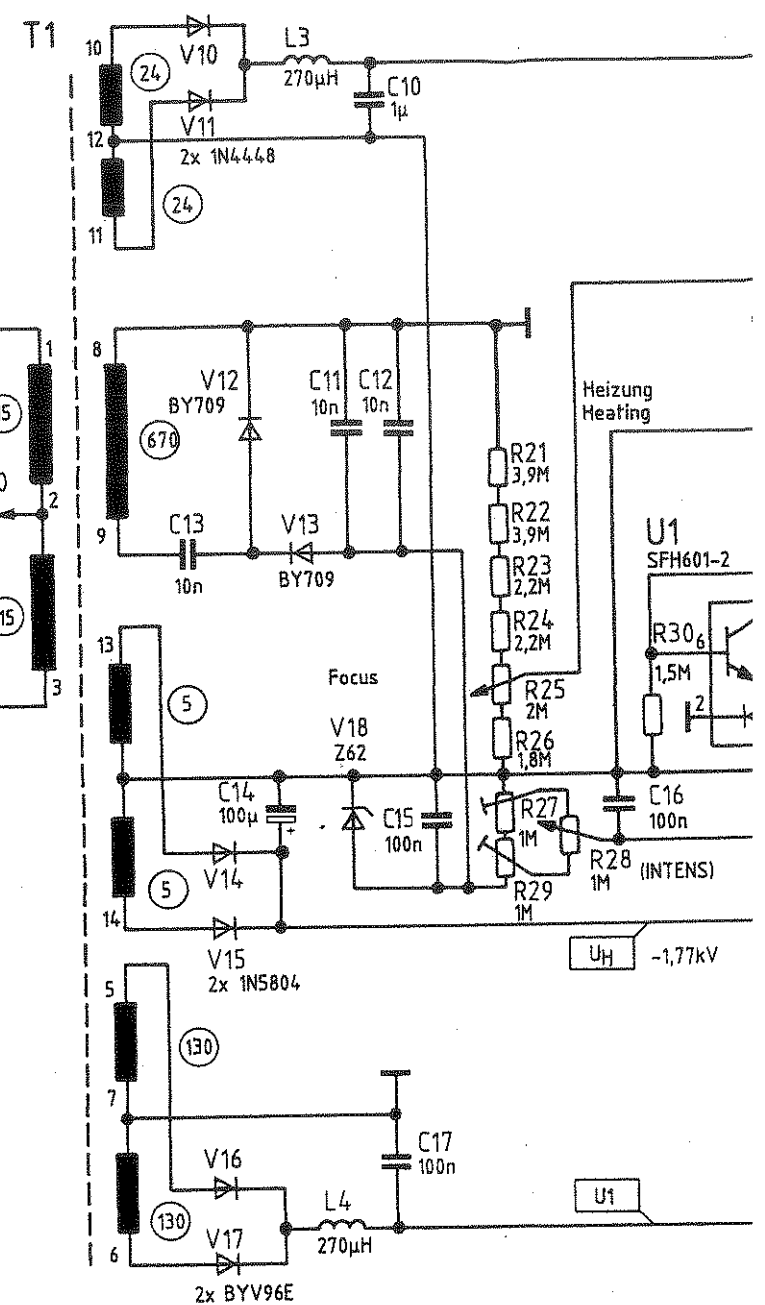
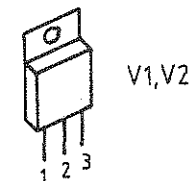
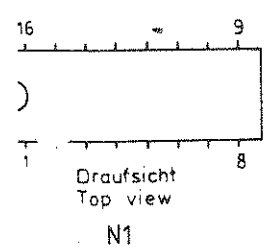
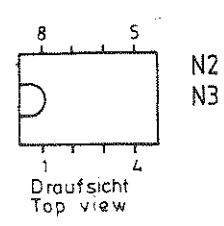
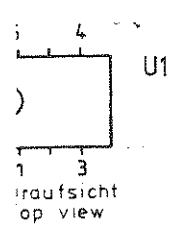
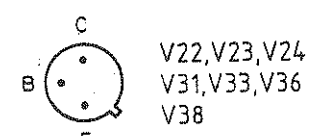
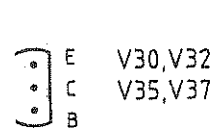
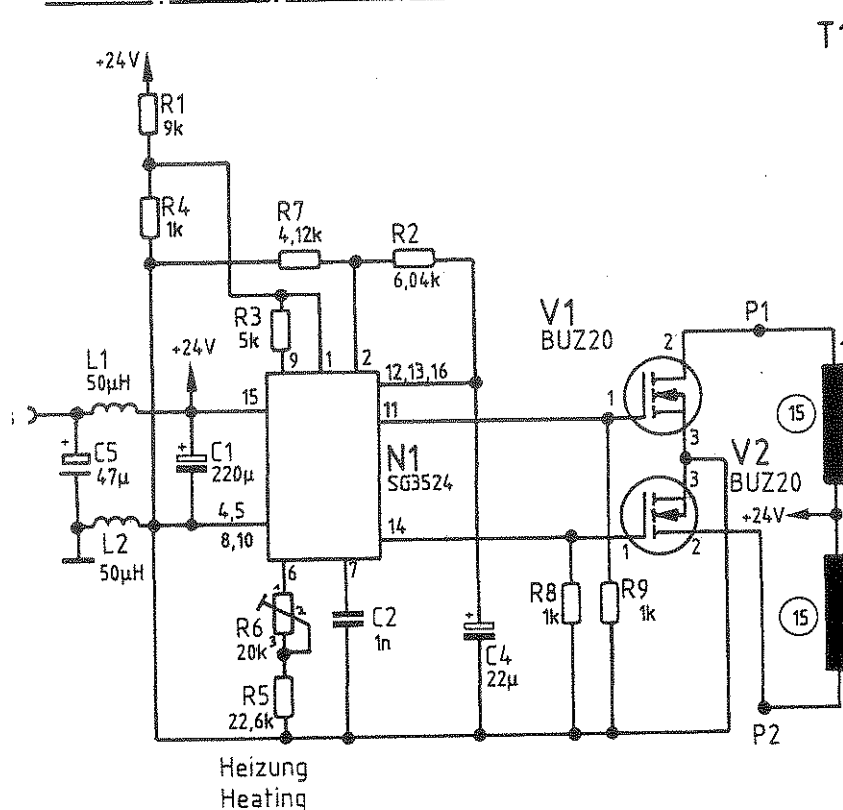
reg. i.V. 802.2020 V

erste Z.

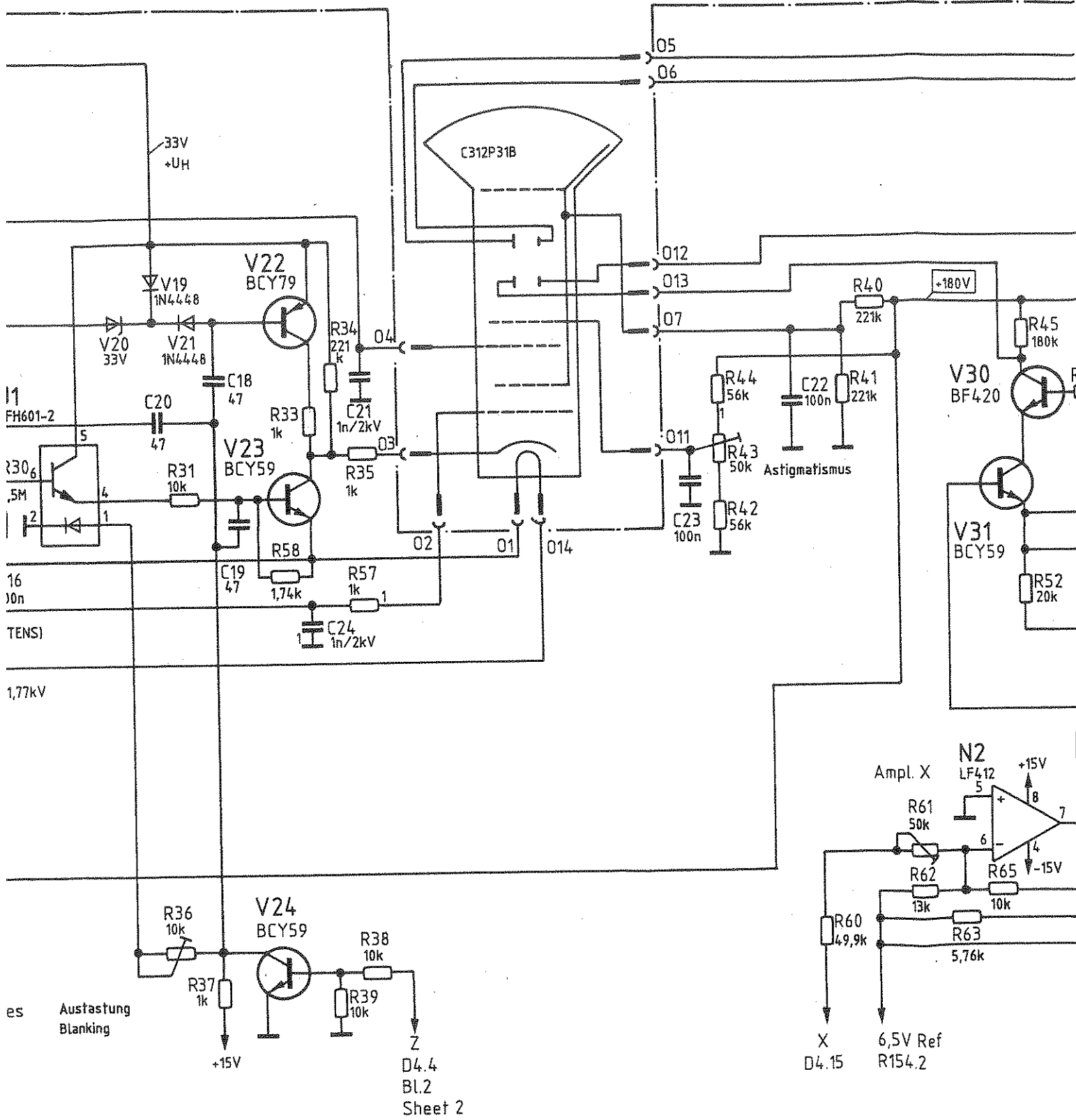


Stromlauf gilt für VAR 02
Circuit diagramm is valid for model 02

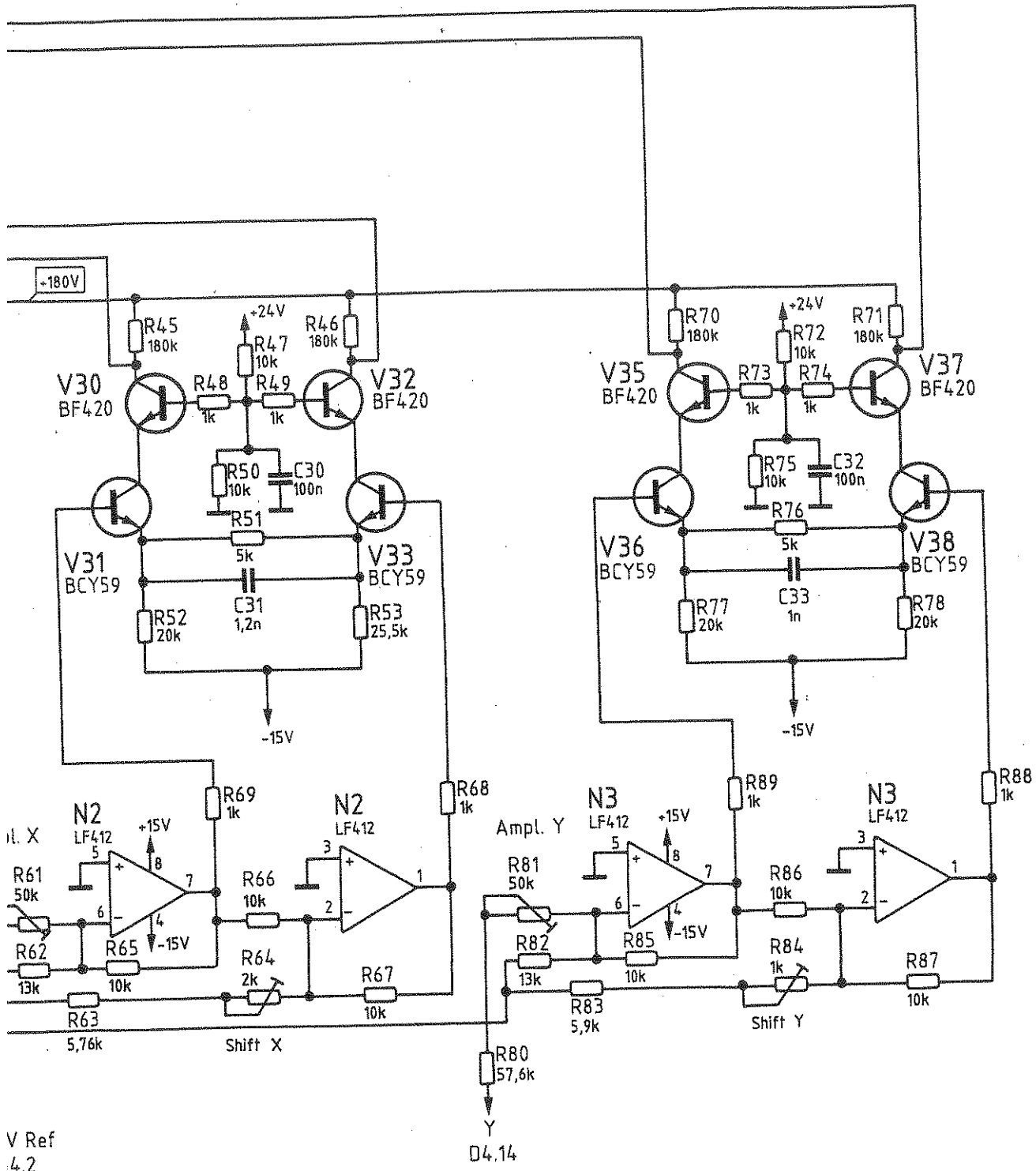
A		7.85	CO	1KGA	Tag	Name	Benennung			Z
				Bearb.	11.84	LS	ED-Oszilloskope Tastatur			
				Gepr.			ED-Oscilloscope keyboard			
				Norm						
				 ROHDE & SCHWARZ			Zeichn.-Nr.		Blatt-Nr.	
							803.1170 S			
And. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CMT			reg. i. V.	802.2020 V	erste Z.	803.1111



Netzteil und Endstufen
Power supply and output stages

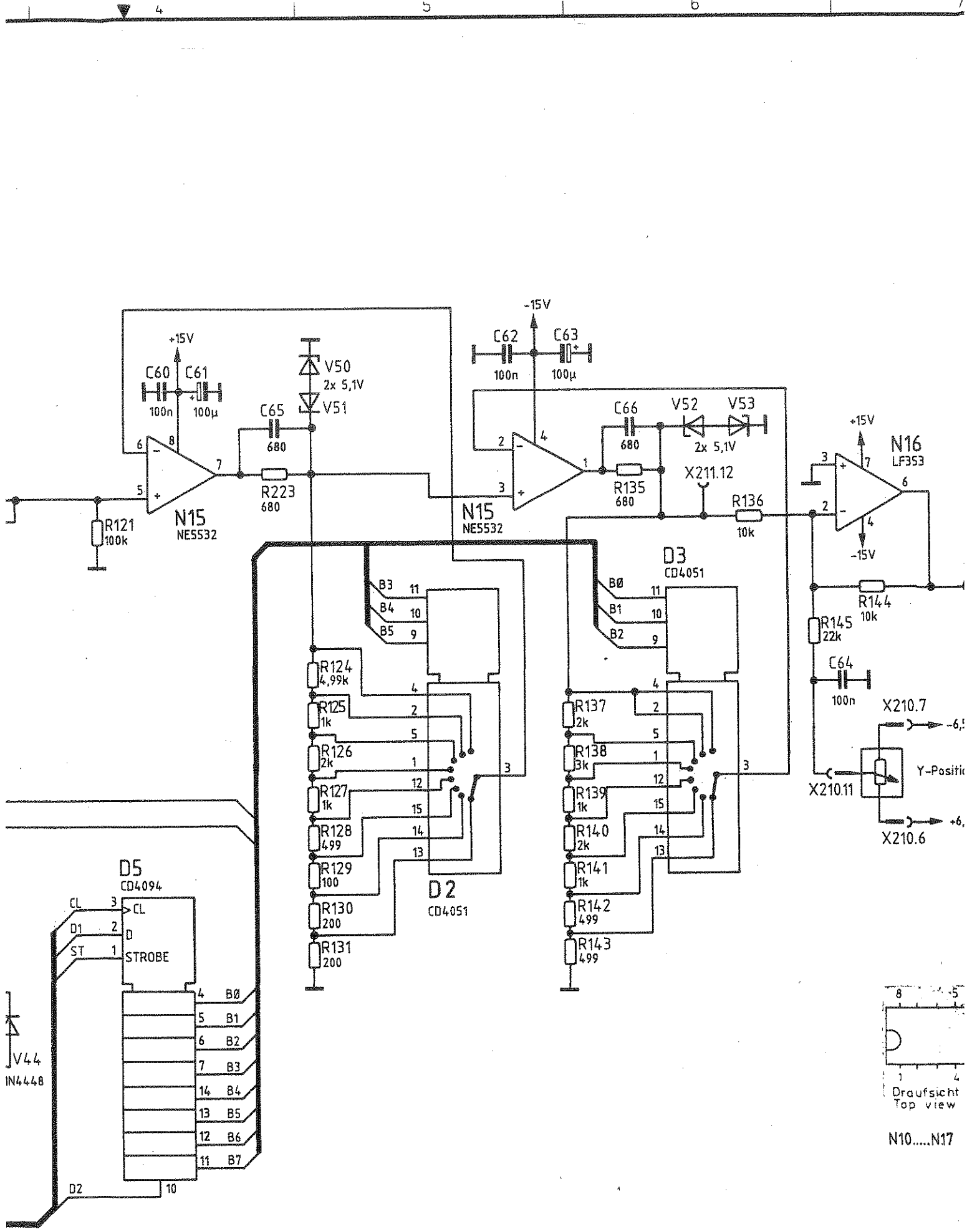


IWARZ	A		7.85	CO	D	35533	11.86	CO	1KGA	Tag	Name	Benennung
	B	32954	8.86	CO	E	35547	5.87	IB	Bearb.	7.85	CO	
	C	35533	8.86	CO	F	38951	7.87	LS	Gepr.			
	And. Zust.	Änderungs-Mitteilung	Datum	Name	And. Zust.	Änderungs-Mitteilung	Datum	Name	Norm			
	F											

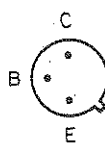
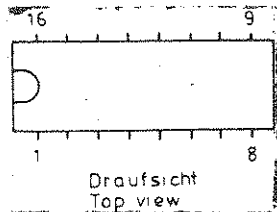
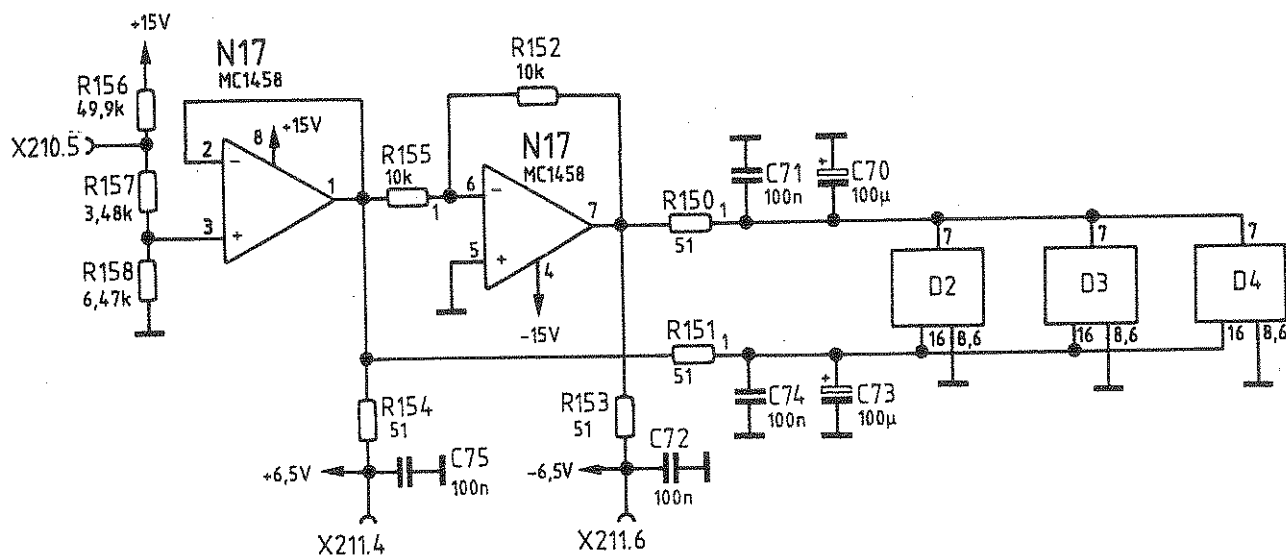
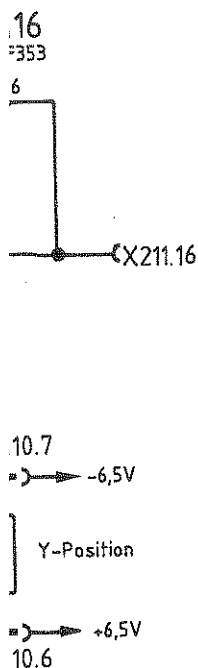
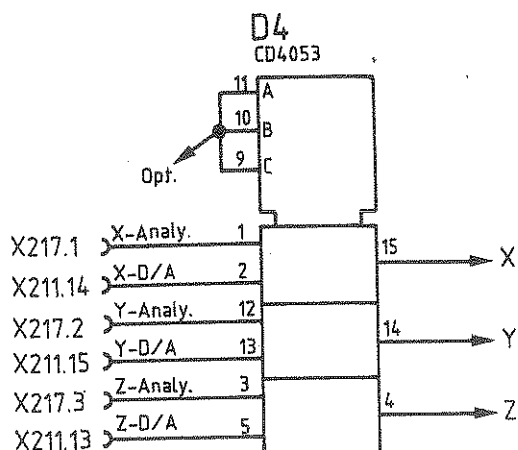


V Ref
4.2

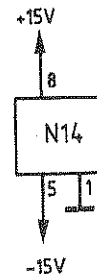
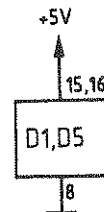
Benennung	Z	Zeichn.-Nr. 803.1211 S	Blatt-Nr. 1
Scope			v 2 BI
zu Gerät: CMT		reg. i. V. 802.2020 V	erste Z 803.1111



	A		7.85	CO					1KSA	Tag	Nr
	B	32954	4.86	CO					Bearb.	7.85	C
									Gepr.		
	And. Zust.	Anderungs-Mitteilung	Datum	Name	And. Zust.	Anderungs-Mitteilung	Datum	Name	Norm.		



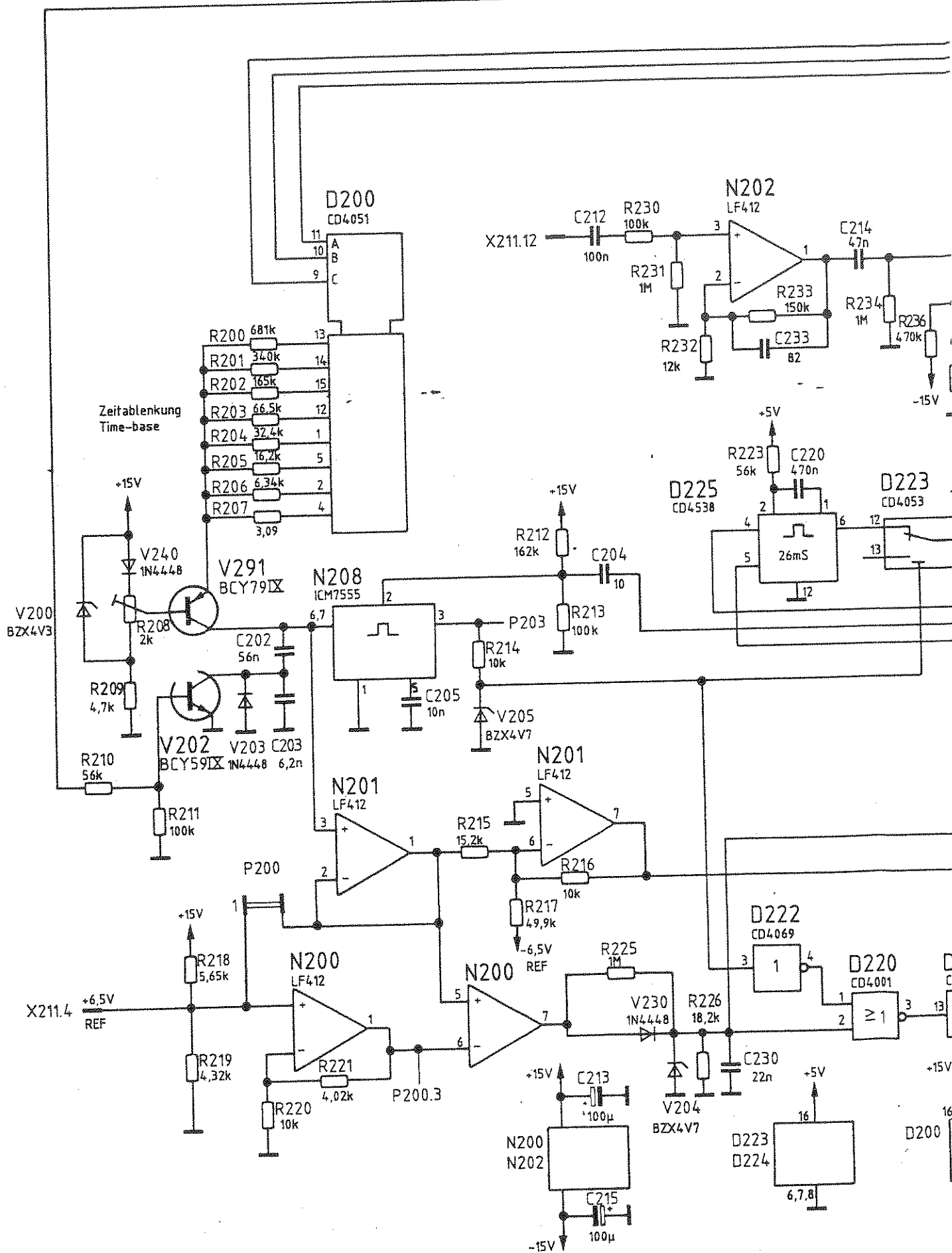
V45

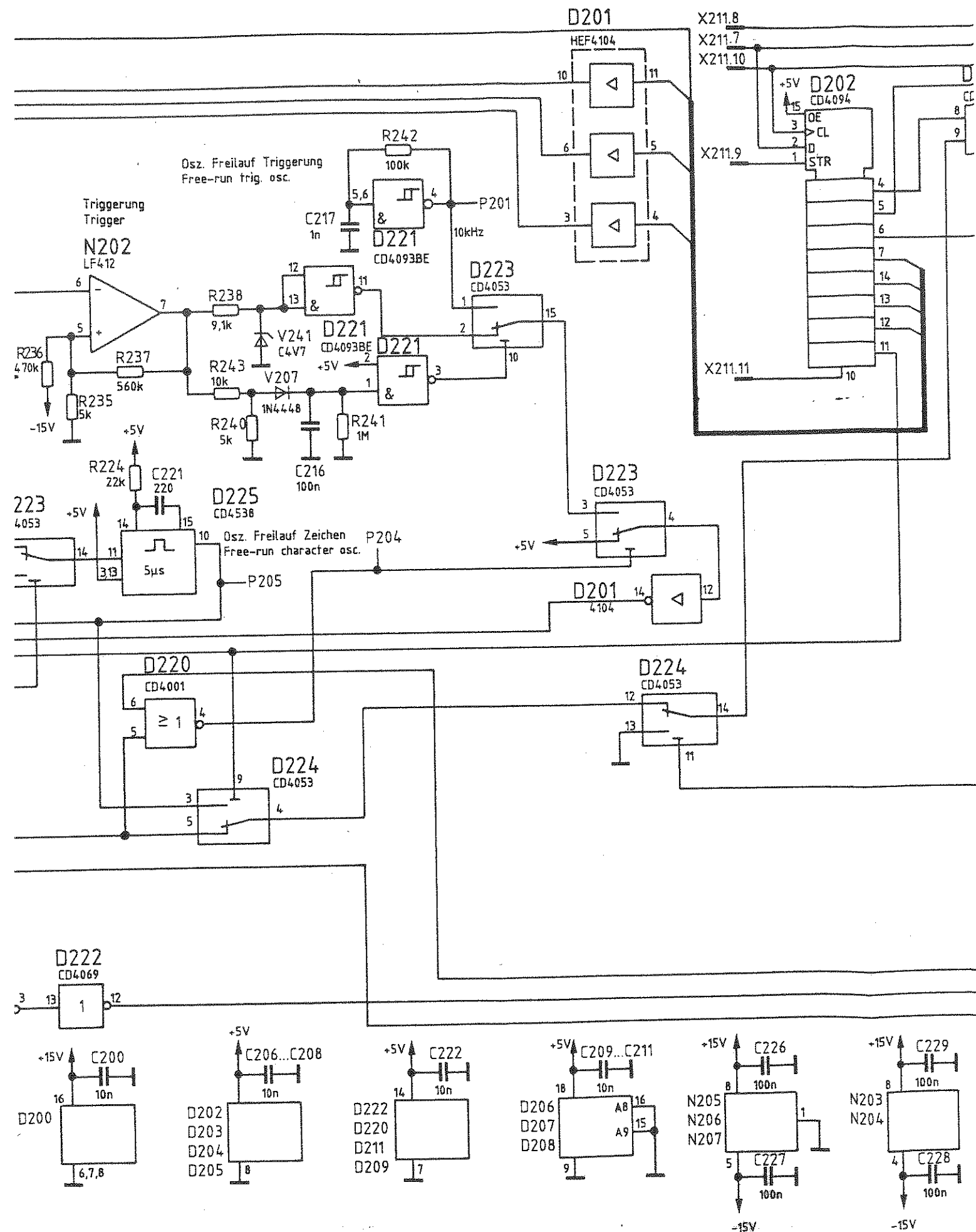


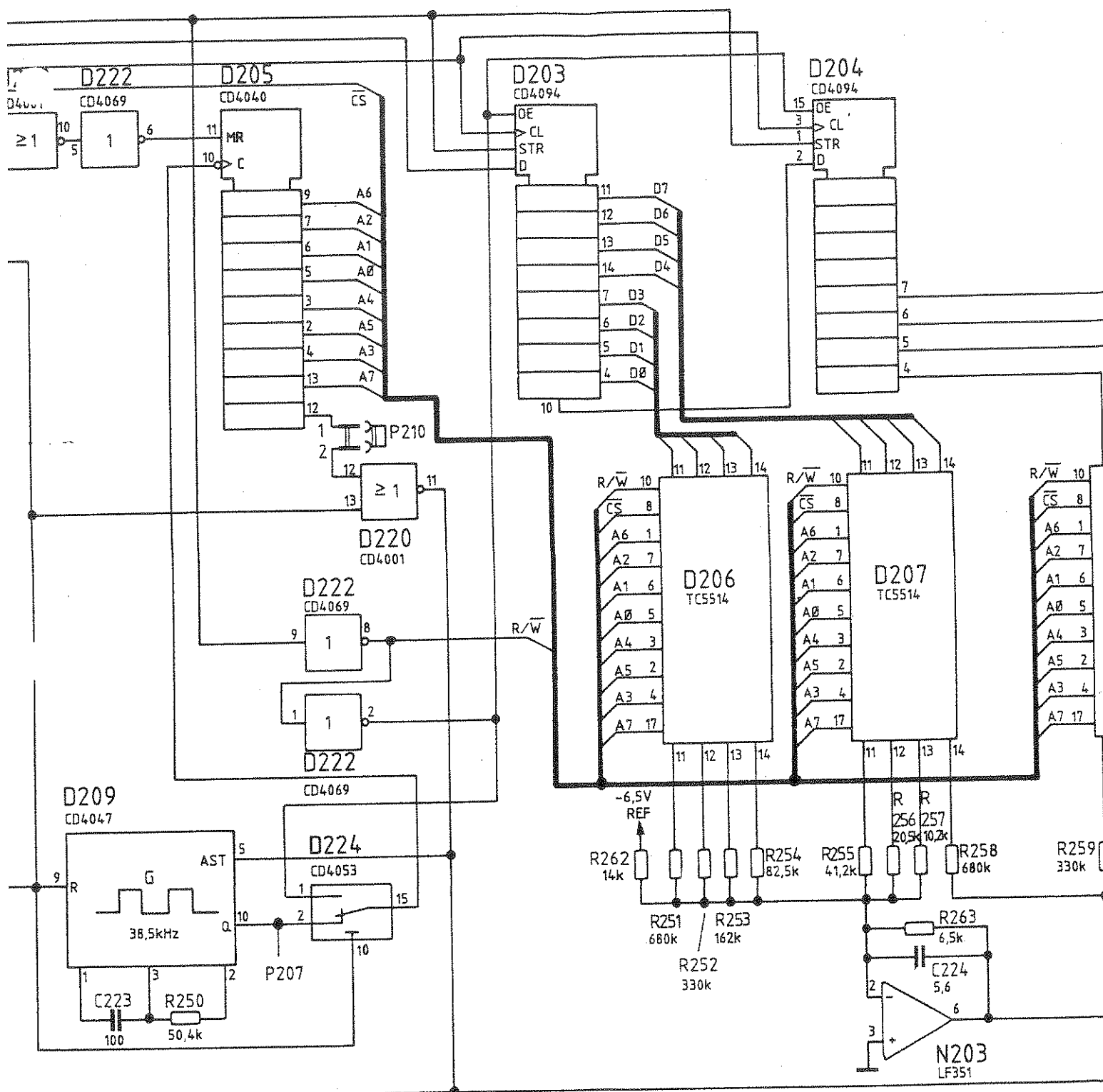
D1,D2,D3,D4,D5

10.....N17

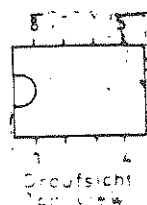
Name	Benennung	Z	Zeichn.-Nr.
CO	Scope		803.1211 S
	zu Gerät: CMT	reg. i. V.	802.2020 V
		erste Z	803.1111



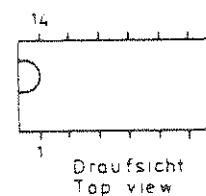



ROHDE & SCHWARZ

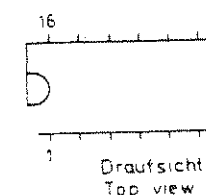
A		7.85	CO	D	35547	5.87	IB	1KSA	T
B	32954	4.86	CC					Beard.	7.
C	35533	8.86	CO					Gepr	
And Zus.	Änderungs- Mittel	Datum	Name	Änd. Zus.	Änderungs- Mittel	Datum	Name	Norm.	



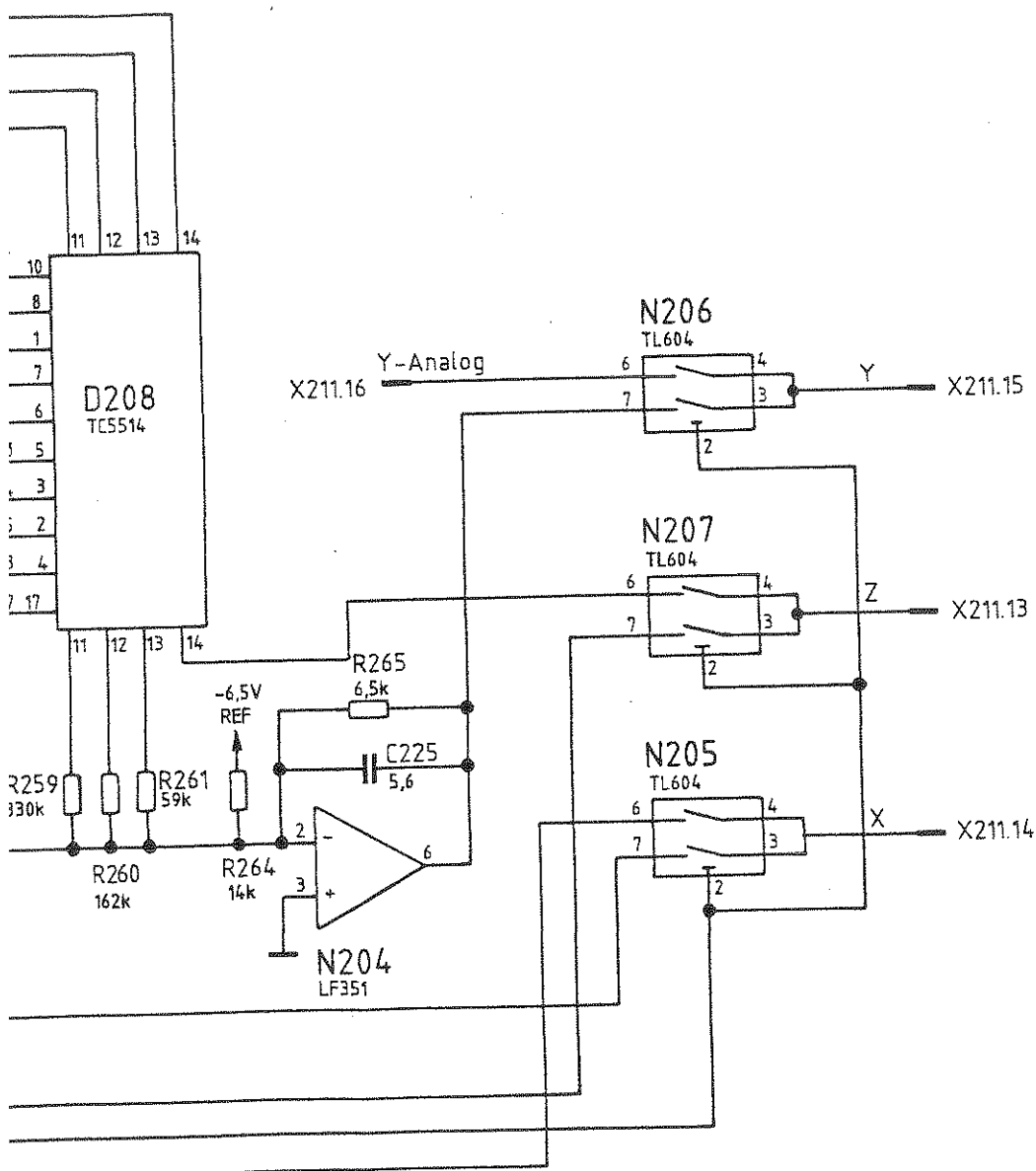
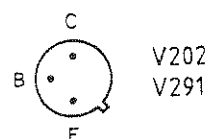
N200.....N208



D209,D220,D221,D



D200.....D208
D223,D224,D225



Stromlauf gilt für VAR 02
Circuit diagram is valid for model 02

Tag	Name	Benennung	Zeichn.-Nr.
7.85	CO	X/Y - Zeichenerzeugung X/Y - Marker generation	803.1257 S
		zu Serial CMT	req. V 802.2020 V erste Z 803



ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

RF Millivoltmeter Option CM-B8

803.6813.02

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Component lists

Circuit diagrams

Component layout diagrams

5.1 Function Description

The functional principle of this option is based on the comparison of the rectified voltages of two circuits.

In addition to the meter rectifier for the RF voltage to be measured, the probe and the insertion unit each contain a reference rectifier of similar design to which an AC reference voltage generated in the instrument is applied. The difference between the two rectified voltages is further amplified in the instrument. Since the voltages from the rectifiers may be less than 1 μ V, the input amplifier of the option is designed as a chopper-stabilized DC voltage amplifier. This consists of the chopper transistors V46 and V48, the amplifier V50 and N60, the synchronous rectifier D55, the transistor V65 and the amplifier N70. The generator D40 supplies the switching voltage for the chopping amplifier and the synchronous rectifier. The amplified voltage is applied to the feedback branch D25 via V80 and V81. Transistors V80 and V81 act like a rectifier which allows positive voltages to pass through but blocks negative voltages. This is necessary to stabilize the control loop.

The DC output voltage of transistors V80 and V81 is converted in D25 into an amplitude-proportional squarewave AC voltage with a frequency of 5 kHz. The switching voltage for D25 is provided by generator D30. The transformer T20 together with the capacitor C20 and the resistors R22 to R24 constitutes a damped resonant circuit whose resonance frequency is 5 kHz and which converts the 5-kHz squarewave oscillation into a sinewave voltage. This voltage is amplified in the driver amplifier N10 and applied to the reference rectifier in the probe (or insertion unit) via transformer T1. The gain of this driver amplifier can be adjusted using R21 which sets the full-scale value of the display.

Because of the high gain of the control loop, the amplitude of the reference voltage is adjusted such that the difference between the rectified voltages becomes zero except for a small offset. Since the diodes in the meter and reference rectifiers are selected with the same characteristic, the rms values of the input voltage and the reference voltage become equal with the same waveform (sinewave).

The feedback circuit therefore produces a proportionality between the DC output voltage and the rms value of a sinewave input voltage. The display is therefore proportional to the rms value of a sinewave input voltage. The accuracy is largely dependent on the equality in the characteristics of the four diodes within a probe.

The input voltage taken from transistors V80 and V81 is applied to the A/D converter on the digital unit (802.4517.02) via the selectable amplifier N110 (0.20 dB) and the analog multiplexer on the analog unit (802.8412.02).

5.2 Testing and Adjustment

The ambient temperature must be between 20 and 25 °C and the instrument must have been switched on for at least 10 minutes.

The probe is used together with the BNC adapter (insertion adapter) as a URV probe. An insertion unit can also be used but a T-piece must be inserted so that the internal conductor is accessible for voltage measurements.

With a gain of 20 dB, first adjust the offset to 0 mV at N110. The gain of 20 dB at N110 is retained for the following adjustments.

Resonance adjustment

Apply a voltage with a frequency of 1 MHz and an amplitude $V_{rms} = 1 \text{ V}$ to the probe. Using R30, adjust the output voltage at X1.B29 to a minimum as exactly as possible.

Chopper adjustment

Disconnect the test voltage and set R38 fully clockwise. Measure the voltage at X3.14 using an oscilloscope and adjust the AC voltage component (approx. 22 Hz) to a minimum using R45.

Offset adjustment

Adjust R38 such that the output voltage at X1.B29 varies between 0 and 3 mV (a voltage must not be applied to the probe).

Gain adjustment

Apply a voltage with a frequency of 1 MHz, an amplitude of $V_{rms} = 1 \text{ V} \pm 1 \text{ mV}$ and a distortion factor $< 0.3\%$ to the probe. Adjust the output voltage at X1.B29 to $10.000 \text{ V} \pm 10 \text{ mV}$ using R21.

Fine adjustment for low RF voltages

Apply an AC voltage (1 MHz, $1.2 \text{ mV} \pm 1\%$). Adjust the output voltage at X1.B29 to 12 mV using R38.

5.2.1 Testing the Reference Generator

The AC output voltage of the reference generator must be approx. 300 mV at X3.5 with a DC input voltage of 1 V at X3.13 (caution: internal impedance at test connector X3.5 = 10 k Ω .)

5.2.2 Replacing the Diodes in the Probe

If one or more of the diodes are destroyed because the permissible input voltage has been exceeded, all four diodes must be replaced. A set of four diodes can be ordered from Rohde & Schwarz under order number 243.9001. Replace as follows:

- + Push back the cable bushing.
- + Remove the fixing screw of the probe sleeve.
- + Remove the probe sleeve in the cable direction.
- + Replace the set of four diodes GL1.I to GL1.IV using tweezers.

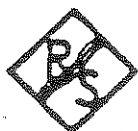
!!! Do not solder, diodes are to be inserted !!!

If it is necessary to carry out soldering work on the probe, first remove the four diodes from their sockets to protect them from high temperatures.

5.2.3 Replacing the Diodes in the 10-V and 100-V Insertion Units

If one or more of the diodes are destroyed because the permissible input voltage has been exceeded, all four diodes must be replaced. A set of four diodes can be ordered from Rohde & Schwarz under order number 288.8304. Replace as follows:

- + Unscrew the labelled cover. All four diodes are now accessible.
- + Pull out the diodes GL1.III and GL1.IV. The connection wires are plugged into miniature sockets and are not to be soldered.
- + The diodes GL1.I and GL1.II are also plugged in. First pull the wire facing the coaxial part upwards out of the miniature socket; then pull the diode to the front and thus the other wire from the miniature socket located in the chamber partition.



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MÜNCHEN

Schalteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans

ROHDE&SCHWARZ		AZ	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	1
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
C1	CK 22NF+- 5%63V RD 8X18KS CAPACITOR			024.4258		
C2	SCHUEMANN CKS22000/5/63/400 CC 1NF+-10%63V K2000 CERAMIC CAPACITOR			CC 022.0784		
C10	VALVO 2222 63051 102 CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR			358.6062		
C11	NCC SRE 22UF/16V+-20% CK 1UF+-10%50V5RM MKT CAPACITOR			CK 099.2998		
C12	WIMA MKS2/50/1UF/10% CC 33PF+-2%4X5NPO CAPACITOR			CC 087.6487		
C13	VALVO 2222 678 10339 CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR			358.6062		
C14	NCC SRE 22UF/16V+-20% CK 220NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR			CK 006.5056		
C20	ROEDERST MKT1822-422/0 CK 10NF+-1% 63V RD 7X18KS CAPACITOR			024.4593		
C26	SCHUEMANN CKS10000/1/63/40 CK 1UF+-10%50V5RM MKT CAPACITOR			CK 099.2998		
C30	WIMA MKS2/50/1UF/10% CC 1 NF+- 5%100V NPO VIEL CERAMIC CAPACITOR			CC 060.0894		
C40	ERIE 8133-100-COG-1NF-J CK 47NF+-20%100V4X9X11MKT CAPACITOR			CK 087.0914		
C45	ITT 42515-12747 CK 100NF+-5%63V5RM MKT CAPACITOR			CK 099.2930		
C46	WIMA MKS/2/63/0,1UF/5% CC 1PF+-0,25PF3X4P100 CAPACITOR			CC 087.6170		
C50	VALVO 2222 678 03108 CK 470NF+-5%63V5RM MKT CAPACITOR			CK 099.2975		
C51	WIMA MKS2/63/0,47UF/5% CE 47UF+-20%10V6,3RDX5RAD ELECTROLYTIC CAPACITOR			377.0308		
C55	NATIONAL ECEALAKS470 CK 220NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR			CK 006.5056		
C56	ROEDERST MKT1822-422/0 CE 22UF-10+50% 16V 9X13B ELECTROLYTIC CAPACITOR			CE 086.4368		
C60	ROEDERST ELKO 22/16 CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR			358.6062		
	NCC SRE 22UF/16V+-20%					

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		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	2
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
C61	CC 100PF+-2%6X9NPO CAPACITOR VALVO 2222 678 10101	CC 087.6541				
C63	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR NCC SRE 22UF/16V+-20%	358.6062				
C65	CK 220NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR ROEDERST MKT1822-422/0	CK 006.5056				
C70	CC 33PF+-2%4X5NPO CAPACITOR VALVO 2222 678 10339	CC 087.6487				
C71	CC 100PF+-2%6X9NPO CAPACITOR VALVO 2222 678 10101	CC 087.6541				
C75	CC 2,2PF+-0,25PF3X4NPO CAPACITOR VALVO 2222 678 09228	CC 087.6341				
C80	CK 47NF+-20%100V4X9X11MKT CAPACITOR ITT 42515-12747	CK 087.0914				
C100	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR NCC SRE 22UF/16V+-20%	358.6062				
C101	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-ALESS-101	803.0580				
C105	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR NCC SRE 22UF/16V+-20%	358.6062				
C106	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-ALESS-101	803.0580				
C115	CE 22UF+-20%16V5RDX5RAD.A ELECTROLYTIC CAPACITOR NCC SRE 22UF/16V+-20%	358.6062				
C116	CE 1,0UF+-20%35V 5X 4X 7 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR1-1/35	CE 022.8185				
D25	BL CD4016BF 4XANALOGSCH ANALOG SWITCH RCA CD4016BF	BL 086.8040				
D30	BL CD4047AE MULTIVIBR. MULTIVIBRATOR RCA CD4047AE	BL 086.7221				
D40	BL CD4047AE MULTIVIBR. MULTIVIBRATOR RCA CD4047AE	BL 086.7221				
D55	BL CD4016BF 4XANALOGSCH ANALOG SWITCH RCA CD4016BF	BL 086.8040				
D110	BJ TL601CP 2X ANALOGSCH ANALOG SWITCH TEXAS TL601CP {MJG}	BJ 213.4530				

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		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	3
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
D115	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF			BL 418.0064		
N10	BO LM308N PREC. OPAMP OPERATIONAL AMPLIFIER MOTOROLA LM308N			BO 247.7510		
N60	BO LM308N PREC. OPAMP OPERATIONAL AMPLIFIER MOTOROLA LM308N			BO 247.7510		
N70	BO LM308N PREC. OPAMP OPERATIONAL AMPLIFIER MOTOROLA LM308N			BO 247.7510		
N110	BO LF411CN JFET OPAMP OPERATIONAL AMPLIFIER NSC LF411CN			349.3058		
R1	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D			RL 082.6543		
R10	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D			RL 083.1351		
R11	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D			RL 082.6543		
R12	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/332OHM-F-D			RL 083.0255		
R13	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D			RL 083.1297		
R14	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D			RL 082.6543		
R20	RL 0,35W 51,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/51,1K-F-C			RL 083.1822		
R21	RS 0,5W20KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-203			RS 087.7577		
R22	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C			RL 083.1639		
R23	RL 0,35W 24,3KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/24,3K-F-C			RL 083.1574		
R24	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C			RL 083.1639		
R26	RL 0,35W 1,21KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,21K-F-D			RL 083.0655		
R30	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103			RS 247.7903		

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		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	4
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
R31	RL 0,35W 41,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/41,2K-F-C	RL 082.2319				
R35	RF 0,5 W 10 MOHM +-5% DEPOS.-CARBON RESISTOR RESISTA SK4/10M5%	007.1854				
R36	RL 0,35W562 OHM+-0,1%TK25 RESISTOR DRALORIC SMA/207/562/HM-B-E	RL 083.8662				
R37	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862				
R38	RS 0,5W1MOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-105	RS 087.7602				
R40	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270				
R45	RS 0,5W100KOHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F 100KOHM	RS 087.7583				
R46	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800				
R47	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800				
R48	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800				
R49	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800				
R50	RL 0,35W4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250				
R51	RL 0,35W 825 OHM+-1%TK50 RESISTOR DRALORIC SMA 0207/825OHM-F-C	RL 082.2502				
R52	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862				
R53	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764				
R55	RL 0,35W1,50MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 1,50MOHM 1% TK50	RL 099.8138				
R56	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R60	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R61	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764				

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		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	5
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R62	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R63	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R65	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R66	RF 0,5 W 10 MOHM +-5% DEPOS.-CARBON RESISTOR RESISTA SK4/10M5%			007.1854		
R70	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R71	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R75	RL 0,35W 43,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/43,2K-F-C			RL 083.1774		
R76	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D			RL 082.7862		
R77	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R79	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D			RL 083.0084		
R80	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D			RL 083.1297		
R81	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C			RL 082.2477		
R82	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R90	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D			RL 082.9507		
R91	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D			RL 082.9507		
R100	RL 0,35W 121KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/121K-F-C			RL 083.2070		
R101	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		
R105	RL 0,35W 121KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/121K-F-C			RL 083.2070		
R106	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C			RL 082.1764		

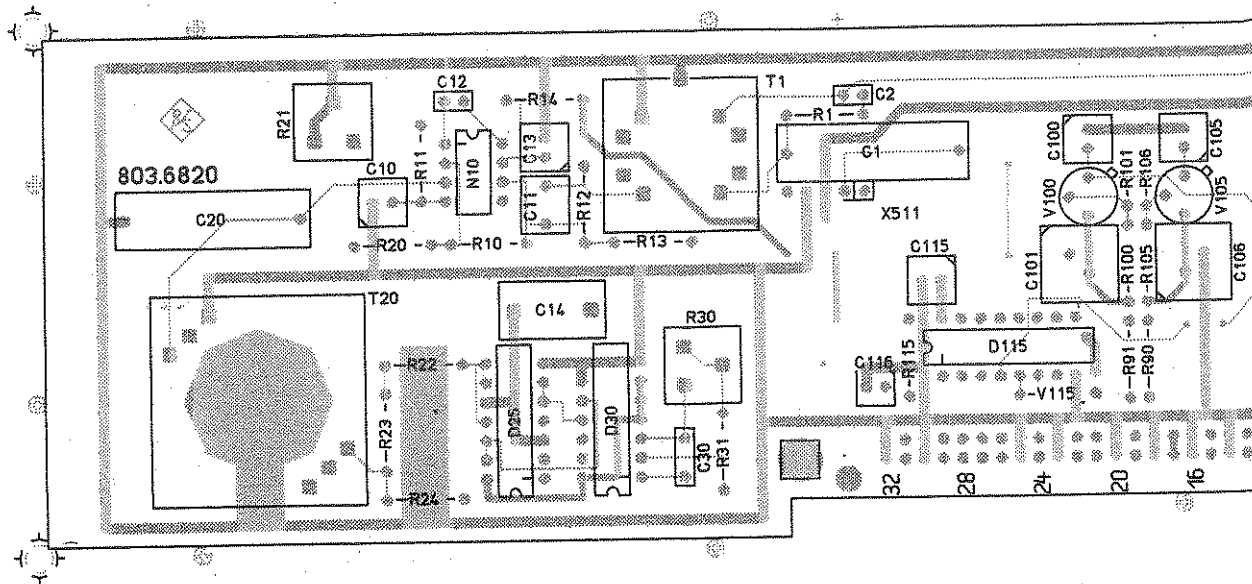
ROHDE&SCHWARZ		Az	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	6
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
R110	RS 0,5W20KOHM+-10%10X10X5 CERMET POTENTIOMETER T	RS 087.7577				
R111	BOURNS 3386F-1-203 RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160				
R112	DRALORIC SMA0207/1K-F-C RL 0,35W 9,09KOHM+-1%TK50 RESISTOR	RL 082.2177				
R113	DRALORIC SMA0207/9,09K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160				
R115	DRALORIC SMA0207/1K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297				
	DRALORIC SMA0207/10K-F-D					
T1	LU UEBERTRAGER 1 TRANSFORMER 1	292.5641				
T20	LU UEBERTRAEGER 2	332.9335				
V35	AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE	AE 252.5386				
V36	VALVO BAV45 AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE	AE 252.5386				
V45	VALVO BAV45 AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700				
V46	TEXAS INST 1N4448 GEGURTET AM 2N4117SELNKAN 40V FET	248.2486				
V47	FET INTERSIL 2N4117/R&S-LV AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700				
V48	TEXAS INST 1N4448 GEGURTET AM 2N4117SELNKAN 40V FET	248.2486				
V50	FET INTERSIL 2N4117/R&S-LV AM 2N6485 NKAN-DUAL-FET	292.5712				
V65	FET INTERSIL 2N6485 AM 2N6485 NKAN-DUAL-FET	292.5712				
V75	INTERSIL 2N6485 AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE	AE 252.5386				
V76	VALVO BAV45 AE BZX55/B11 0,5W Z-DI ZENER DIODE	AE 012.2190				
V77	VALVO BZX55/B11 AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE	AE 252.5386				
V78	VALVO BAV45 AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700				
	TEXAS INST 1N4448 GEGURTET					

ROHDE&SCHWARZ	AZ	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	05	0587	ED HF-MILLIVOLTMETER RF MILLIVOLTMETER	803.6820.01 SA	7

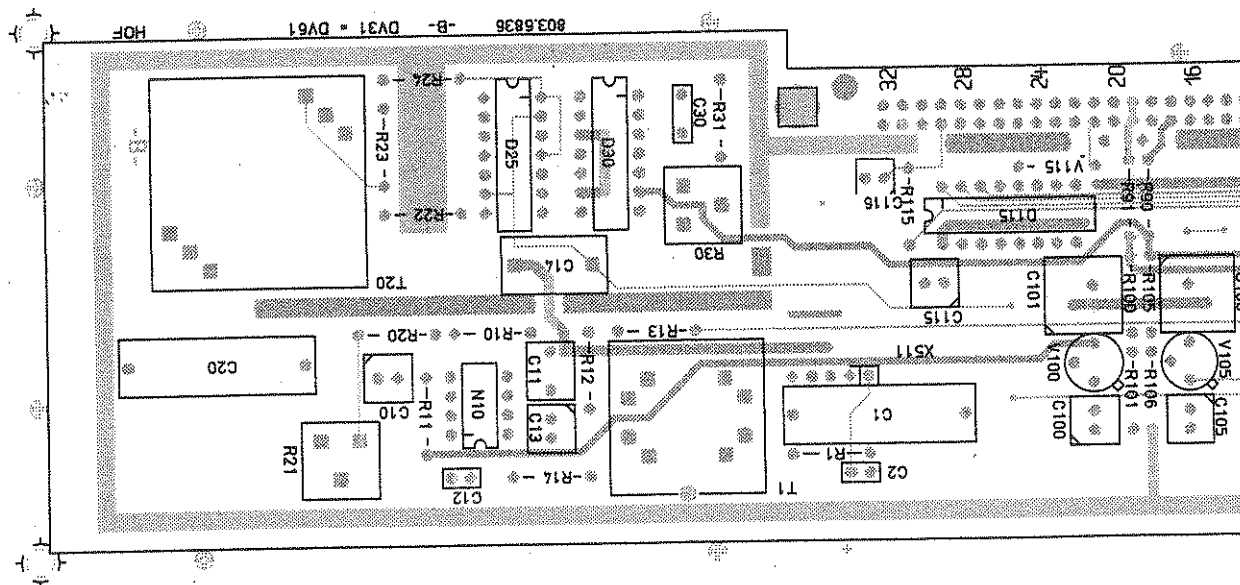
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V80	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	
V81	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX	AK 010.3777	
V100	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX	AK 010.3777	
V105	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	
V115	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT PANDUIT 100-064-033/999	FP 084.6470	
X3	FR IC-FASSUNG 16 POLIG 16-PIN IC-SOCKET PRECICONT US016T	FR 249.6091	
X4	FP INDIRECT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36	FP 242.3600	
X511	FP WINKELSTECKERLEIST.36P ANGLE PIN CONNECTOR BERG 75168-113-36	FP 243.3578	

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Ansicht und Leitungsfi
View of tracks on com



Ansicht und Leitungsfi
View of tracks on sol

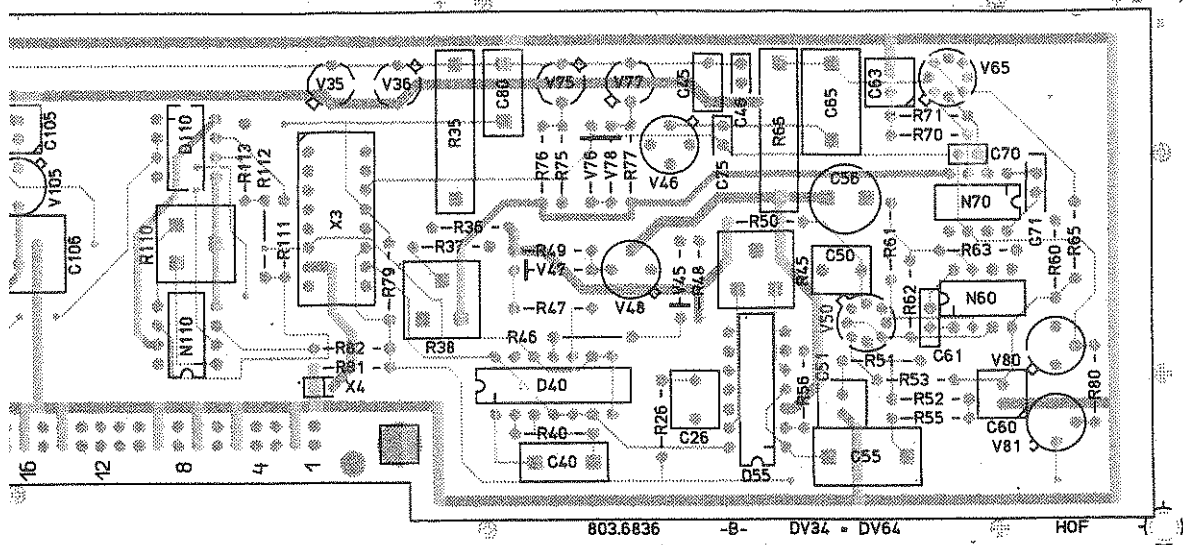


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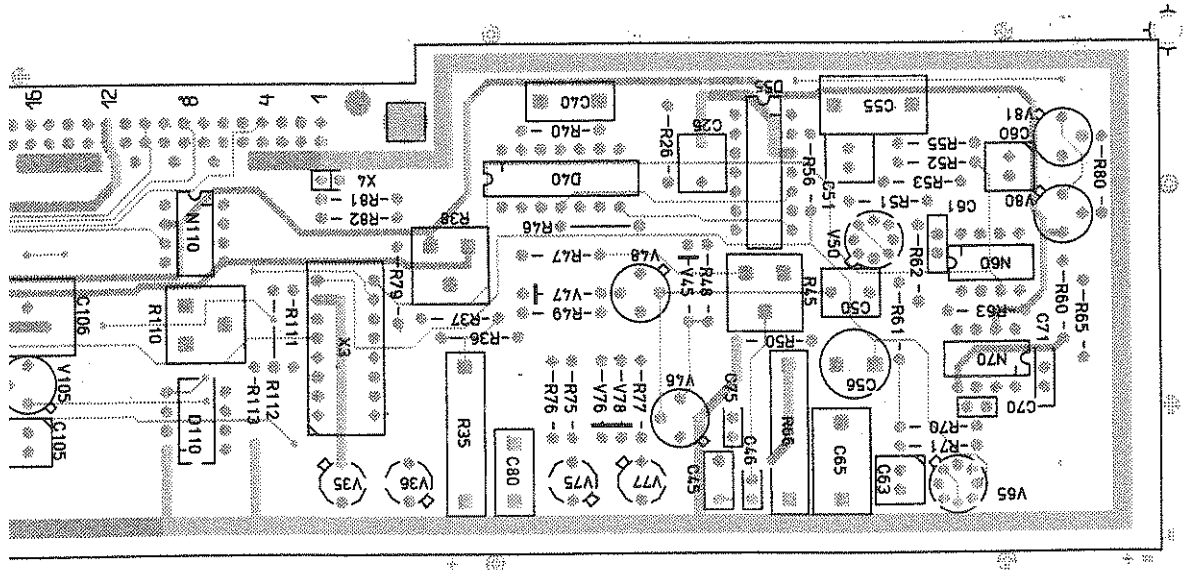



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Bauelemente erfordern eine
besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

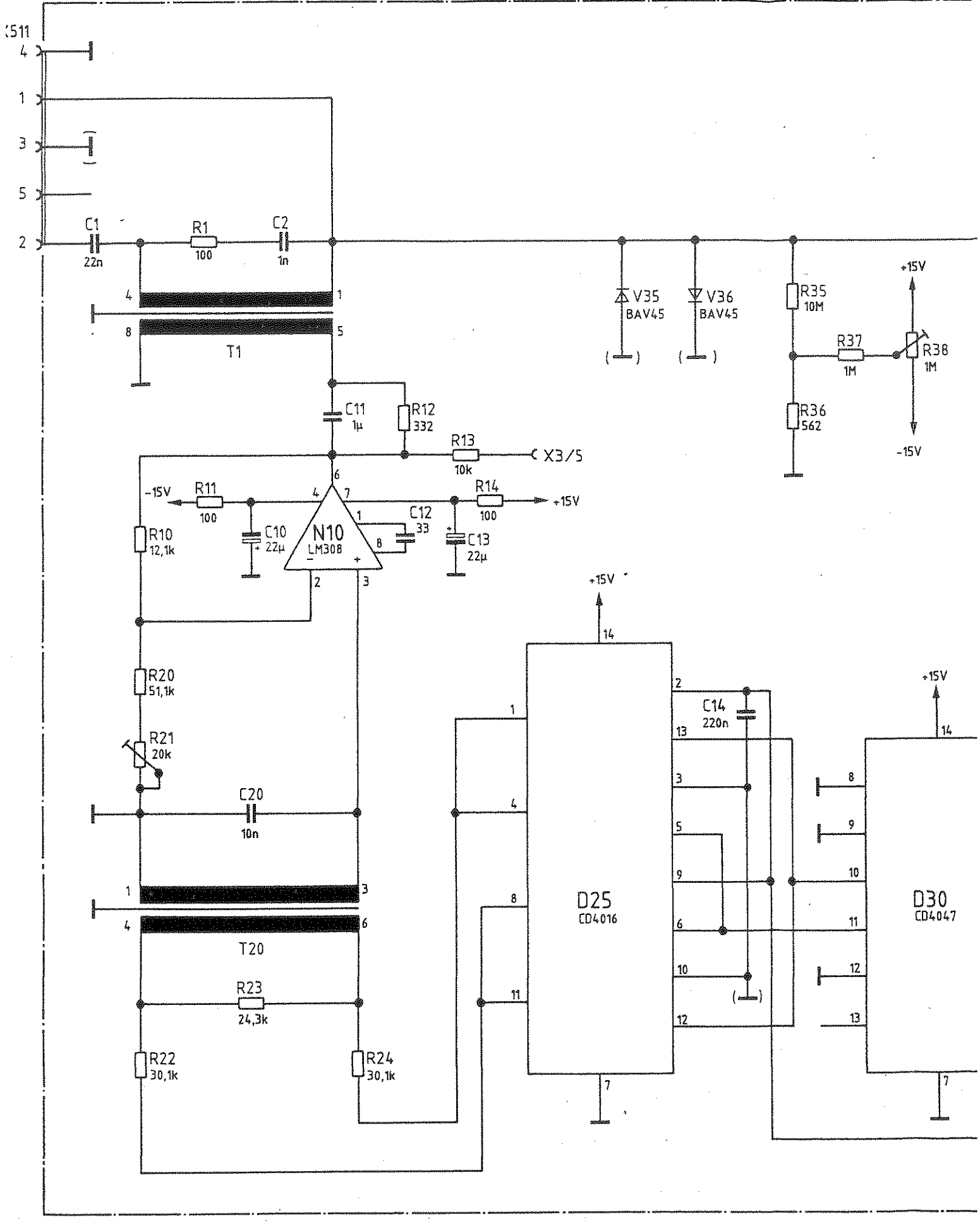
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component side

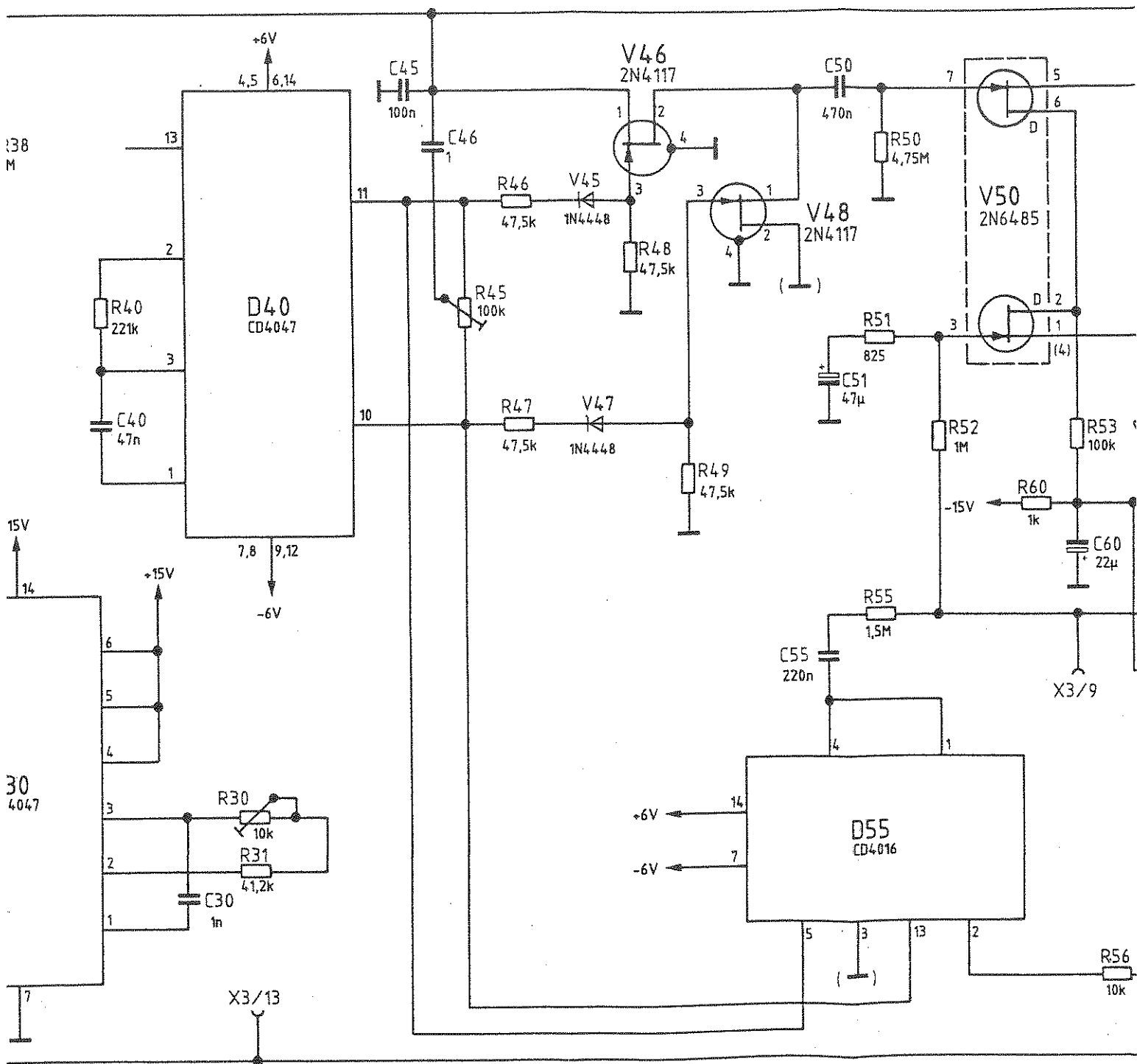


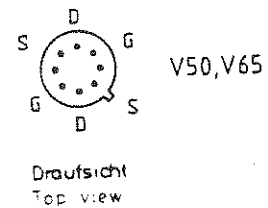
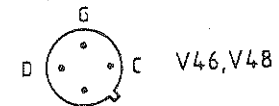
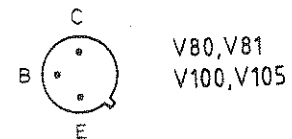
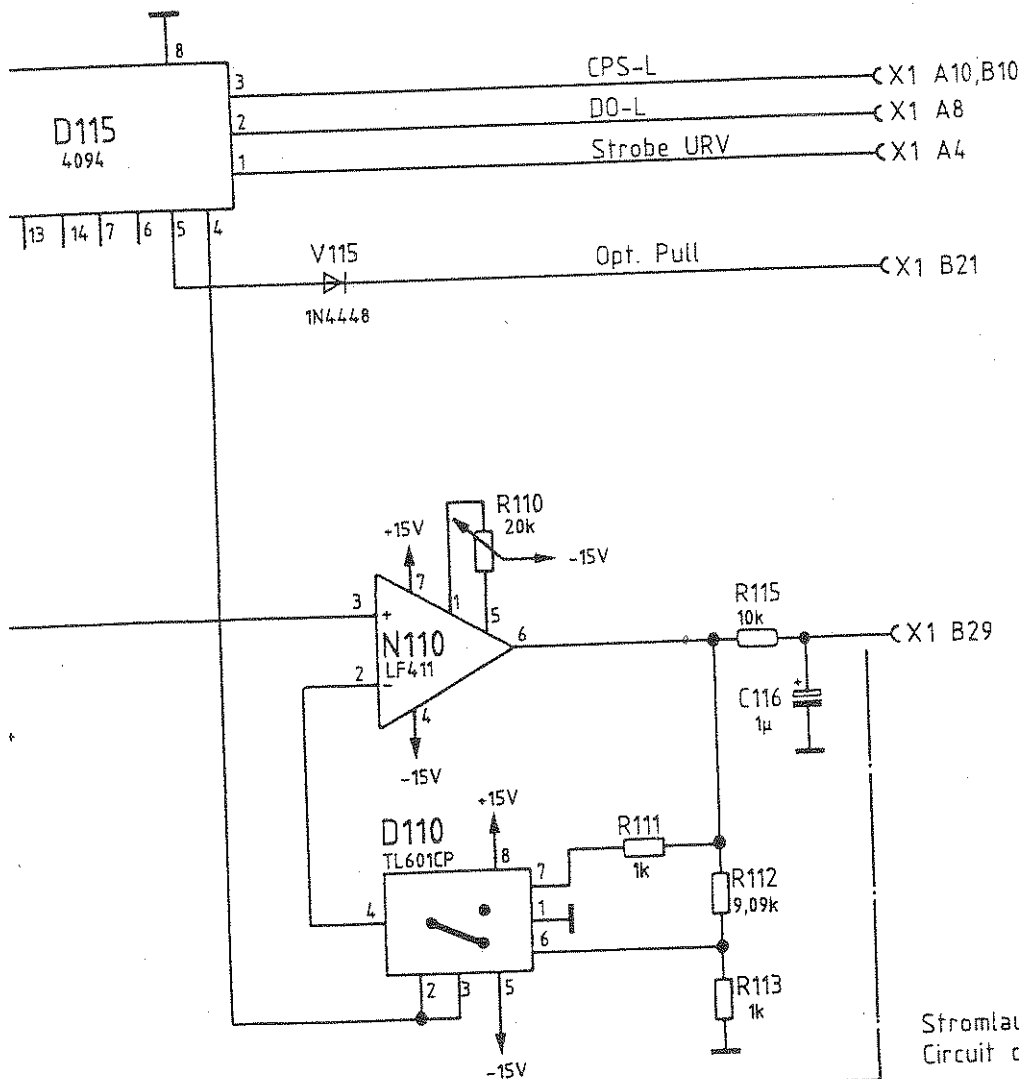
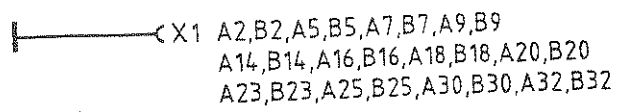
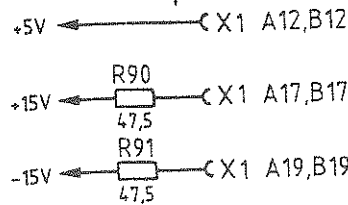
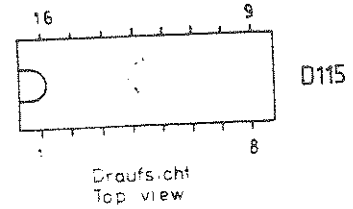
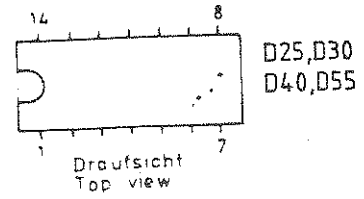
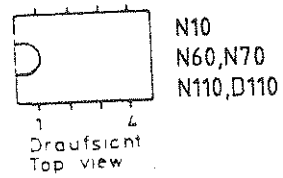
ungsführung Lötseite
solder side



A		10.85	H0	Maße ohne Toleranzangabe		Maßstab 1 : 1			
D	32 956	10.85	H0			Halbzeug, Werkstoff			
				1KSA	Tag	Name	Benennung HF-Millivoltmeter		Z
				Bearb.	10.85	H0			
				Gepr.					
				Norm					
				 ROHDE & SCHWARZ			Zeichn.-Nr.		Blatt-Nr. 2
							803.6820.01		
Änd. Zust.	Änderungs- Mitteilung	Tag	Name	zu Gerät CM - B8			reg. i. V. 803.6813V		erste Z.







Stromlauf gilt für VAR 02
Circuit diagram is valid for model 02

Name	Benennung	Z	Zeichn.-Nr	Blatt-Nr
BT	HF-Millivoltmeter RF-Millivoltmeter		803.6820 S	
	zu Gerät CM-B8		reg. V 803.6813 V	erste Z 803.6813



ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Transfer Memory Module CM-Z1

803.7510.02

5	<u>Service Manual for Transfer Memory Module CM-Z1</u>	5.1
5.1	Function Description	5.1
5.1.1	Interface to Instrument	5.2
5.1.2	RAM	5.2
5.1.3	Internal Interface	5.2
5.1.4	BUSY Display	5.4
5.1.5	Battery Supply	5.4
5.2	Testing and Adjustment	5.4
	Component lists	
	Circuit diagrams	
	Component layout diagrams	

5.1 Function Description

This module is used to record and reproduce programmed instrument settings and data. The entered data are retained by a built-in battery supply, even if the module is not connected to the instrument, and can be read out again on the instrument or overwritten at any time.

The module can be divided into the following function units (see Fig. 5-1):

- Interface to instrument
- RAM
- Internal interface
- BUSY display
- Battery supply

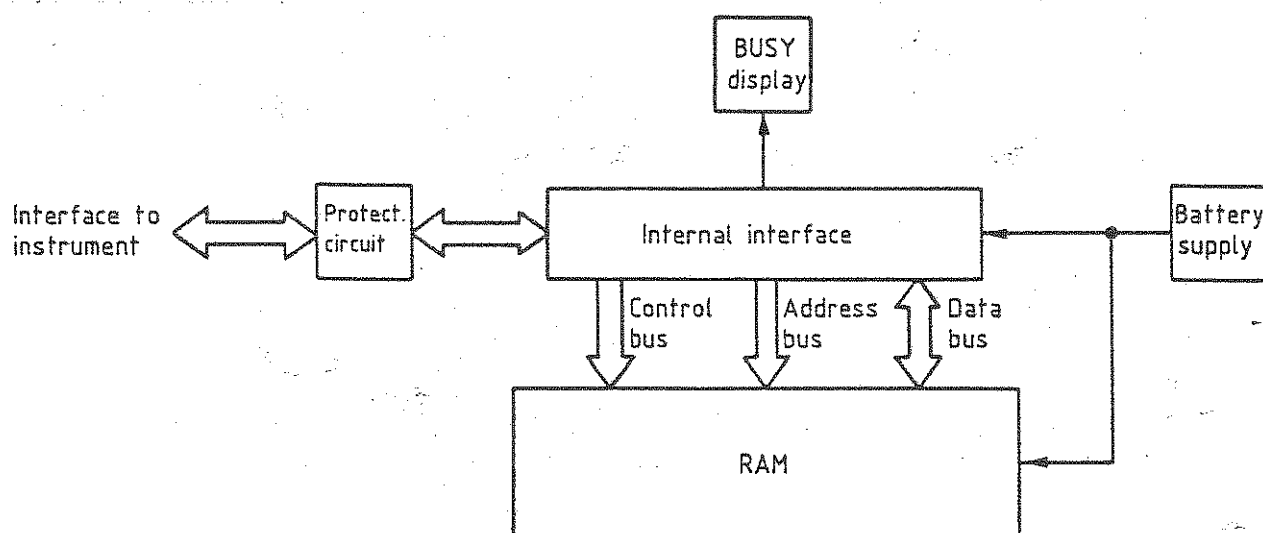


Fig. 5-1 Block diagram of the transfer memory

The reason for the transfer from blocks I to II and III to IV is that the address must be stable in the RAM when the change from "Disable" to "Read" or from "Read" to "Disable" takes place. The contents from A0 to A12 do not change within a cycle. A12 appears first on the data line and CS2 last. With block III, D7 appears first on the data line and D0 last.

5.1.4 BUSY Display

The BUSY display visibly indicates a read or write access to the transfer memory. Since the signal STREM is activated at least once with every read and write process, this signal can be used to drive an LED stage. The short intervals between two STREM pulses prevent the BUSY LED from flickering.

5.1.5 Battery Supply

The RAM is powered by a built-in back-up battery if the instrument power is missing. In addition, the section of the internal interface circuit which provides the control signals (\overline{WE} , \overline{OE} , CS2) for the RAM is also connected to the back-up supply. The RAM remains in the low power "Data hold" mode if CS2 = 0.

5.2 Testing and Adjustment

The module need not be adjusted. All tests should be carried out using Section 3.



ROHDE & SCHWARZ

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Schaltteilliste für
Parts list forED TRANSFERSPEICHER
TRANSFER MEMORYSachnummer
Stock No.

803.7532.01 SA

Blatt
Page

1

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C2	CC 10NF-20+50X7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C3	CE 100UF+-20X25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-A1ESS-101	803.0580	
C4	CC 10NF-20+50X7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
D1	BC HM6264LP15 8KX8B.SRAM SRAM HITACHI HM6264LP15	344.7410	
D2	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064	
D3	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064	
D4	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064	
D5	BL CD4021BE 8BIT SH.REG SHIFT REGISTER RCA CD4021BE	BL 086.7096	
G1	EB 3,4V LITHIUM-BATTERIE LI BATTERY SAFT LS 3 CNA	565.1687	
P1	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542	
P2	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542	
R1	RN 5X 22KOHM+-2XSIL 6 H5 RESISTOR NETWORK BOURNS 4306R-101-223	RN 470.6501	
R2	RL 0,21W 22,1KOHM+-1%TK50 RESISTOR RESISTA MK1 22K1 1% TK50	RL 092.1609	
R3	RL 0,21W 22,1KOHM+-1%TK50 RESISTOR RESISTA MK1 22K1 1% TK50	RL 092.1609	
R4	RN 4X 10KOHM+-2XSIL 8 H5 RESISTOR NETWORK BECKMAN MOD.764-3-10KOHM	RN 291.5154	
R10	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R11	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800	

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Parts list forSachnummer
Stock No.Blatt
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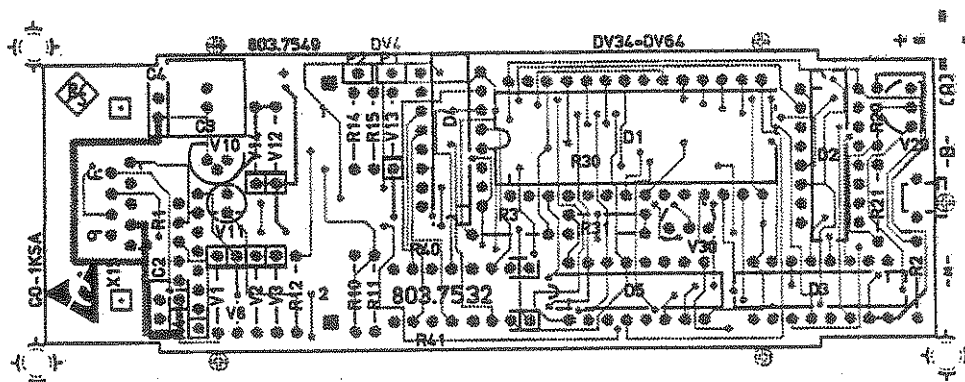
ED TRANSFERSPEICHER
TRANSFER MEMORY

803.7532.01 SA

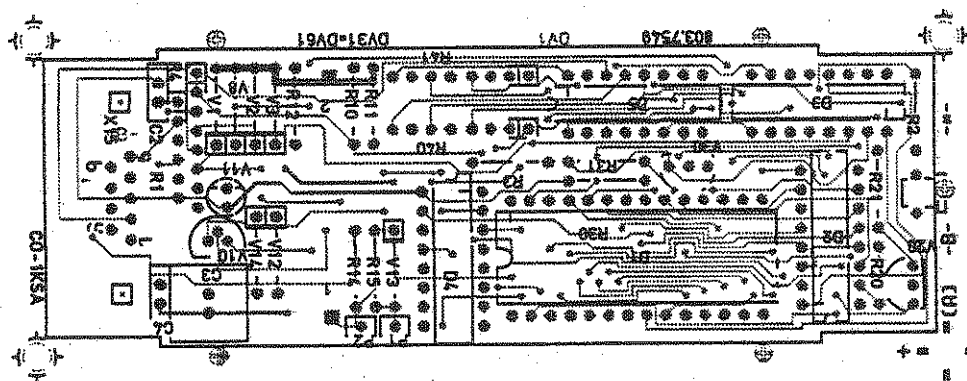
2

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R12	RL 0,35W 20,00 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/200HM-F-D	RL 082.9142	
R14	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R15	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R20	RL 0,21W 1,00KOHM+-1%TK50 RESISTOR RESISTA MK1 1K00 1% TK50	RL 092.1444	
R21	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R30	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R31	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R40	RN 4X6,8KOHM+-2% SIL 8 H5 RESISTOR NETWORK BOURNS 4308R-102-682	RN 212.8578	
R41	RN 4X6,8KOHM+-2% SIL 8 H5 RESISTOR NETWORK BOURNS 4308R-102-682	RN 212.8578	
V1	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1	AE 012.2449	
V2	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1	AE 012.2449	
V3	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1	AE 012.2449	
V8	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1	AE 012.2449	
V10	AK BC517 NPN 30V DARL. TRANSISTOR SIEMENS BC517	AK 282.2133	
V11	AF HLMP1700 LED RT RD3 LED HP HLMP1700	AF 099.9134	
V12	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800	AE 012.9066	
V13	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800	AE 012.9066	
V14	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800	AE 012.9066	

Ansicht und Leitungsführung Bauteilseite View of tracks on component side




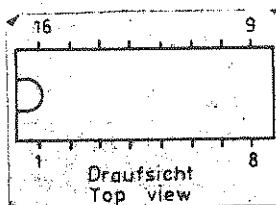
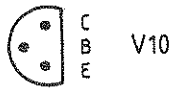
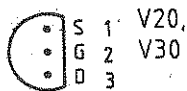
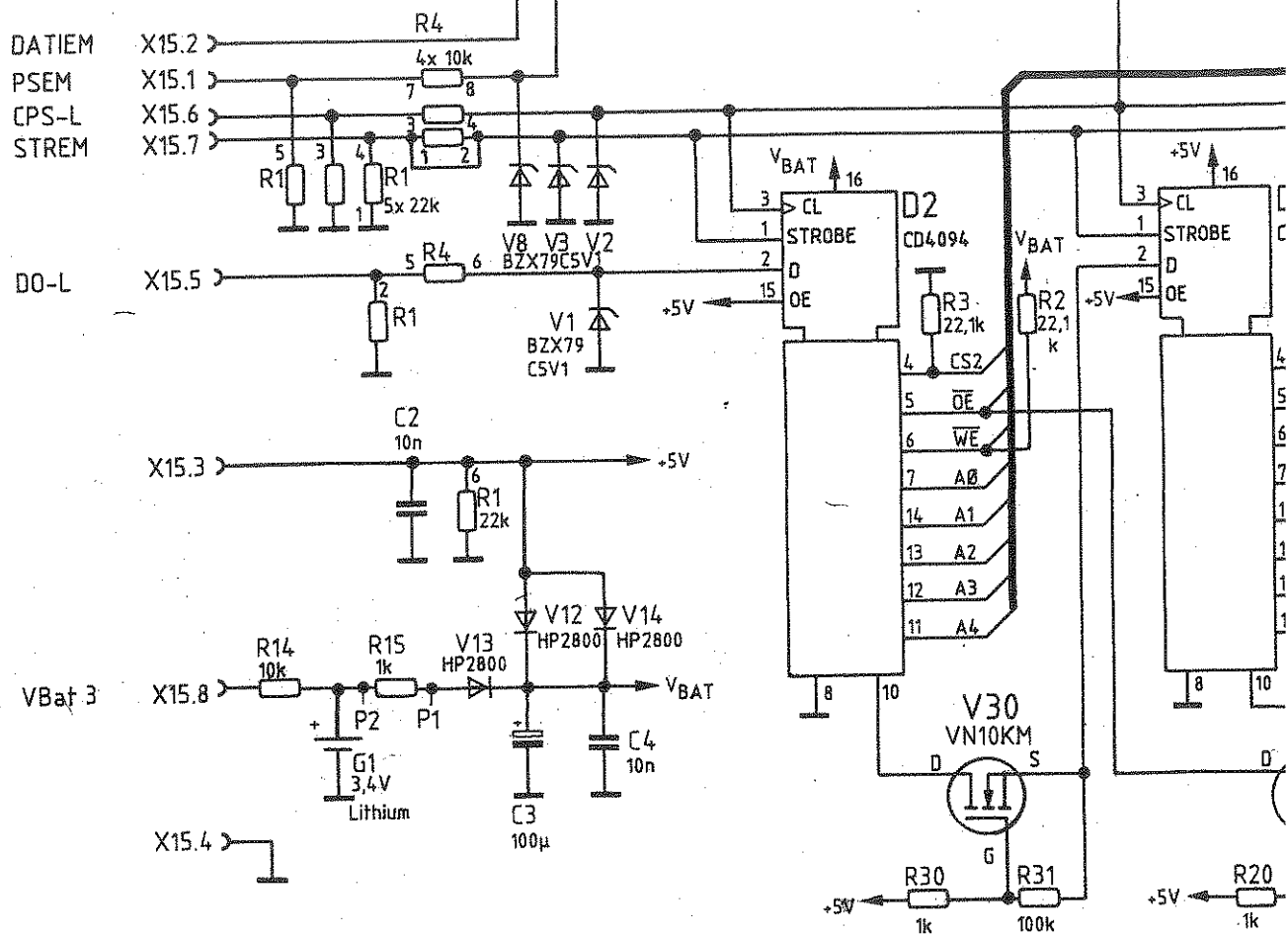
Ansicht und Leitungsführung Lötseite View of tracks on solder side



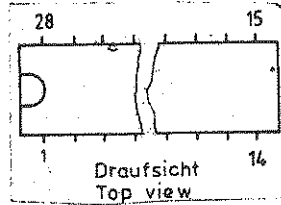
ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
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ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

VARIANTENERKLÄRUNG / VERSION VAR 02 - GRUNDAUSFÜHRUNG / BASIC MODEL

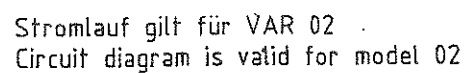
E	35523	01.87	CO	Maße ohne Toleranzangabe		Maßstab 1 : 1				
						Halbzeug, Werkstoff				
				1KSA	Tag	Name	Benennung TRANSFERSPEICHER TRANSFER MEMORY			Z
				Bearb.	01.87	CO				
				Gepr						
				Norm						
							Zeichn.-Nr.			Blatt-Nr.
				 ROHDE & SCHWARZ			803.7532.01		EE	2
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And Zust	Änderungs- Mitteilung	Tag	Name	zu Gerät CM-21		reg. i. V. 803.7510 V		erste Z.		



D2,D3,D4,D5



D1





ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Duplex Modulation Meter Option CM-B9

803.5317.02

5	<u>Service Manual for Duplex Modulation Meter</u>	
	<u>Option CM-B9</u>	5.1
5.1	Function Description	5.1
5.1.1	Output Frequency	5.1
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5.1.2.2	Fractional Divider	5.3
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	Component lists	
	Circuit diagrams	
	Component layout diagrams	

5.1 Function Description

The duplex modulation meter replaces the mixing oscillator required to convert the RF to the IF which means that the instrument is able to transmit and receive simultaneously.

The module contains a frequency synthesizer which generates frequencies in the range from 31.25 MHz to 1000 MHz. Two phase locked loops are used for frequency synthesis. The individual loops are designated RF loop and VCXO loop; the RF loop generates the coarse grid and the VCXO loop the fine grid. The two phase locked loops are synchronized to a crystal reference frequency of 100 MHz in order to stabilize the output frequency. The reference frequency must be applied to the module.

5.1.1 Output Frequency

Three oscillators generate frequencies of 500 MHz to 1000 MHz; lower frequencies are obtained by dividing. The output frequency is calculated according to the following equation:

$$F_{out} = (0.2 \times M + 2 \times \frac{M}{N}) \times \frac{1}{T} \quad [\text{MHz}]$$

M = Coarse divider factor 2499 to 4999
N = Fine divider factor 16666 to 50000
T = Octave divider 1, 2, 4, 8, 16

5.1.2 VCXO Loop

The VCXO loop provides the reference frequency for the coarse control loop of the RF loop. A programmable frequency divider divides the externally applied 100-MHz reference frequency to values between 2 and 6 kHz; the voltage-controlled crystal oscillator (VCXO 10.002 MHz to 10.006 MHz) is fine-tuned via a phase locked loop in this frequency range. The output signal of the VCXO is mixed with 10 MHz derived from the 100-MHz reference frequency. The filtered mixture product (2 to 6 kHz) is applied to a phase detector whose output voltage tracks the VCXO. The VCXO frequency is adjusted to the frequency of approx. 50 kHz required for the coarse control loop by dividing.

The frequency range of the VCXO loop of 50.01 to 50.03 kHz has been selected such that the range of 1 step of the coarse control loop of 200 kHz is covered. The resolution of the total system results from the maximum change in frequency of the VCXO loop with a change in the divider factor N by 1. The most unfavorable value is with M at a maximum and N at a minimum and is approx. 36 Hz. Since the ranges of the coarse control loop and the VCXO loop overlap, the divider factors M and N must be adjusted optimally before triggering in order to minimize the frequency error.

5.1.2.1 Programmable Divider by N

The fractional method and the pulse swallow method are used simultaneously in this divider. D520 is a fast ECL prescaler which can divide by 10 or 11 and is provided with a control signal (:10 or :11) by the auxiliary divider D575, D585. The signal at the output of B12 with a frequency of approx. 10 MHz is applied to a monoflop to increase the pulse width and is then divided into the following two branches:

1. The programmable synchronous divider D540 to D560
2. The auxiliary divider D575, D585

The auxiliary divider is a shift register which shifts the data applied in parallel to the input with a 10-MHz clock in serial to the prescaler once during each AF clock and thus controls the division ratio 10:1 or 11:1.

The sequence described above represents the well-known pulse swallow method with frequency division. The fractional method is also implemented using the arrangement D590, D597 and D595.

The three components form an up-counter with programmable step sizes which generates an overflow signal at 256. The counter clock is the output signal of the synchronous prescaler (D540 to 560); the step size is applied by the memory IC D592 to the input of adder D595, D590. If an overflow results (pin 9), an additional "1" is written into the shift register operating as an auxiliary divider which causes a 1:10 divider cycle to be replaced at D520 by a 1:11 cycle. An additional 100-MHz period used in this manner increases the divider ratio N by an amount <1 (fractional method). Example: $N = 200.1$ is generated by dividing 9 times in succession by 200 and then once by 201.

5.1.2.2 Fractional Divider

A resolution of approx. 36 Hz (see Section 5.1.2) is insufficient for some applications. The module can therefore be extended by a fractional divider which expands the N divider factor by up to 255/256 yielding a resolution <1 Hz. The non-harmonics resulting from the principle used are a disadvantage and lead to a deterioration in the spurious FM.

The fractional divider consists of ICs D590, D595, D97; control takes place via D592 (see also Section 5.1.2.1).

5.1.3 RF Loop

The output frequency range of 500 to 1000 MHz is generated in the RF loop. This range is divided amongst three oscillators.

Range	f in MHz	Transistor
Osc. I	500 to 655	V30
Osc. II	655 to 825	V60
Osc. III	825 to 1000	V90

The oscillating transistor (BRF96) reduces the damping of a series resonant circuit by its negative impedance at the base. The inductance of the resonant circuit is implemented using a coaxial line to keep the microphony as small as possible. A voltage-variable diode is used for tuning; the tuning voltage is applied to the cathode of the voltage-variable diode via RF inductors. The output power of the oscillator is set with the adjustable constant current of the oscillating transistor. A switching stage with two transistors driven at TTL level switches the operating voltage on for the oscillator as well as a switching diode to decouple the RF in the forward direction.

The M divider is a programmable high-frequency divider with a fixed prescaler (D310) as well as a switchable prescaler (D315). The first prescaler (D310) divides the oscillator frequency by 4 down to 125 to 250 MHz. The second prescaler (D315) with the internal switchover 11/10 operates together with the so-called auxiliary counter (D330) as a decadic counter stage in the 4-digit M divider.

The prescaler 11/10 starts with a divider ratio 11:1. After 11 input pulses, the counters (D330 and D331) are simultaneously incremented by 1. If the 9 has been reached on the auxiliary counter (D330) this switches the prescaler (D315) to a divider ratio 10:1. The pulses divided by 10:1 are then only recorded by the main counter (D331, D332, D333). If these have also reached the 9, the prescaler is again set to 11:1 by a reset pulse and the other dividers to the entered divider ratio. A new counting cycle can then begin.

For example, if the divider factor is 2654, the auxiliary counter and the main counter count 4 pulses before the prescaler is switched from 11 to 10. The prescaler divides the input frequency by 10 for the remaining divider factor of the main counter (= 261). The input frequency must deliver $4 \times 11 + (256-4) \times 10 = 2564$ pulses for the complete counting cycle, which corresponds to the above dividing factor.

The M divider must be loaded with the difference between the final counter value and the divider factor because it is an up-counter. An additional 10 input pulses are used because the loading of the counters uses one clock pulse and the prescaler is set to the dividing factor 10 during this time. For example, if the divider ratio M is to be 2654, $(10009 - 2654) = 7355$ must be loaded into the counter. This value is stored in the shift registers (D360 and D365) in BCD code.

The output signal of approx. 50 kHz from the M divider is applied to the phase detector; the signal is then compared with the frequency from the VCXO loop and controls the oscillators via the subsequent integrator.

5.1.4 Octave Divider

The actual RF synthesizer only delivers frequencies in the range from 500 to 1000 MHz; lower frequencies must therefore be generated by dividing. The output signal of the oscillators is applied to the dividers via a buffer amplifier (N130). The octave divider consists of a 2:1 divider and three 4:1 dividers. These are connected such that divider ratios of 2, 4, 8 and 16 are produced. The output signals of the individual dividers are applied to the output amplifier via switching diodes.

Since the duplex modulation meter can only control the LO input of the mixer, filtering of the harmonics produced by dividing can be omitted. Subharmonics of the LO frequency may lead to undesirable non-harmonics, however, and all unrequired frequency dividers are therefore switched off.

5.1.5 Control and Diagnosis

The module is controlled via a serial data interface. The data for a complete setting (with fractionator) are stored in 8 shift registers (D360, D365, D2, D18, D550, D565, D580 and D592).

Five test points on the module can be called up by the multiplexer (D15) for diagnosis (self-test). The tuning voltages of the oscillators are also constantly monitored by window discriminators (N240, N440 and N660) and the loop OK line is set to LOW if the limits are violated.

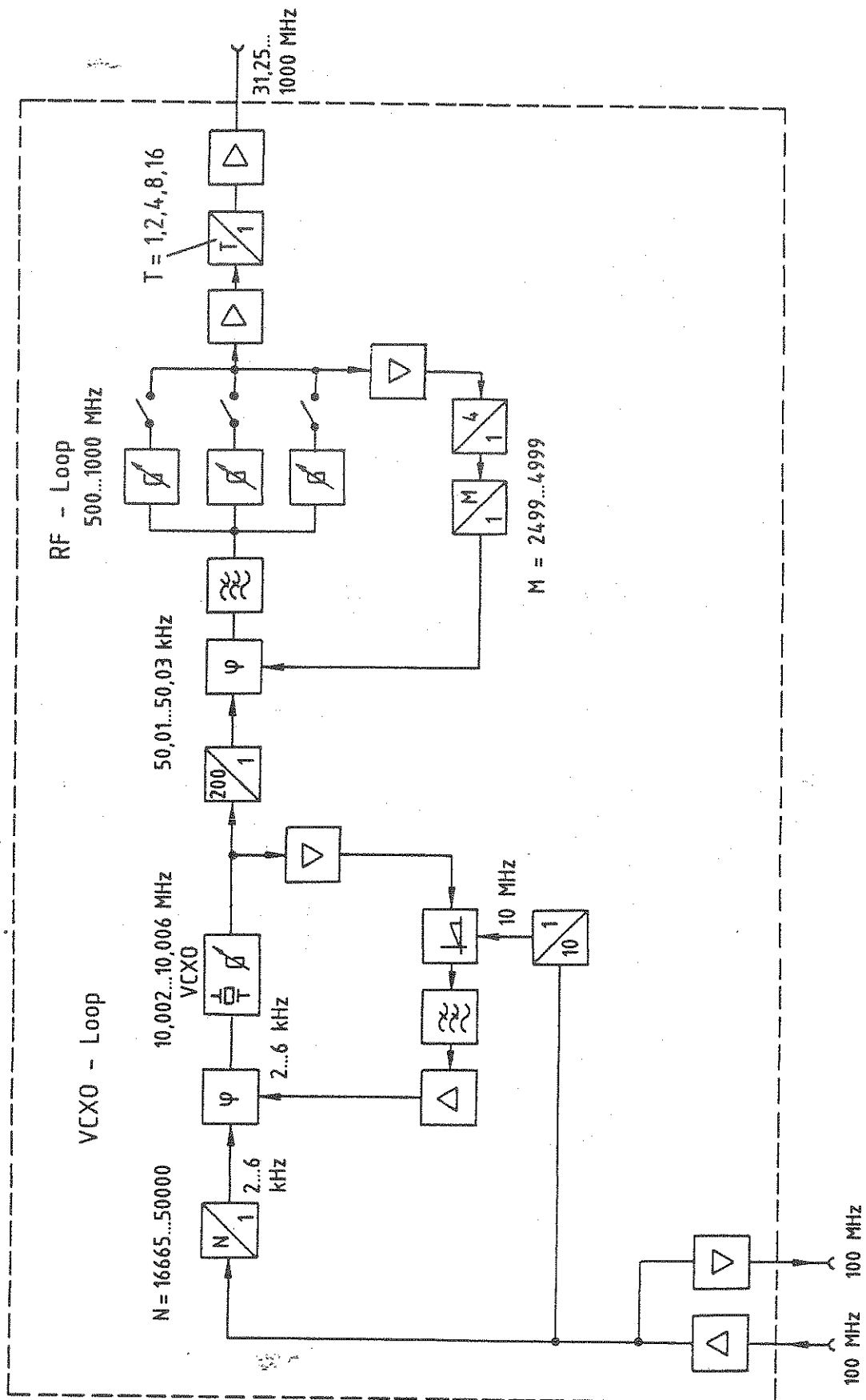


Fig. 5-1 Block diagram of the Duplex Modulation Meter

5.2 Testing and Adjustment

5.2.1 Frequency Adjustment of RF Oscillators

- Apply DC voltage of $2.5 \text{ V} \pm 0.1 \text{ V}$ to X9/2.
- Connect an RF analyzer or frequency counter to X309.
- Adjust the frequency using trimmers C21, C51 and C81 according to the following table:

Instrument setting	Frequency at X309	Trimmer
520 MHz	$500 \text{ MHz} \pm 5 \text{ MHz}$	C21
700 MHz	$655 \text{ MHz} \pm 5 \text{ MHz}$	C51
900 MHz	$825 \text{ MHz} \pm 5 \text{ MHz}$	C81

- Insert plug-in jumper X9, screw on cover. The control voltage can be measured through the hole provided in the RF shielding; the correct value should be $2.5 \text{ V} \pm 0.1 \text{ V}$ for the following frequencies:

Frequency at X309	Trimmer
500 MHz	C21
655 MHz	C51
825 MHz	C81

5.2.2 Level Adjustment of RF Oscillators

- Apply DC voltage of $12 \text{ V} \pm 0.5 \text{ V}$ to X9/2.
- Connect RF analyzer or power meter to X309.
- Adjust the frequency using trimmers R49, R79 and R109 according to the following table:

Instrument setting	Level at X309	Trimmer
520 MHz	$-3 \text{ dBm} \pm 3 \text{ dB}$	R49
700 MHz	$-3 \text{ dBm} \pm 3 \text{ dB}$	R79
900 MHz	$-3 \text{ dBm} \pm 3 \text{ dB}$	R109

5.2.3 Testing the RF Loop

- + Connect a frequency counter and a power meter to the RF terminator X309. Check the level and frequency with the following instrument settings.
- + Frequency setting on instrument:
 - 501 MHz
 - 654 MHz
 - 656 MHz
 - 824 MHz
 - 826 MHz
 - 1000 MHz
- + The frequency must agree with the setting.
- + The level must be $-3 \text{ dBm} \pm 3 \text{ dB}$.
- + The tuning voltage at X9/1 must be in the range 2.5 V to 20 V.

5.2.4 Testing the Spurious FM

The spurious FM must be tested with the module closed.

- + Connect modulation analyzer to X309.
- + Adjust frequencies on the instrument in the range from 500 to 1000 MHz and measure the spurious FM.
- + The spurious FM (weighted to CCITT, RMS) must be $<12 \text{ Hz}$.

5.2.5 Testing the Frequency Dividers

- + Connect DC voltage source (2 V to 20 V) to X9/2.
- + Connect RF analyzer to X309.
- + Set the following frequencies on the instrument and sweep the complete voltage range in each case.
 - f in MHz: 900, 700, 520, 450, 350, 260, 225, 175, 130, 113,
87, 65, 57, 44, 32.
- + Check on the analyzer that no non-harmonics or subharmonics occur.
- + The level must be $-3 \text{ dBm} \pm 3 \text{ dB}$ in the complete frequency range (approx. 30 MHz to 1000 MHz).

5.2.6 Testing the VCXO Loop

- a) Instrument setting: frequency 500.1 MHz
- The tuning voltage at X6 must be >3 V.
 - The frequency at X3 must be 10.002 MHz.
- b) Instrument setting: frequency 500.3 MHz
- The tuning voltage at X6 must be <12 V.
 - The frequency at X3 must be 10.006 MHz.

5.3 Troubleshooting

Troubleshooting can be readily carried out using the specified DC voltage values and signal levels. The inductors L30, L60 and L90 should be checked if the RF oscillators have a high microphony sensitivity. The inductors must be adhered firmly onto the circuit board.

5.3.1 Frequencies at the Output of the N Divider

The frequency of the N divider should be tested at P1 in the case of small frequency errors (<200 kHz).

- a) Determination of M divider factor:

$$M = \text{INT} \left(\frac{F_{\text{OUT}}}{50.01} \cdot 250 \right) [\text{MHz}]$$

- b) Determination of N divider factor:

$$N = 2 \times M / (F_{\text{OUT}} - 0.2 \times M) [\text{MHz}]$$

- c) Determination of frequency at P1: $F_{P1} = 100 \text{ MHz}/N$

5.3.2 DC Voltage Values

Emitter V30, V60, V90	-9 V \pm 1.5 V
X6	3 to 12 V
X9	2.5 to 20 V
P12	12 V \pm 1 V
P11	-11 V \pm 1,5 V
D140/6 (switched off)	<0.5 V
D160, D170, D180/2 (switched off)	<0.5 V
N400/3	2.5 V \pm 0.3 V
D260/6	8.6 V \pm 1 V
Emitter V230	6.8 V \pm 1 V

5.3.3 Signal Levels

N500/4	100 MHz	ECL
D510/5	10 MHz	ECL
P5	approx. 10 MHz	ECL
P6	approx. 10 MHz	TTL
D570/12	100.02 to 100.06 kHz	TTL
P1	2 to 6 kHz	TTL
P2	2 to 6 kHz	TTL
X3	10.002 to 10.006 MHz	approx. 4 V _{pp}
N260/3	2 to 6 kHz	50 to 150 mV _{pp}
X8	approx. 50 kHz	TTL
P3	approx. 50 kHz	TTL

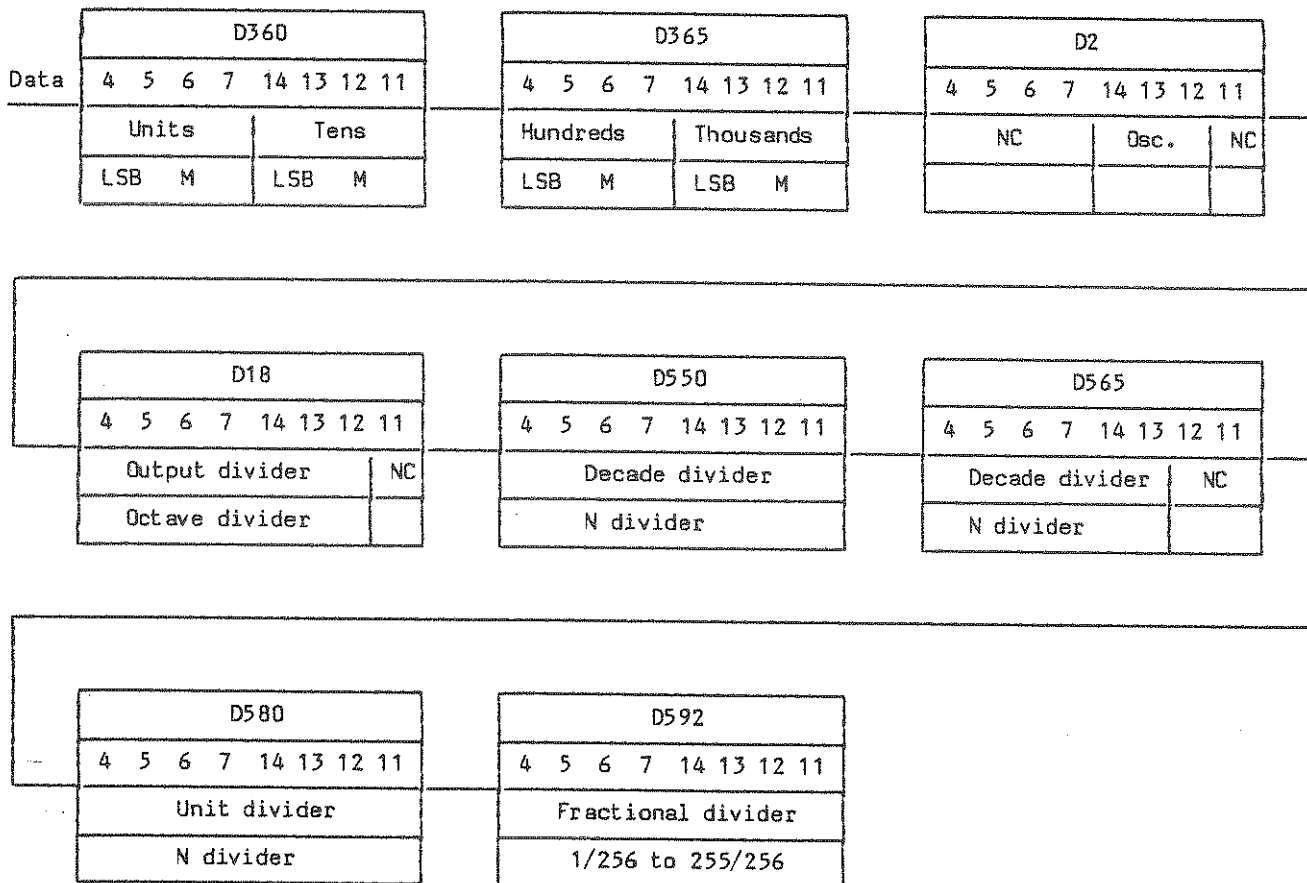
5.3.4 Control Signals for Octave Divider

Frequency at X309 in MHz	Control signals at D18						
	Pin						
	4	5	6	7	14	13	12
500 to 1000	0	1	1	1	1	0	0
250 to 500	1	0	1	1	1	1	0
125 to 250	1	1	0	1	1	0	1
62.5 to 125	1	1	1	0	1	1	0
31.25 to 62.5	1	1	1	1	0	0	1

5.3.5 Control Signals for the M Divider

Frequency at X309 in MHz	Control signals															
	D365								D360							
	Pin															
	11	12	13	14	7	6	5	4	11	12	13	14	7	6	5	4
802	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
801.8	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0
801.6	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
801.2	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
800.4	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
800	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0
798	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
794	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
786	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
782	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
762	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
722	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
642	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
842	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0

5.3.6 Bit Pattern



5.4 Interfaces

Coaxial Interfaces

Pin	Frequency	Level
X931	100 MHz (input)	-3 dBm \pm 3 dB
X932	100 MHz (output)	800 mV _{pp} , ECL
X939	31.25 to 1000 MHz	-3 dBm \pm 3dB


Multipoint connector X1:

A12, A13, B12, B13	+5-V power supply
A15, B15	+24-V power supply
A17, B17	+15-V power supply
A19, B19	-15-V power supply
A2, B2	Ground
A7, B7	
A9, B9	
A11, B11	
A14, B14	
A16, B16	
A18, B18	
A20, B20	
A30, B30	
A32, A32	
A10, B10	Clock
A8	DATA
A6	STROBE
B21	Data programming
A23	Test voltages



ROHDE & SCHWARZ
MÜNCHEN

Schaltteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans

 ROHDE & SCHWARZ		AI 01	Datum Date 0487	Schalteilliste für Parts list for CM-B9 DUPLEX MODULAT.MET.	Sachnummer Stock No. 803.5317.01 SA	Blatt Page 1
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
A93	ED DUPLEX-MODULATIONS-M	803.6020.02	- ENDE -			
W3	DX HF-KABEL W3 RF-CABLE W3	803.6688				
W21	DX HF-KABEL W21 RF-CABLE W21	803.6694				
		803.5317.01 SA BL 1-				

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	1
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
B230	EQ 10,006 MHZCL30HC49-1D3 QUARTZ CRYSTAL UNIT QUARZKERAM N. R&S SACHNUMMER	EQ 090.2366				
C3	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
C4	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
C12	CE 10 UF+-20%25V 7X 5X11 ELECTROLYTIC CAPACITOR ERO-TANTAL ETR3-10/25	CE 023.5980				
C17	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
C18	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
C21	CT 13PF 7RDX13TK50 250V TRIMMER TEKELEC LUFTTTRAT5400	CT 450.7283				
C22	CC 22PF+-10%100V2NPO CHIP CAPACITOR VITRAMON VJ0805A220KFA	CC 082.2931				
C25	CC 12PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A120JFA	CC 099.8744				
C26	CC 9PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A9RODFA	CC 099.8738				
C27	CC 3PF+-0,25PF50V NPO1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A3ROCFA	CC 099.8350				
C30	CC 5PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A5RODFA	CC 099.8696				
C31	CC 7PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A7RODFA	CC 099.8715				
C32	CC 22PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A220JFA	CC 099.8396				
C33	CC 7PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A7RODFA	CC 099.8715				
C35	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
C40	CC 4,7NF+-10%6X9R2000 CAPACITOR VALVO 2222 63051 472	CC 087.7102				
C41	CE 4,7UF+-20%20V 7X 4X 8 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR2-4,7/20	CE 022.8110				
					803.6020.01 SA	BL 1+

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	20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	2
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
C48	CE 1,0UF+-20%35V 5X 4X 7 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR1-1/35		CE 022.8185		
C49	CE 1,0UF+-20%35V 5X 4X 7 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR1-1/35		CE 022.8185		
C50	CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 247 G		CE 006.7142		
C51	CT 9,2PF TAUCHTR.RD 7X12 AIR-TYPE TRIMMER TEKELEC LUFTTRAT5200		CT 025.7367		
C52	CC 22PF+-10%100V2NPO CHIP CAPACITOR VITRAMON VJ0805A220KFA		CC 082.2931		
C53	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102		CC 022.0784		
C54	CE 10UF -10+50% 63V 9X13 ELECTROLYTIC CAPACITOR ROEDERST ELKOEK10/63		CE 022.7650		
C55	CC 2PF+-0,25PF50V NPO1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A2ROCFA		CC 099.8673		
C56	CC 12PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A120JFA		CC 099.8744		
C57	CC 5PF+-0,5PF50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A5RODFA		CC 099.8696		
C60	CC 3PF+-0,25PF50V NPO1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A3ROCFA		CC 099.8350		
C61	CC 3PF+-0,25PF50V NPO1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A3ROCFA		CC 099.8350		
C62	CC 22PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A220JFA		CC 099.8396		
C63	CC 4PF+-0,25PF50V NPO1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A4ROCFA		CC 099.8680		
C65	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103		CC 087.7525		
C70	CC 4,7NF+-10%6X9R2000 CAPACITOR VALVO 2222 63051 472		CC 087.7102		
C71	CE 4,7UF+-20%20V 7X 4X 8 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR2-4,7/20		CE 022.8110		
C81	CT 9,2PF TAUCHTR.RD 7X12 AIR-TYPE TRIMMER TEKELEC LUFTTRAT5200		CT 025.7367		
C82	CC 22PF+-10%100V2NPO CHIP CAPACITOR VITRAMON VJ0805A220KFA		CC 082.2931		
803.6020.01 SA BL 2+					

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	4
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in		
C131	CC 100PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A101JFA	CC 099.8415				
C132	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C133	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C134	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C135	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C140	CE 1,0UF+-20%35V 5X 4X 7 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETRI-1/35	CE 022.8185				
C141	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102	CC 022.0784				
C142	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C143	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C144	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C145	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C146	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C160	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C161	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C162	CC 470PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A471JFA	CC 099.8515				
C163	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C164	CC 4,7NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y472KFA	CC 099.8450				
C165	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C166	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
803.6020.01 SA BL 4+						

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	5
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
C168	CC 100NF+-10% 50V5K1200 C CAPACITOR VITRAMON VJ1812Y104KFA	CC 082.3473				
C170	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C171	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C172	CC 470PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A471JFA	CC 099.8515				
C173	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C174	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C175	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C180	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C181	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C182	CC 470PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A471JFA	CC 099.8515				
C183	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438				
C184	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C185	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C190	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C191	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C195	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C196	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C202	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C203	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525				
803.6020.01 SA BL 5+						

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	6
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
C210	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C211	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C220	CK 1UF+-10%50V5RM MKT CAPACITOR			CK 099.2998		
	WIMA MKS2/50/1UF/10%					
C221	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C222	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C223	CE 22UF-10+50% 63V 9X13 ELECTROLYTIC CAPACITOR			CE 006.7120		
	ROEDERST EK 00 CB 222 J					
C225	CK 220NF+-5%63V5RM MKT CAPACITOR			CK 099.2952		
	WIMA MKS2/63/0,22UF/5%					
C226	CK 47NF+-5%63V5RM MKT CAPACITOR			CK 099.2917		
	WIMA MKS2/63/0,047UF/5%					
C230	CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR			CE 006.7142		
	ROEDERST EK 00 CB 247 G					
C231	CC 10NF-20+50%7X8R4000. CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C232	CC 100PF+-2%6X9NPO CAPACITOR			CC 087.6541		
	VALVO 2222 678 10101					
C233	CC 100PF+-2%6X9NPO CAPACITOR			CC 087.6541		
	VALVO 2222 678 10101					
C250	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C251	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C255	CE 47UF -10+50% 63V 13X17 ELECTROLYTIC CAPACITOR			CE 022.7672		
	ROEDERST ELKOEK47/63					
C257	CC 10NF-20+50%7X8R4000 CAPACITOR			CC 087.7525		
	VALVO 2222 63051 64051103					
C259	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR			CE 208.4007		
	ROEDERST ELKOEK100/25					
C260	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR			CC 022.0784		
	VALVO 2222 63051 102					
C261	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR			CC 022.0784		
	VALVO 2222 63051 102					

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803.6020.01 SA BL 6+

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	7
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
C262	CK 1UF+-10%50V5RM MKT CAPACITOR	CK 099.2998				
C263	WIMA MKS2/50/1UF/10% CK 220NF+-5%63V5RM MKT CAPACITOR	CK 099.2952				
C264	WIMA MKS2/63/0,22UF/5% CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
	VALVO 2222 63051 64051103					
BIS/TO C267 C268	CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7142				
C300	ROEDERST EK 00 CB 247 G CC 100PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR	CC 099.8415				
C301	VITRAMON VJ1206A101JFA CK 10NF+-5%63V5RM MKT CAPACITOR	CK 099.2869				
C302	WIMA FKS 2/100/0,01UF/5% CC 100PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR	CC 099.8415				
C303	VITRAMON VJ1206A101JFA CC 100PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR	CC 099.8415				
C304	VITRAMON VJ1206A101JFA CC 100PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR	CC 099.8415				
C305	VITRAMON VJ1206A101JFA CE 470UF+-20%25V12,5X12,5 ELECTROLYTIC CAPACITOR	803.0715				
C310	MATSUSHITA ECE-A1ESS-471U CC 1NF+-10%63V K2000 CERAMIC CAPACITOR	CC 022.0784				
C311	VALVO 2222 63051 102 CC 1NF+-10%63V K2000 CERAMIC CAPACITOR	CC 022.0784				
C315	VALVO 2222 63051 102 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C320	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C330	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
BIS/TO C335 C340	VALVO 2222 63051 64051103 CE 100UF-10+50% 16V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7165				
C341	ROEDERST EK 00CB 310 D CE 100UF-10+50% 16V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7165				
	ROEDERST EK 00CB 310 D					
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	8
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
C343	CE 100UF-10+50% 16V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7165				
C358	ROEDERST EK 00CB 310 D CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C359	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C366	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C380	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C390	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C400	VALVO 2222 63051 64051103 CK 100NF+-5%63V5RM MKT CAPACITOR	CK 099.2930				
C401	WIMA MKS/2/63/0,1UF/5% CK 470NF+-5%63V5RM MKT CAPACITOR	CK 099.2975				
C402	WIMA MKS2/63/0,47UF/5% CE 22UF-10+50% 63V 9X13 ELECTROLYTIC CAPACITOR	CE 006.7120				
C410	ROEDERST EK 00 CB 222 J CK 470NF+-10%160V27X7X17 WIMA MKP10 0,47UF160V 10%	803.0721				
C411	CC 4,7NF+-10%6X9R2000 CAPACITOR	CC 087.7102				
C412	VALVO 2222 63051 472 CK 470NF+-10%160V27X7X17 WIMA MKP10 0,47UF160V 10%	803.0721				
C426	CK 220NF+-10%160V18X7X14 MET.POLYPROP.CAPACITOR WIMA MKP10 0,22UF160V 10%	803.0496				
C501	CC 1NF+-10%200V5K1200VIEL CAPACITOR	CC 068.4047				
C502	UNION CARB CK05BX102K CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C504	VALVO 2222 63051 64051103 CC 10NF-20+50%7X8R4000 CAPACITOR	CC 087.7525				
C510	VALVO 2222 63051 64051103 CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350				
C520	UNION CARB CK05BX104K CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 099.8521				
C530	VITRAMON VJ1206Y103KFA CC 6PF+-0,5PF50V NPO CERAMIC CHIP CAPACITOR VITRAMON VJ1206A6RODFA	CC 099.8709				
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	9
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
C540	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C545	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C555	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C560	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C570	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C571	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C575	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C585	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C590	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C595	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C597	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y103KFA	CC 099.8521				
C601	LD FILT.40DB/10GHZ10A300V LOWPASS-FILTER ERIE 9900-001-6020	911.0705				
C602	LD FILT.40DB/10GHZ10A300V LOWPASS-FILTER ERIE 9900-001-6020	911.0705				
C603	LD FILT.40DB/10GHZ10A300V LOWPASS-FILTER ERIE 9900-001-6020	911.0705				
D2	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726				
D18	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726				
D50	BO LT337AH -ADJ0A5 VREGL VOLTAGE REGULATOR LIN.TECHN. LT337AH	803.6665				
D140	BL SP8605BDG 2:1DIVID UHF DIVIDER PLESSEY SP8605BDG	BL 092.9280				
		803.6020.01 SA BL 9+				

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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	10
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
D150	BO UA78M12HC+12V0A5 VREGL VOLTAGE REGULATOR			BO 569.3155		
D160	FAIRCHILD MA78M12HC BL CA3199E 4:1 DIVID DIVIDER			372.1106		
D162	RCA CA3199E BO CA3081F 7XN TR.ARRAY TRANSISTOR ARRAY			BO 455.0506		
D170	RCA CA3081F BL CA3199E 4:1 DIVID DIVIDER			372.1106		
D180	RCA CA3199E BL CA3199E 4:1 DIVID DIVIDER			372.1106		
D202	RCA CA3199E BL MM74HC00N 4X2IN.NAND QUAD 2-INPUT NAND GATE			BL 571.3194		
D210	MOTOROLA MC74HC00N BL MM74HC107N 2XJK-FF CL DUAL J-K FLIPFLOP W.CLEAR			BL 099.9534		
D250	NSC MM74HC107N BL SN74LS02N 4/2INP.NOR IC NOR GATE SN74LS02N			266.4658		
D255	TEXAS SN74LS02N BL MM74HC390N 2X4B.COUNT DUAL 4-BIT DECADE COUNTER			BL 099.9640		
D260	NSC MM74HC390N BO MC1496L MOD/DEMOM MODULATOR/DEMOMULATOR			BO 473.9024		
D310	MOTOROLA MC1496L BL CA3199E 4:1 DIVID DIVIDER			372.1106		
D315	RCA CA3199E BL SP8647BDG10:1DIVID UHF DIVIDER			BL 300.6747		
D320	PLESSEY SP8647BDG BL 74F00PC 4X2IN.NANDG QUAD-NAND-GATE			BL 344.6659		
D330	FAIRCHILD 74F00PC BL 74F162PC BCD DEC.COUNT BCD DECADE COUNTER			BL 099.9892		
	FAIRCHILD 74F162APC					
BIS/TO D333 D358	BL CD4094BE 8BIT SH.REG SHIFT REGISTER			BL 586.7726		
D359	RCA CD4094BE BL CD4051BE 8CH. MUX MULTIPLEXER			BL 339.4174		
D360	RCA CD4051BE BL CD4094BE 8BIT SH.REG SHIFT REGISTER			BL 586.7726		
D365	RCA CD4094BE BL CD4094BE 8BIT SH.REG SHIFT REGISTER			BL 586.7726		
	RCA CD4094BE					
						803.6020.01 SA BL10+

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	20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	11
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
D380	BL MM74HC74N 2XD-FLIPFL DUAL D FLIP-FLOP NSC MM74HC74N		BL 571.3171		
D390	BL MM74HC107N 2XJK-FF CL DUAL J-K FLIPFLOP W.CLEAR NSC MM74HC107N		BL 099.9534		
D395	BL MM74HC00N 4X2IN.NAND QUAD 2-INPUT NAND GATE MOTOROLA MC74HC00N		BL 571.3194		
D510	BL MC10138L 4B.COUNTER COUNTER MOTOROLA MC10138L		BL 564.8407		
D520	BL SP8647BDG10:1DIVID UHF DIVIDER PLESSEY SP8647BDG		BL 300.6747		
D530	BL PC74HC123 2XMULTIVIB DUAL MONOST.MULTIVIBRATOR VALVO PC74HC123		BL 099.9540		
D540	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC		BL 344.6871		
D545	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC		BL 344.6871		
D550	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D555	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC		BL 344.6871		
D560	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC		BL 344.6871		
D565	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D570	BL PC74HC123 2XMULTIVIB DUAL MONOST.MULTIVIBRATOR VALVO PC74HC123		BL 099.9540		
D575	BL SN74LS165N 8BIT-S.REG. SN74LS165N 8BIT-S.REG. TEXAS SN74LS165N		353.3088		
D580	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE		BL 586.7726		
D585	BL SN74LS165N 8BIT-S.REG. SN74LS165N 8BIT-S.REG. TEXAS SN74LS165N		353.3088		
L21	LD 0,33UH10%0,22OHM0,830A CHOKE DELEVAN DROSSEL1025--08		LD 067.2805		
L24	LD 0,39UH10%0,30OHM0,710A CHOKE DELEVAN DROSSEL1025-10		LD 067.2811		
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	12
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.			enthalten in contained in	
L25	LD SPULE COIL	801.6422			802.6455	
L26	LL SPULE	802.7474				
L30	LD SPULE COIL	801.6422				
L31	LD 0,33UH10%0,22OHM0,830A CHOKE	LD 067.2805			802.6455	
L50	DELEVAN DROSSEL1025--08 LD 0,22UH10%0,14OHM1,045A CHOKE	LD 067.2786				
L51	DELEVAN DROSSEL1025-04 LD 0,22UH10%0,14OHM1,045A CHOKE	LD 067.2786				
L52	DELEVAN DROSSEL1025-04 LD 0,22UH10%0,14OHM1,045A CHOKE	LD 067.2786			802.6455	
L54	DELEVAN DROSSEL1025-04 LD 0,33UH10%0,22OHM0,830A CHOKE	LD 067.2805				
L55	DELEVAN DROSSEL1025--08 LD SPULE COIL	801.6422				
L56	LL SPULE	802.7422			802.6455	
L60	LD SPULE COIL	801.6422				
L61	LD 0,22UH10%0,14OHM1,045A CHOKE	LD 067.2786				
L81	DELEVAN DROSSEL1025-04 LD 0,15UH10%0,10OHM1,230A CHOKE	LD 067.2763			802.6455	
L84	DELEVAN DROSSEL1025-00 LD 0,15UH10%0,10OHM1,230A CHOKE	LD 067.2763				
L85	DELEVAN DROSSEL1025-00 LD SPULE COIL	801.6422				
L86	LL SPULE	802.7516			802.6455	
L90	LD SPULE COIL	801.6422				
L91	LD 0,15UH10%0,10OHM1,230A CHOKE	LD 067.2763				
L112	DELEVAN DROSSEL1025-00 LD 1,20UH10%0,18OHM0,620A CHOKE	LD 067.2870			802.6455	
L120	DELEVAN DROSSEL1025-22 LD 100 UH10%8,00OHM0,084A CHOKE	LD 067.3101				
L133	DELEVAN DROSSEL1025-68 LD 100 UH10%8,00OHM0,084A CHOKE	LD 067.3101				
L140	DELEVAN DROSSEL1025-68 LD 0,33UH10%0,22OHM0,830A CHOKE	LD 067.2805			802.6455	
L145	DELEVAN DROSSEL1025--08 LD 470 UH10%42,00OHM0,036A CHOKE	LD 067.3182				
	DELEVAN DROSSEL1025-84					
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	13
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
L146	LD 470 UH10%42,00HM0,036A CHOKE			LD 067.3182		
L163	DELEVAN DROSSEL1025-84 LD 470 UH10%42,00HM0,036A CHOKE			LD 067.3182		
L166	DELEVAN DROSSEL1025-84 LD 390 UH10%35,00HM0,040A CHOKE			LD 067.3176		
L173	DELEVAN DROSSEL1025-82 LD 470 UH10%42,00HM0,036A CHOKE			LD 067.3182		
L183	DELEVAN DROSSEL1025-84 LD 470 UH10%42,00HM0,036A CHOKE			LD 067.3182		
L230	DELEVAN DROSSEL1025-84 LD 15,0UH10%2,800HM0,157A CHOKE			LD 067.3001		
L255	DELEVAN DROSSEL1025-48 LD 220 UH10%21,00HM0,052A CHOKE			LD 067.3147		
L259	DELEVAN DROSSEL1025-76 LD 10,0UH10%3,300HM0,144A CHOKE			LD 026.4184		
	DELEVAN DROSSEL1025-44					
N120	BM OM350 ANTENNEN-VERST ANTENNA AMPLIFIER			BM 334.4953		
	VALVO OM350					
N130	BM OM350 ANTENNEN-VERST ANTENNA AMPLIFIER			BM 334.4953		
	VALVO OM350					
N165	BM OM350 ANTENNEN-VERST ANTENNA AMPLIFIER			BM 334.4953		
	VALVO OM350					
N190	BO LM124J 4XL.P.OPAMP OPERATIONAL AMPLIFIER			300.6353		
	NSC LM124J					
N195	BO LF156J BIFET OPAMP OPERATIONAL AMPLIFIER			BO 645.7251		
	MOTOROLA LF156J					
N220	BO LF156J BIFET OPAMP OPERATIONAL AMPLIFIER			BO 645.7251		
	MOTOROLA LF156J					
N260	BO LM311N COMPAR COMPARATOR			BO 394.8755		
	NSC LM311N					
N300	BM OM345 ANTENNEN-VERST ANTENNA AMPLIFIER			BM 285.1596		
	VALVO OM345					
N400	BO LF156J BIFET OPAMP OPERATIONAL AMPLIFIER			BO 645.7251		
	MOTOROLA LF156J					
N500	BL MC10116L 3XL. RECEIV LINE RECEIVER			BL 282.3275		
	MOTOROLA MC10116L					
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	14
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
P1	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P2	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P3	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P5	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P6	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P11	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P12	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
P48	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
R12	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477				
R25	RG 46,4 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 46,4OHM2% TK	006.8803				
R26	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 10,0KOHM FT	RG 007.0793				
R27	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 825OHM F T	RG 006.7259				
R30	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R35	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926				
R40	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R41	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D	RL 083.0461				
R42	RL 0,35W 68,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/68,1OHM-F-D	RL 082.9636				
R43	RL 0,35W 3,24KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,24K-F-D	RL 082.6843				
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		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	15
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
R44	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/332OHM-F-D	RL 083.0255				
R45	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R47	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D	RL 083.0990				
R48	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R49	RS 0,5W500 OHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F-1-501	RS 247.7878				
R50	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D	RL 083.0490				
R56	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 10,0KOHM FT	RG 007.0793				
R57	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 825OHM F T	RG 006.7259				
R60	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R65	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926				
R70	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R71	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D	RL 083.0461				
R72	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571				
R75	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297				
R77	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D	RL 083.0990				
R78	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160				
R79	RS 0,5W500 OHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F-1-501	RS 247.7878				
R86	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 10,0KOHM FT	RG 007.0793				
R87	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 825OHM F T	RG 006.7259				
					803.6020.01 SA	BL15+

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	20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	16
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
R90	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C		RL 082.2160		
R95	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D		RL 083.0926		
R100	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C		RL 082.2160		
R101	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D		RL 083.0461		
R102	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D		RL 082.9571		
R105	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D		RL 083.1297		
R107	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D		RL 083.0990		
R108	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C		RL 082.2160		
R109	RS 0,5W500 OHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386F-1-501		RS 247.7878		
R116	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 825OHM F T		RG 006.7259		
R120	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR DRALORIC SMA0207/100/HM-F-D		RL 082.6543		
R121	RG 147 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 147OHM2% TK		006.8926		
R122	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 100OHM F T		RG 006.8884		
R123	RG 147 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 147OHM2% TK		006.8926		
R130	RG 147 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 147OHM2% TK		006.8926		
R132	RG 147 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 147OHM2% TK		006.8926		
R133	RL 0,35W 162 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/162OHM-F-D		RL 082.9971		
R134	RG 75,0 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 75,0OHM F T		RG 006.8855		
R135	RG 237 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 237OHM2% TK		006.8978		
803.6020.01 SA BL16+					

ROHDE&SCHWARZ	AZ	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
	20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	17
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
R140	RG 422 OHM+-2%TK200 1206 CHIP RESISTOR		006.9039		
R141	DRALORIC CGB3216 422OHM2% TK RG 100 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8884		
R142	DALE CRCW1206 100OHM F T RG 75,0 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8855		
R157	DALE CRCW1206 75,0OHM F T RL 0,35W 27,4KOHM+-1%TK50 RESISTOR		RL 082.2583		
R159	DRALORIC SMA 0207/27,4K-F-C RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
R160	DALE CRCW1206 10,0KOHM FT RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
R161	DALE CRCW1206 10,0KOHM FT RG 237 OHM+-2%TK200 1206 CHIP RESISTOR		006.8978		
R162	DRALORIC CGB3216 237OHM2% TK RG 100 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8884		
R163	DALE CRCW1206 100OHM F T RG 75,0 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8855		
R166	DALE CRCW1206 75,0OHM F T RL 0,35W 221 OHM+-1%TK50 RESISTOR		RL 083.0084		
R167	DRALORIC SMA0207/221OHM-F-D RG 147 OHM+-2%TK200 1206 CHIP RESISTOR		006.8926		
R168	DRALORIC CGB3216 147OHM2% TK RG 38,3 OHM+-2%TK200 1206 CHIP RESISTOR		006.8784		
R169	DRALORIC CGB3216 38,3OHM2% TK RG 147 OHM+-2%TK200 1206 CHIP RESISTOR		006.8926		
R170	DRALORIC CGB3216 147OHM2% TK RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
R171	DALE CRCW1206 10,0KOHM FT RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
R172	DALE CRCW1206 10,0KOHM FT RG 100 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8884		
R173	DALE CRCW1206 100OHM F T RG 75,0 OHM+-1%TK100 1206 CHIP RESISTOR		RG 006.8855		
R180	DALE CRCW1206 75,0OHM F T RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
R181	DALE CRCW1206 10,0KOHM FT RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR		RG 007.0793		
	DALE CRCW1206 10,0KOHM FT				
803.6020.01 SA BL17+					

ROHDE&SCHWARZ		Az	Datum Date	Schaltteilleiste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	18
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R182	RG 100 OHM+-1%TK100 1206 CHIP RESISTOR			RG 006.8884		
R183	DALE CRCW1206 100OHM F T RG 75,0 OHM+-1%TK100 1206 CHIP RESISTOR			RG 006.8855		
R190	DALE CRCW1206 75,0OHM F T RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR			RG 006.7271		
BIS/TO	DALE CRCW1206 1,0KOHM F T					
R194						
R195	RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR			RG 007.0793		
R196	DALE CRCW1206 10,0KOHM FT RG 10 KOHM+-1%TK100 1206 CHIP RESISTOR			RG 007.0793		
R210	DALE CRCW1206 10,0KOHM FT RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R211	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R221	DRALORIC SMA0207/10K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR			RL 083.1097		
R222	DRALORIC SMA0207/4,75K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R223	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R225	DRALORIC SMA0207/10K-F-D RL 0,35W 1,82KOHM+-1%TK50 RESISTOR			RL 082.2277		
R226	DRALORIC SMA0207/1,82K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R230	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R231	DRALORIC SMA0207/10K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR			RL 082.2160		
R233	DRALORIC SMA0207/1K-F-C RL 0,35W 150 OHM+-1%TK50 RESISTOR			RL 082.9942		
R234	DRALORIC SMA0207/150OHM-F-D RL 0,35W 2,21KOHM+-1%TK50 RESISTOR			RL 082.2477		
R235	DRALORIC SMA 0207/2,21K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR			RL 083.1297		
R236	DRALORIC SMA0207/10K-F-D RL 0,35W 2,21KOHM+-1%TK50 RESISTOR			RL 082.2477		
	DRALORIC SMA 0207/2,21K-F-C					

803.6020.01 SA BL18+

ROHDE&SCHWARZ		AZ	Datum Date	Schaltteilleiste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	19
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
R249	RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543				
R250	DRALORIC SMA0207/100/HM-F-D RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477				
R251	DRALORIC SMA 0207/2,21K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160				
R252	DRALORIC SMA0207/1K-F-C RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390				
R253	DRALORIC SMA0207/475OHM-F-D RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477				
R254	DRALORIC SMA 0207/2,21K-F-C RL 0,35W 2,21KOHM+-1%TK50 RESISTOR	RL 082.2477				
R255	DRALORIC SMA 0207/2,21K-F-C RL 0,35W 150 OHM+-1%TK50 RESISTOR	RL 082.9942				
R256	DRALORIC SMA0207/150OHM-F-D RL 0,35W 6,81KOHM+-1%TK50 RESISTOR	RL 082.2560				
R257	DRALORIC SMA 0207/6,81K-F-C RL 0,35W 1,82KOHM+-1%TK50 RESISTOR	RL 082.2277				
R258	DRALORIC SMA0207/1,82K-F-C RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543				
R259	DRALORIC SMA0207/100/HM-F-D RL 0,35W 274 OHM+-1%TK50 RESISTOR	RL 083.0178				
R260	DRALORIC SMA0207/274OHM-F-D RL 0,35W 3,92KOHM+-1%TK50 RESISTOR	RL 083.1039				
R261	RESISTA MK2 RL 0,35W 3,92KOHM+-1%TK50 RESISTOR	RL 083.1039				
R262	RESISTA MK2 RL 0,35W 475 OHM+-1%TK50 RESISTOR	RL 083.0390				
R263	DRALORIC SMA0207/475OHM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297				
R264	DRALORIC SMA0207/10K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160				
R265	DRALORIC SMA0207/1K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160				
R266	DRALORIC SMA0207/1K-F-C RL 0,35W 100 OHM+-1%TK50 METALFILM-RESISTOR	RL 082.6543				
R267	DRALORIC SMA0207/100/HM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297				
	DRALORIC SMA0207/10K-F-D					
803.6020.01 SA						BL19+

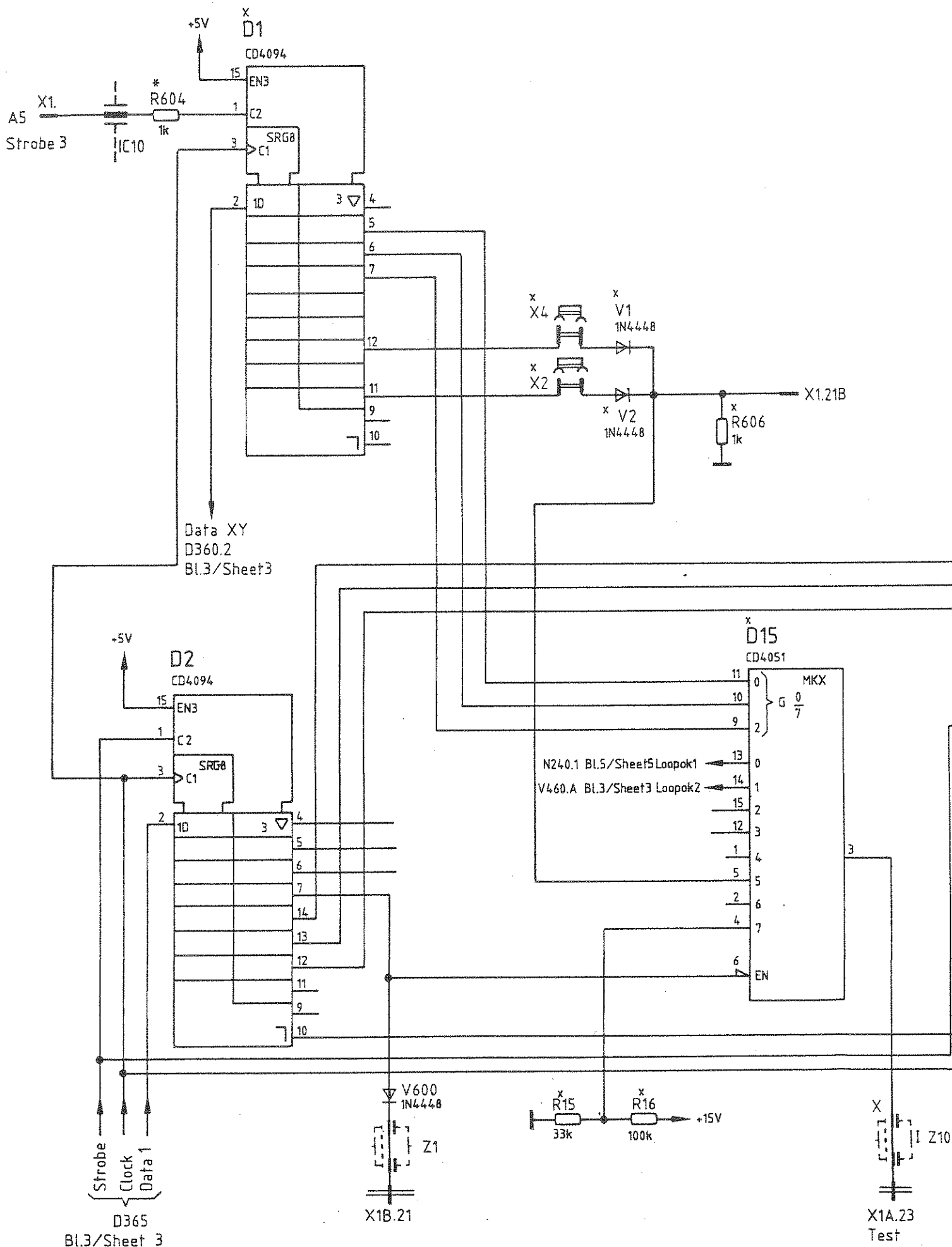
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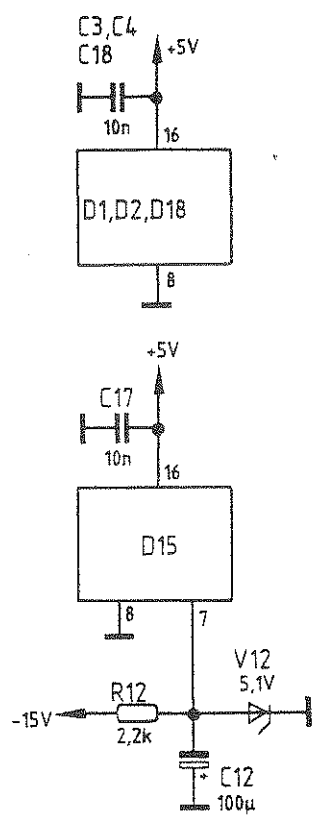
ROHDE&SCHWARZ		AZ	Datum Date	Schaltteilleiste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	20
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R300	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D			RL 083.0084		
R303	RG 82,5 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 82,5OHM F T			RG 006.8861		
R310	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R311	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R312	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R315	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D			RL 083.0490		
R316	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D			RL 083.0732		
R320	RL 0,35W 475 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/475OHM-F-D			RL 083.0390		
R333	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C			RL 082.2477		
R334	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D			RL 083.1097		
R358	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R400	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R402	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D			RL 083.1297		
R403	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D			RL 083.1297		
R405	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C			RL 082.2160		
R410	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/27,4K-F-C			RL 082.2583		
R411	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D			RL 083.0990		
R425	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D			RL 083.1400		
R428	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C			RL 082.2277		

803.6020.01 SA BL20+

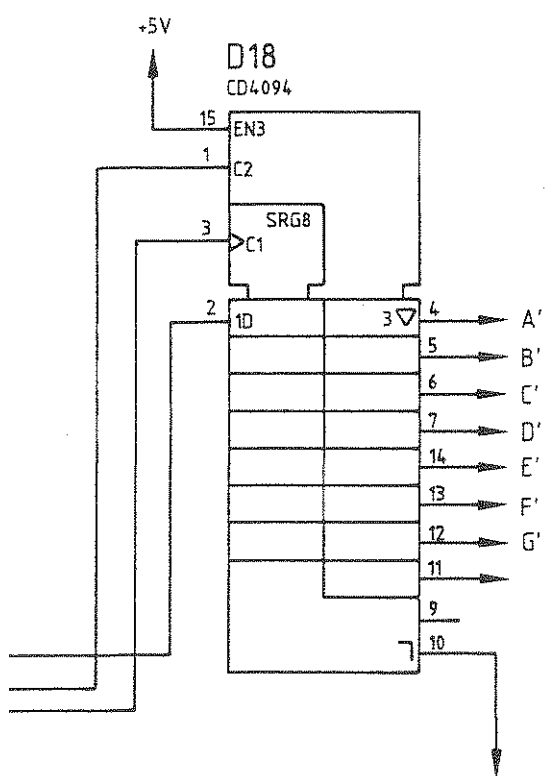
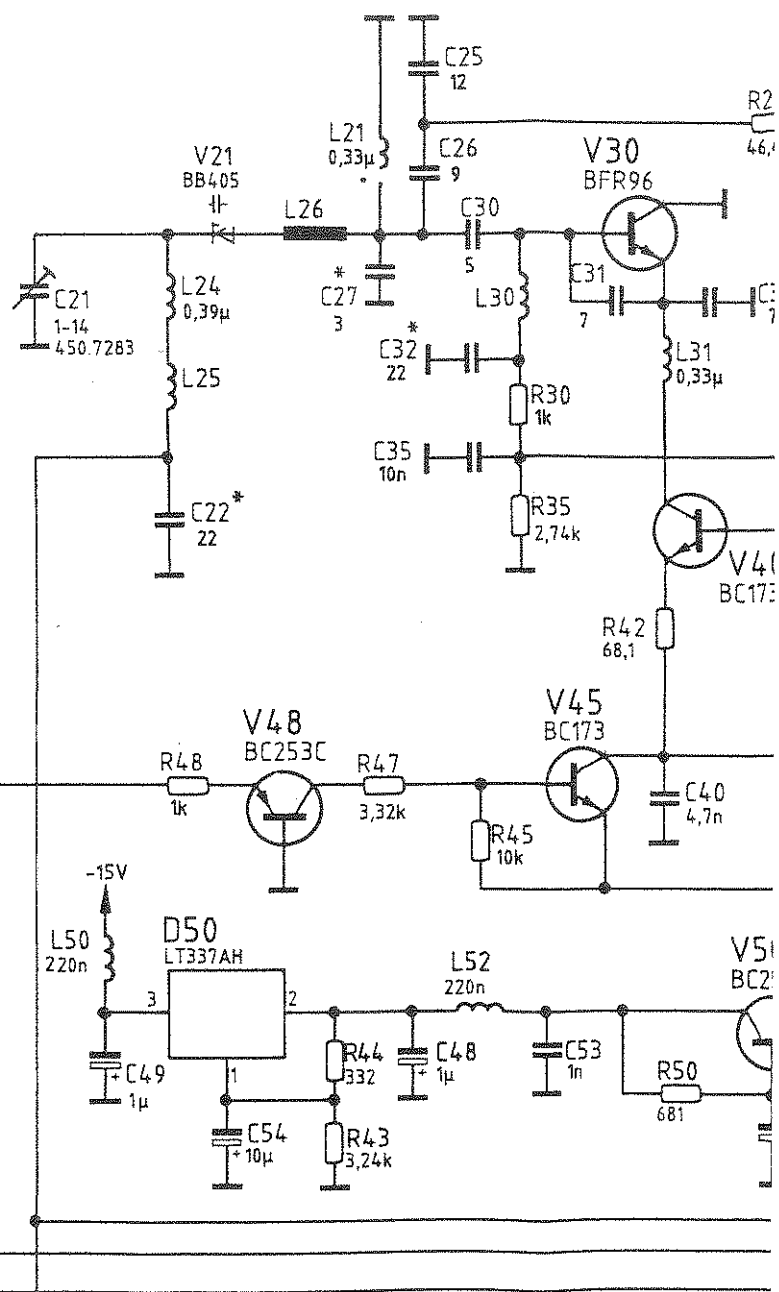
ROHDE&SCHWARZ		Az	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	21
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
R500	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
BIS/TO R504 R510	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
R511	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
R520	RG 1,78KOHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB 3216 1,78KOHM 2%			007.0006		
R521	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
R522	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
R523	RG 681 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 681OHM F T			RG 006.9080		
R524	RG 1,47KOHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB 3216 1,47KOHM 2%			006.9980		
R530	RG 3,83KOHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB 3216 3,83KOHM 2%			007.0693		
R570	RG 8,25KOHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 8,25KOHM FT			RG 007.0770		
R571	RG 825 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 825OHM F T			RG 006.7259		
R601	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 1,0KOHM F T			RG 006.7271		
R602	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 1,0KOHM F T			RG 006.7271		
R603	RG 1000 OHM+-1%TK100 1206 CHIP RESISTOR DALE CRCW1206 1,0KOHM F T			RG 006.7271		
V12	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1			AE 012.2449		
V21	AE BB405B 11/ 2PF CDI TUNING DIODE VALVO BB405B			AE 596.6839		
V30	AK BFR96 NPN 15V 75MA TRANSISTOR VALVO BFR96			AK 093.2738		
V40	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
					803.6020.01 SA	BL21+

ROHDE&SCHWARZ		AZ	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	22
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
V45	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
V48	AK BC253C PNP 25V 100MA TRANSISTOR INTERMETAL BC253C			010.2829		
V50	AK BC253C PNP 25V 100MA TRANSISTOR INTERMETAL BC253C			010.2829		
V51	AE BB405B 11/ 2PF CDI TUNING DIODE VALVO BB405B			AE 596.6839		
V60	AK BFR96 NPN 15V 75MA TRANSISTOR VALVO BFR96			AK 093.2738		
V70	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
V75	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
V78	AK BC253C PNP 25V 100MA TRANSISTOR INTERMETAL BC253C			010.2829		
V81	AE BB405B 11/ 2PF CDI TUNING DIODE VALVO BB405B			AE 596.6839		
V90	AK BFR96 NPN 15V 75MA TRANSISTOR VALVO BFR96			AK 093.2738		
V100	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
V105	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C			010.4444		
V108	AK BC253C PNP 25V 100MA TRANSISTOR INTERMETAL BC253C			010.2829		
V115	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99			911.0092		
V145	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99			911.0092		
V146	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99			911.0092		
V147	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99			911.0092		
V163	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99			911.0092		
V170	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET			AD 012.0700		
803.6020.01 SA BL22+						





Oszillator 1
Oscillator 1



Data2
D550/2
Bl.4 / Sheet 4

X9
Bl.3 / Sheet 3

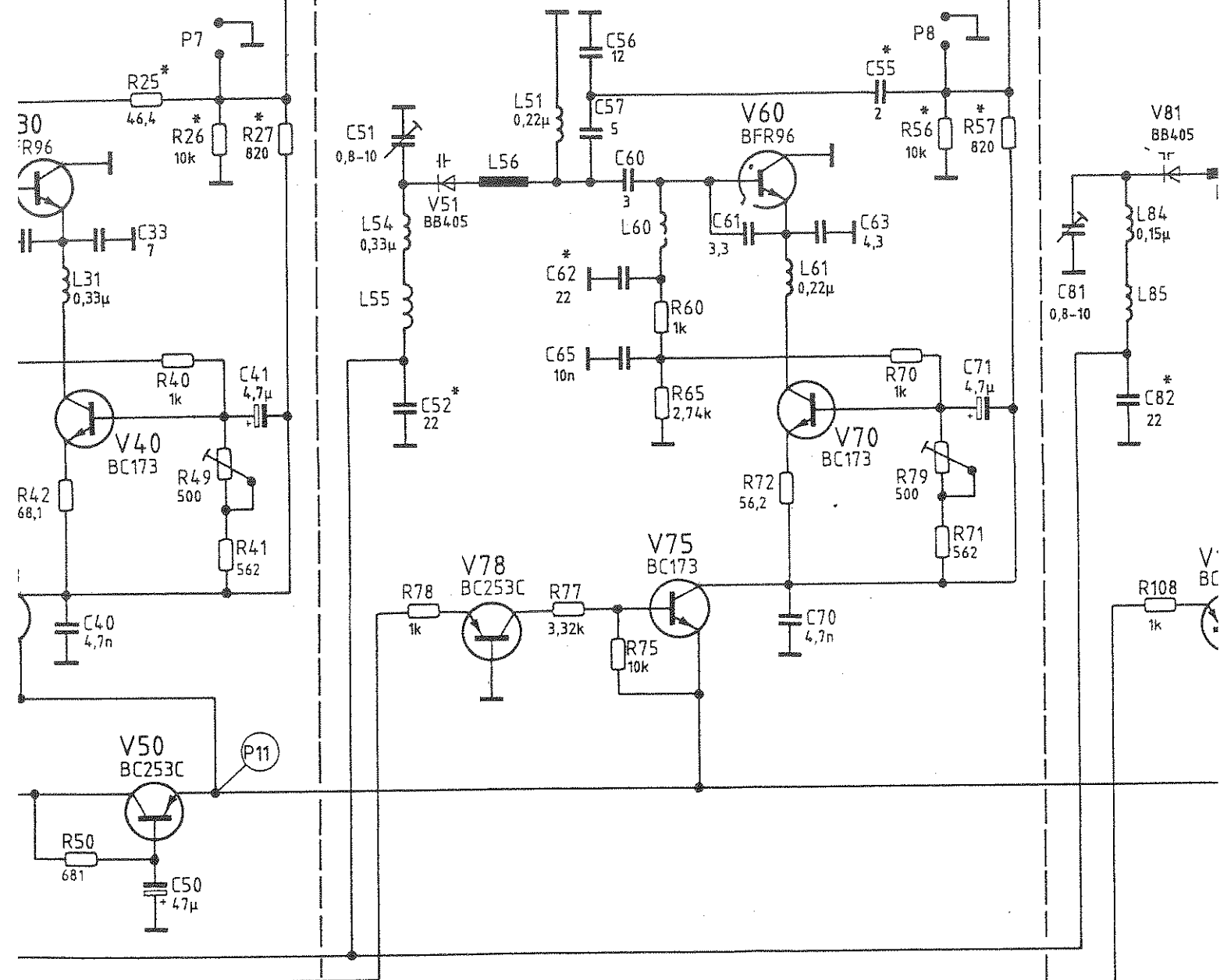
V40, V45, V48
V50, V70, V75
V78, V100, V105
V108

V30
V60
V90

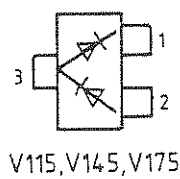
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1 Z10
23

Oszillator 2
Oscillator 2

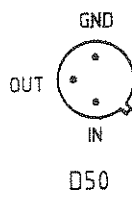
Oszillator 3
Oscillator 3



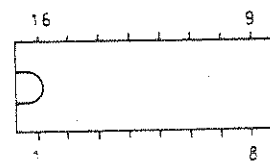
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0
10



V115, V145, V175

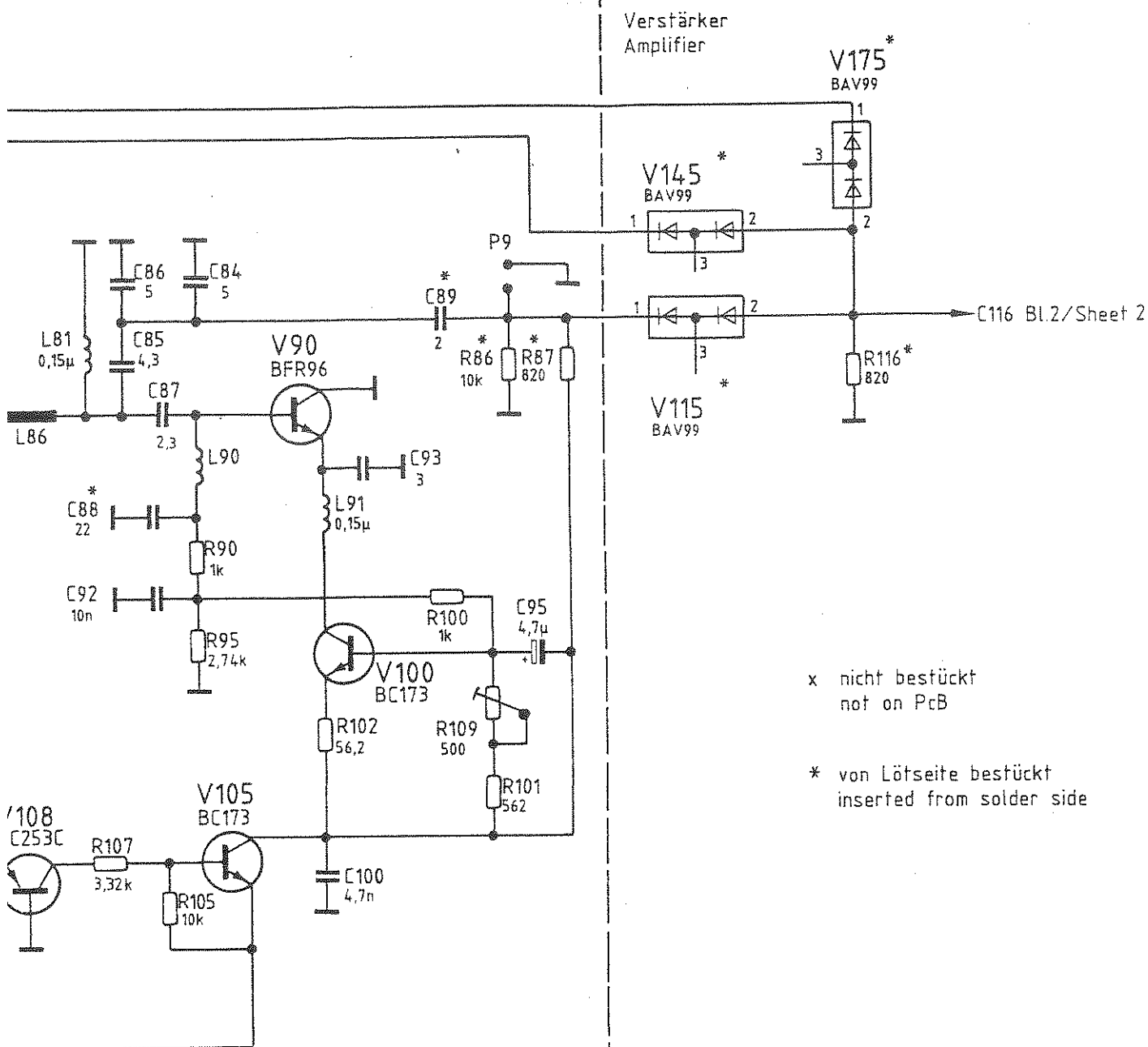


D50



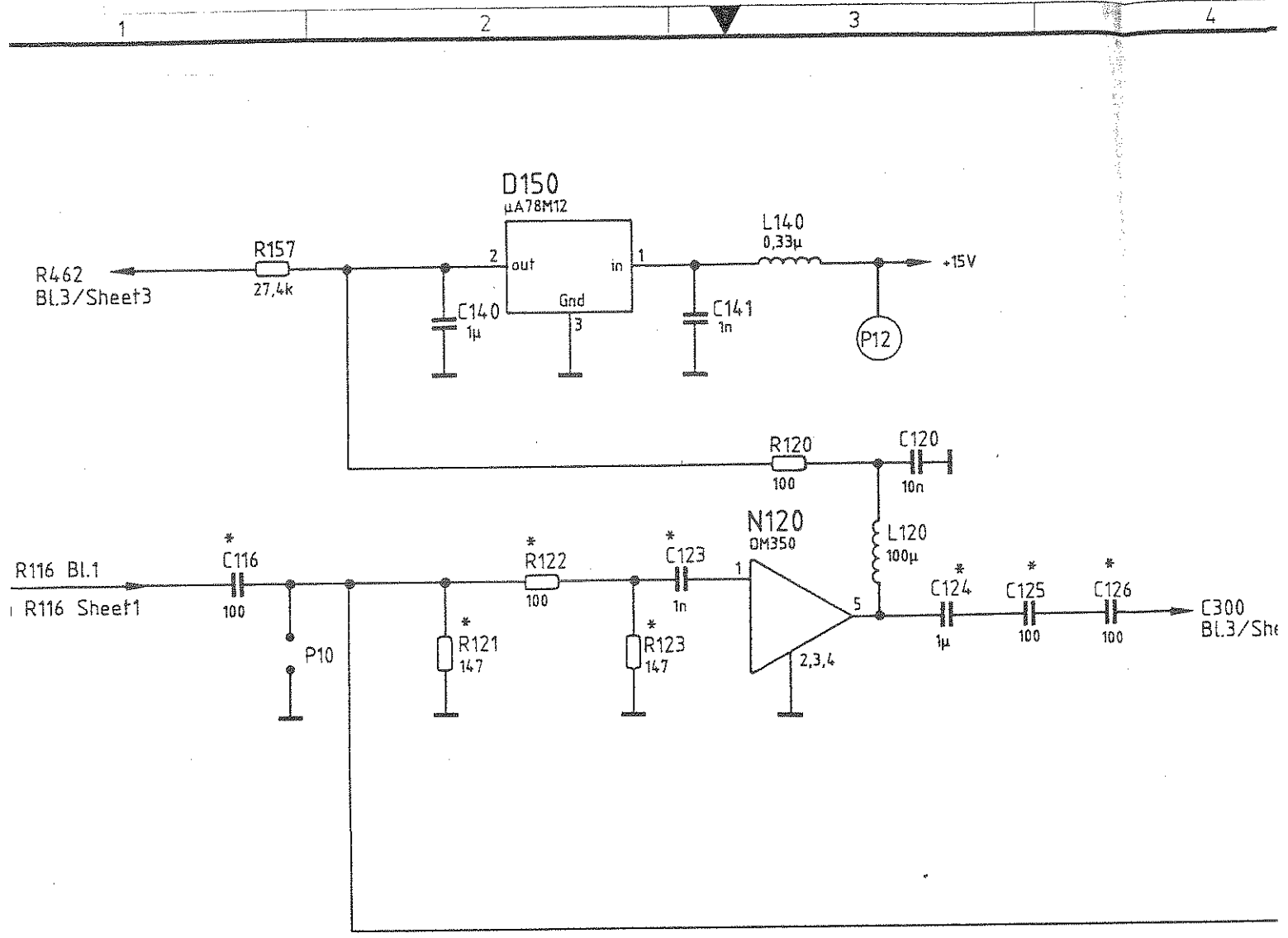
Draufsicht
Top view
D1, D2, D15, D18

	A		3.86	CO					
	B	35529	8.86	CO					
	C	38962	8.87	Co					
	Änderungs- Datum								



Stromlauf gilt für VAR 02
Circuit diagram is valid for model 02

IKSA	Tag	Name	Benennung	Duplex-Modulationsmesser	Z	Zeichn.-Nr.	803.6020 S
Bearb.	11.85	CO		Duplex-Modulation Meter			
Gep.							
Norm				zu Gerät CM-B9		reg. V 803.5317 V	erste Z

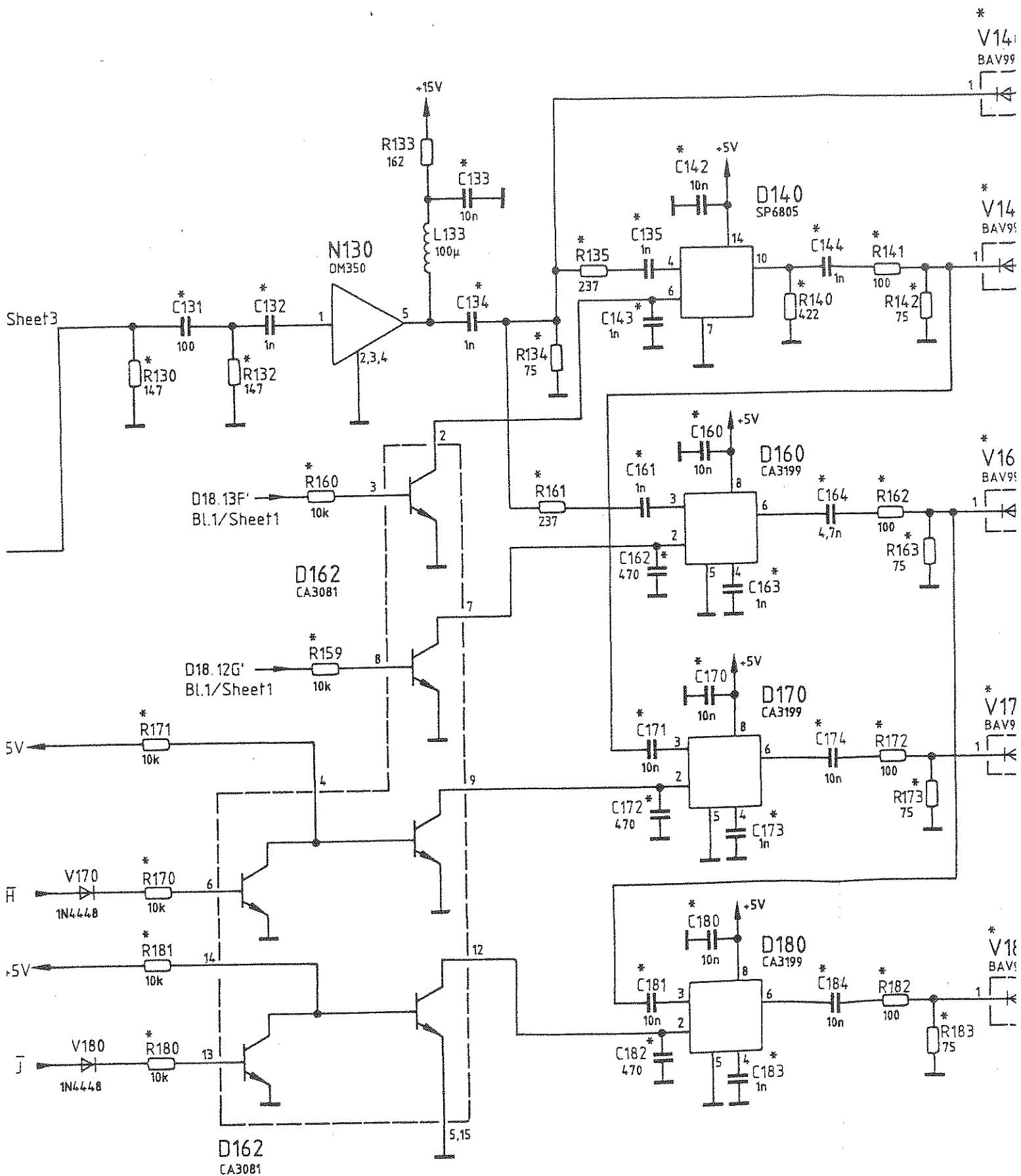


+5V

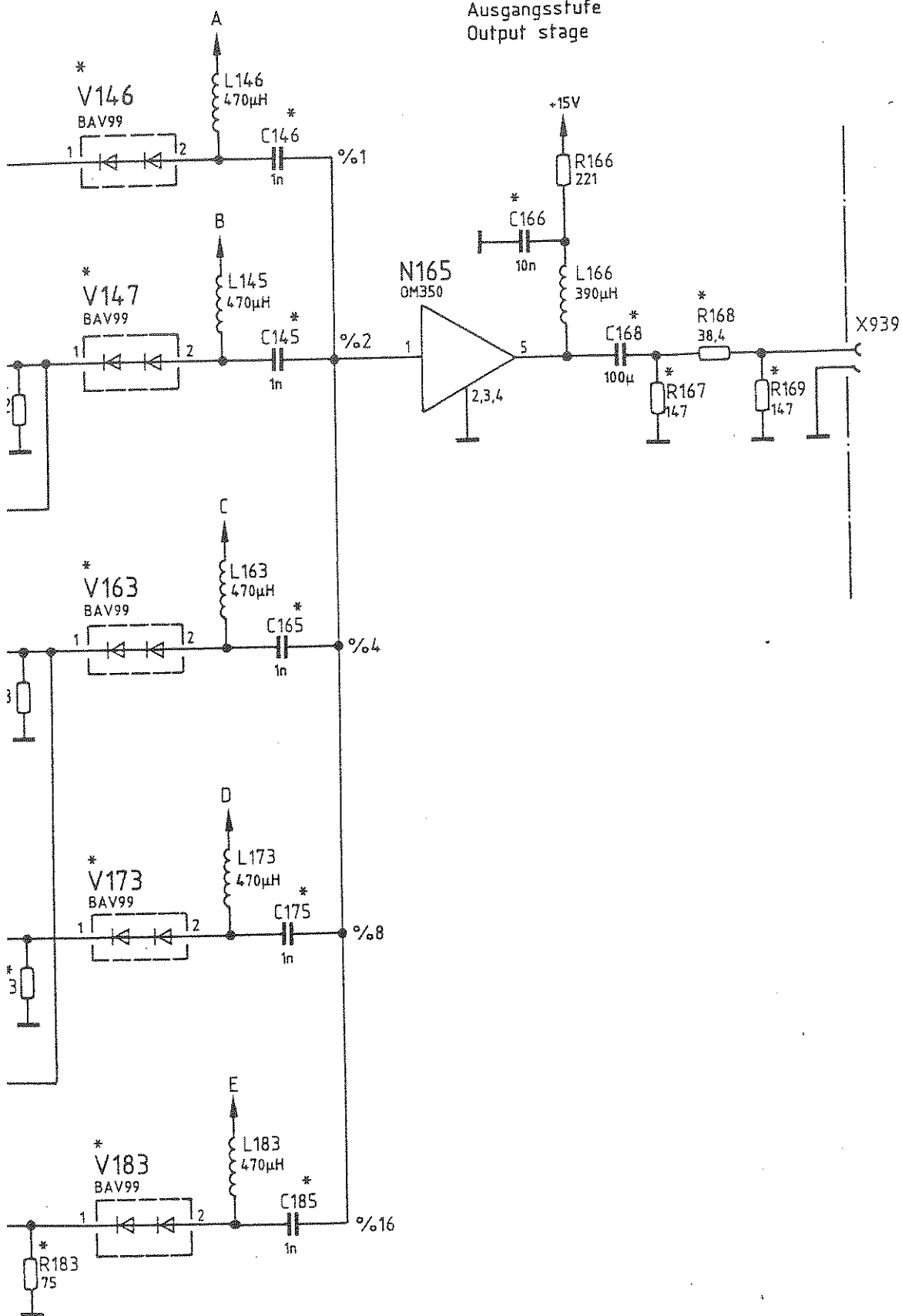
H

+5V

J



Ausgangsstufe Output stage



D18.7 D' -
BL.1/Sheet1

+5V -

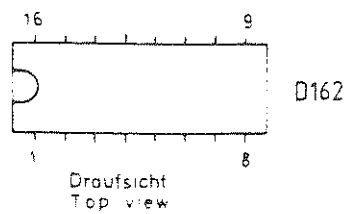
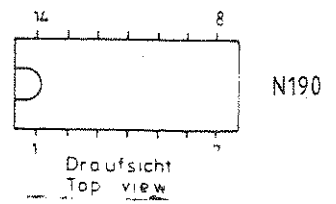
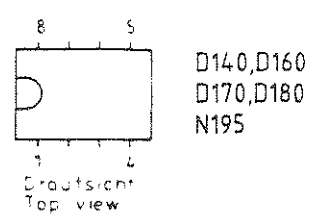
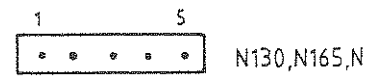
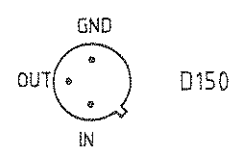
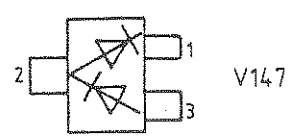
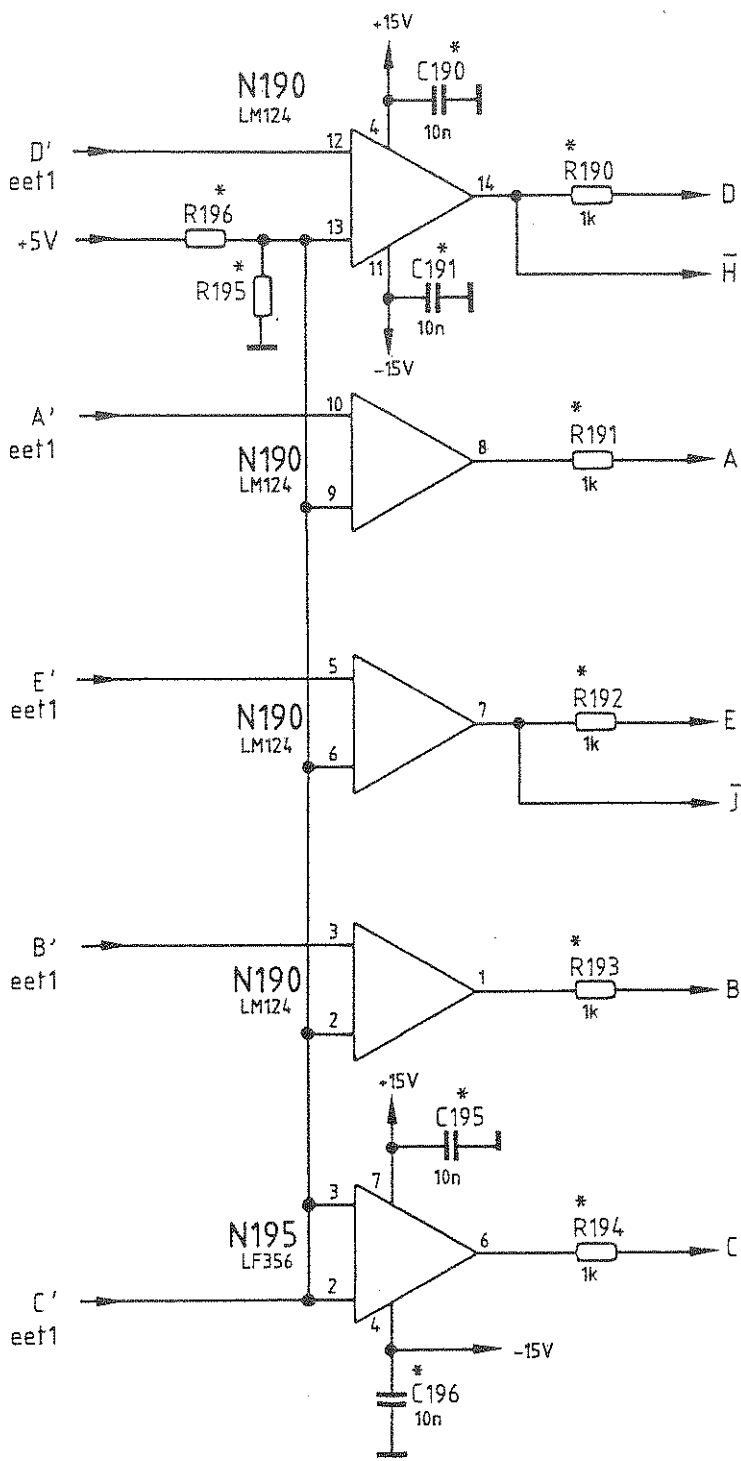
D18.4 A' -
BL.1/Sheet1

D18.14 E' -
BL.1/Sheet1

D18.5 B' -
BL.1/Sheet1

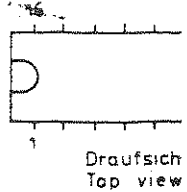
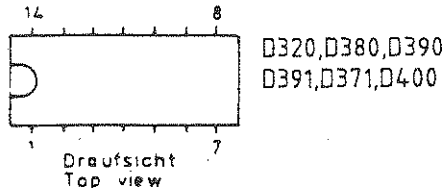
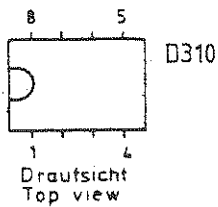
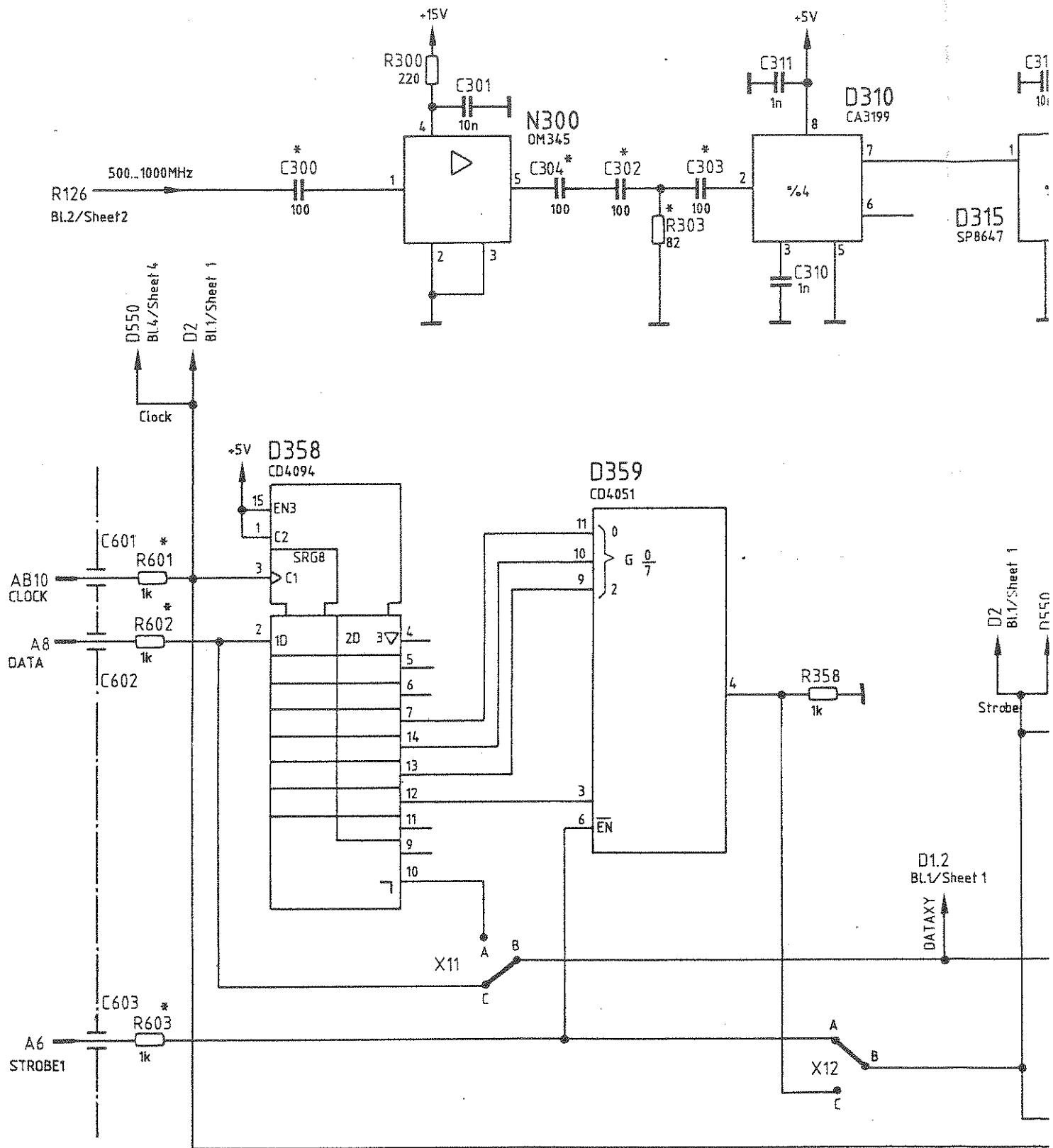
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BL.1/Sheet1

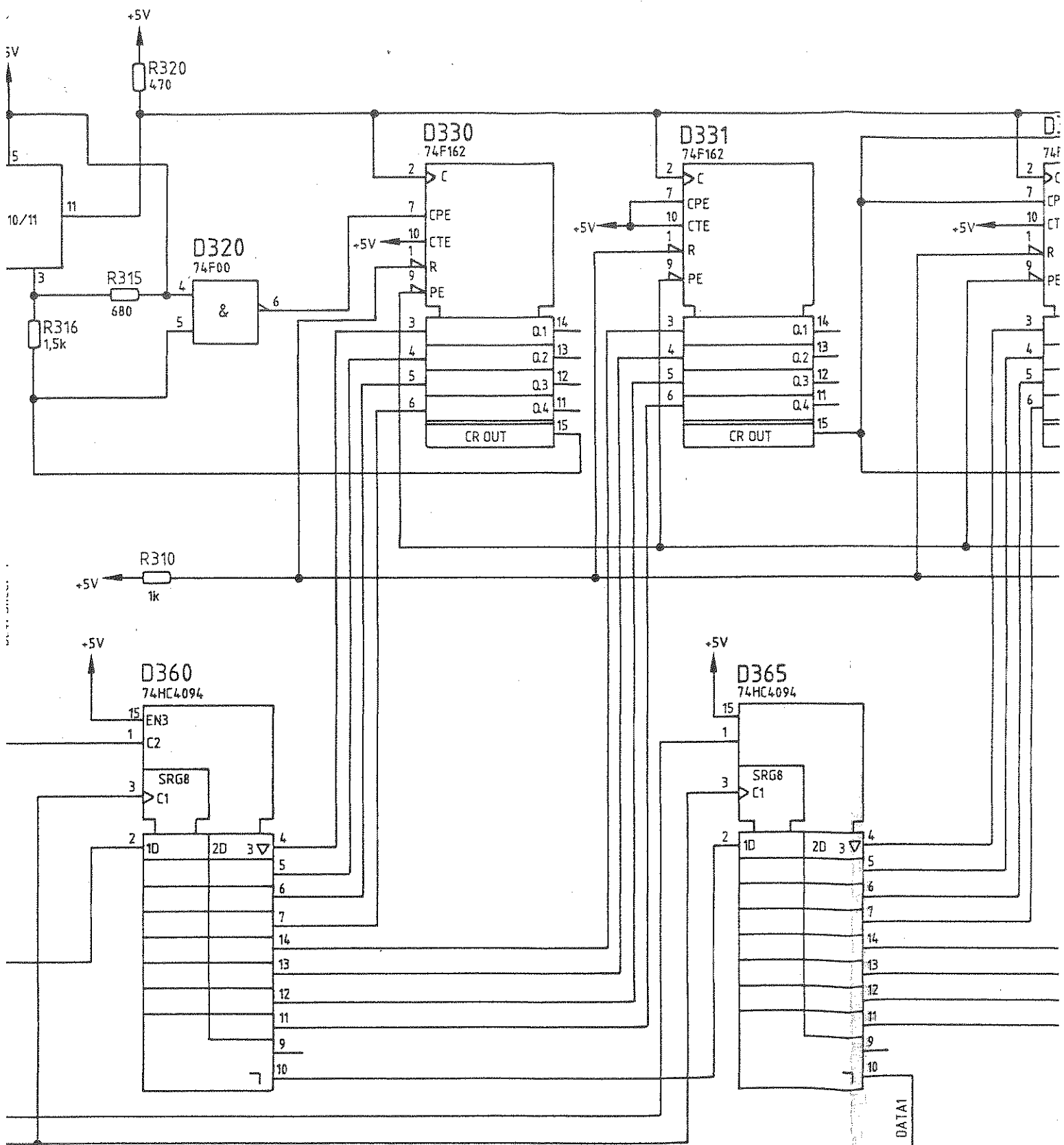
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									Bearb.
									Gepr.
	And	Änderungs	Datum	Name	And	Änderungs	Datum	Name	Norm



* von Lötseite bestückt
inserted from solder side

Tag	Name	Benennung	Zeichn.-Nr.
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		zu Gerät CM-B9	reg. V 803.5317 V erste Z

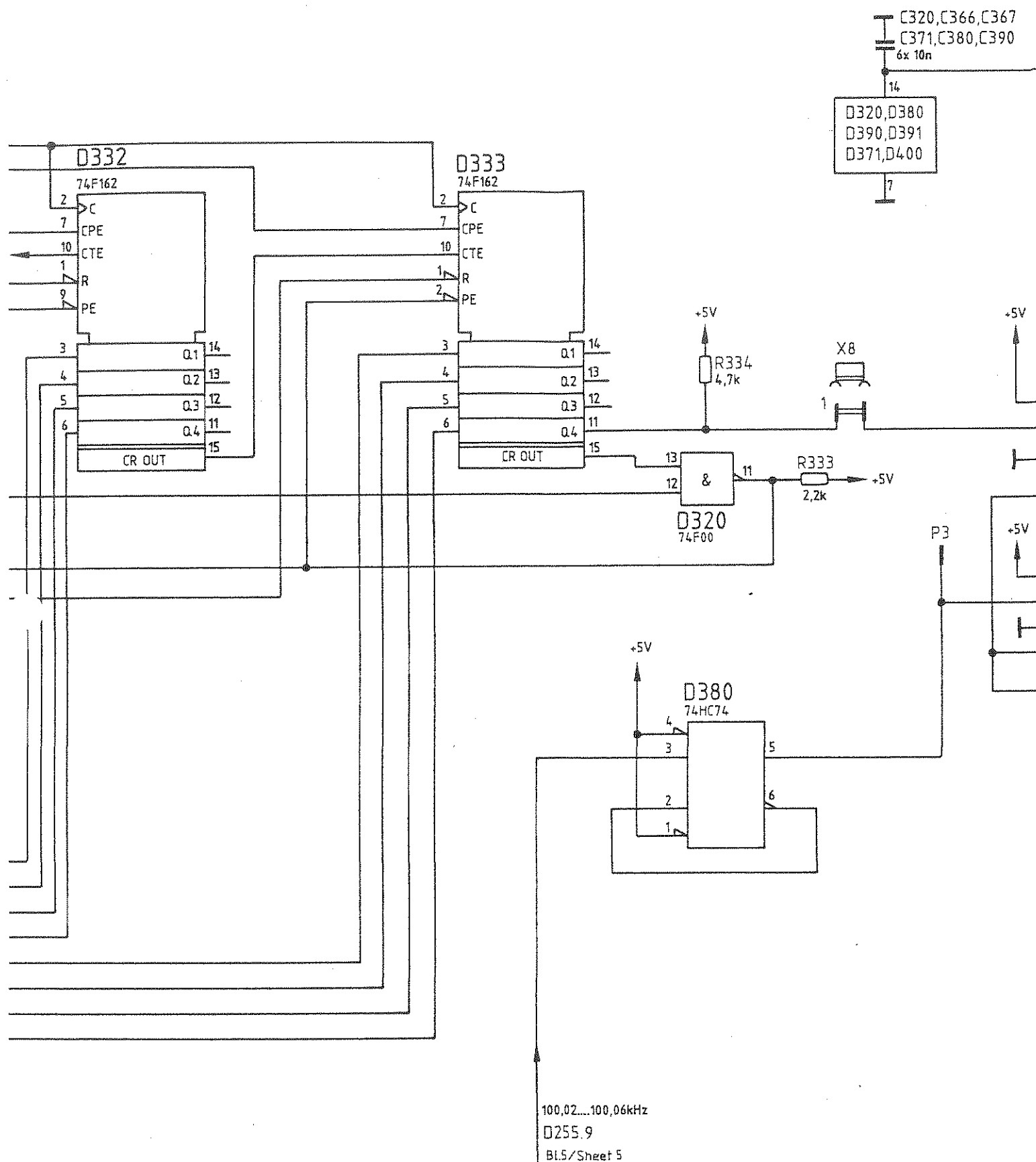




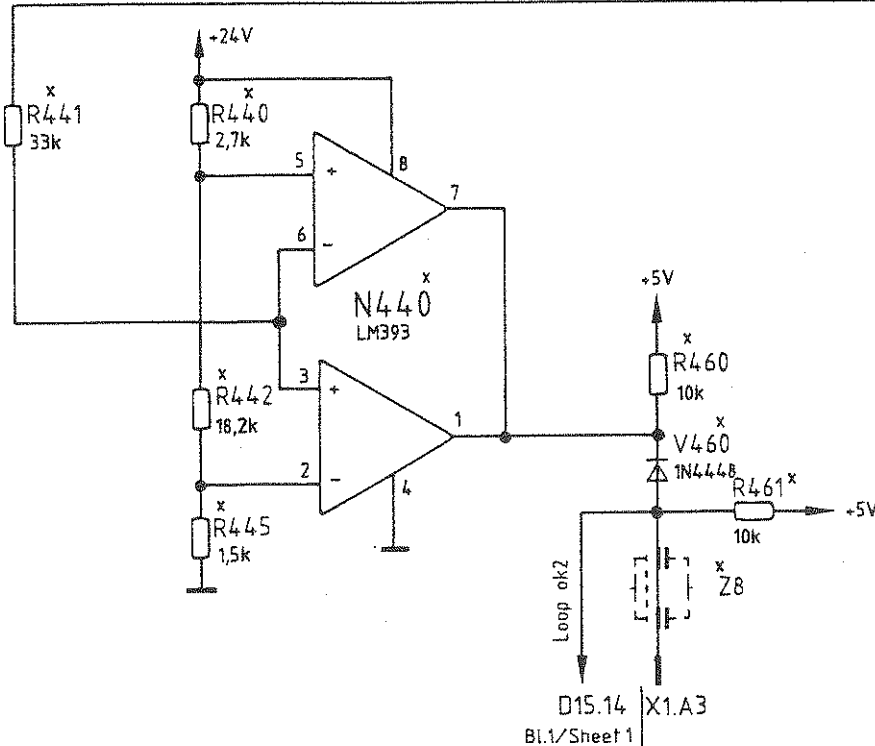
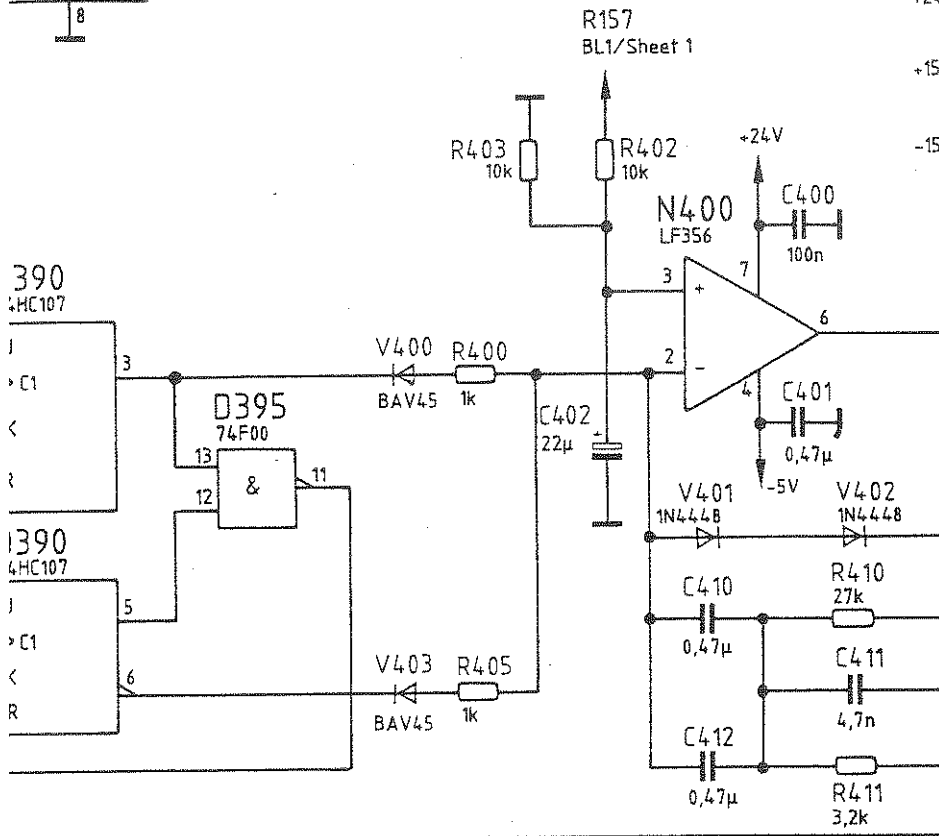
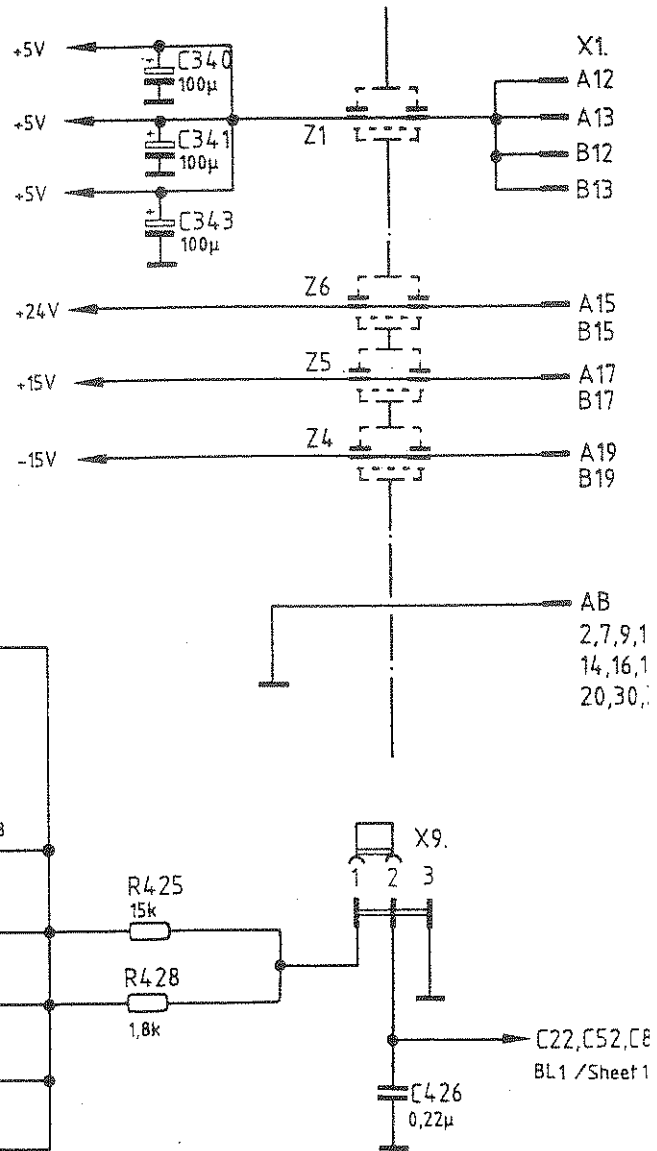
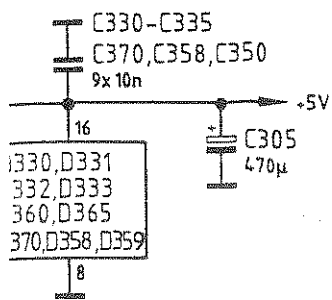
D330,D331,D332
D333,D360,D365
D315



DATA1
D2



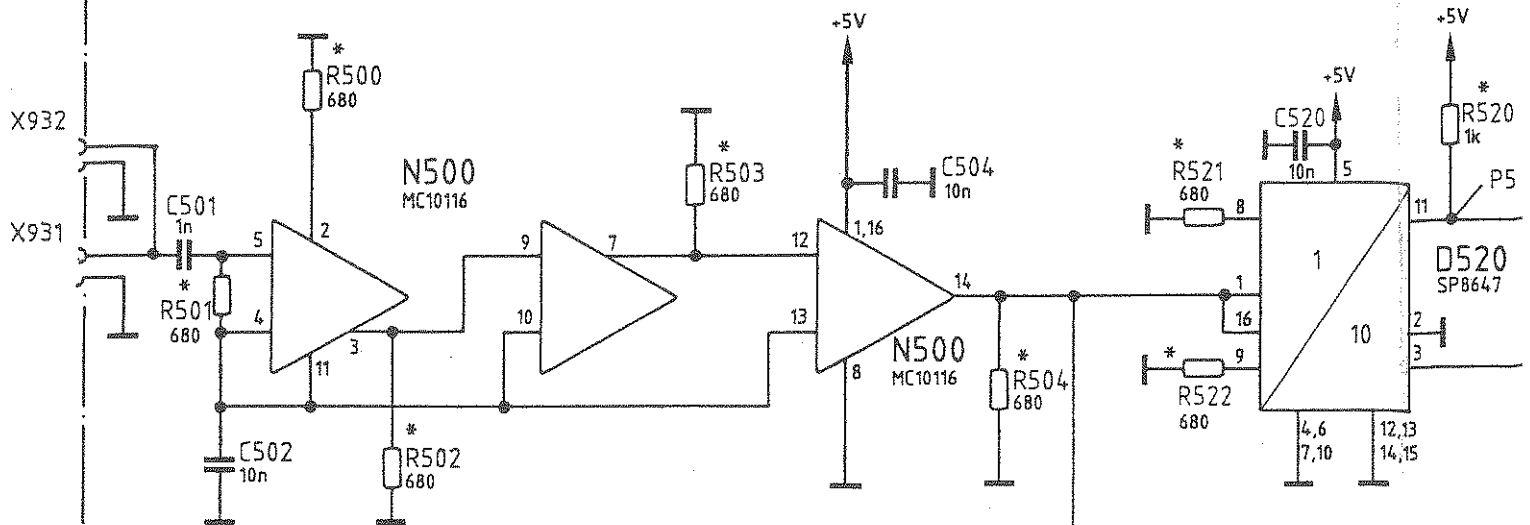
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									Bearb	11.8E
									Gepr	
	And Zust	Anderungs- Menge, u.a.	Datum	Name	Ans tag	Anderungs- Menge, u.a.	Datum	Name	Norm	



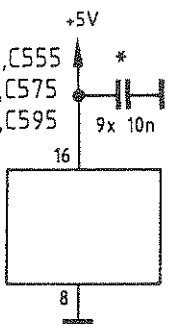
* von Leiterseite bestückt
inserted from solder side

x nicht bestückt
not on PCB

Name	Benennung	Duplex-Modulationsmesser	Z	Zeichn.-Nr	803.6020 S	Blatt	3
CO		Duplex-Modulation Meter					
	zu Gerät	CM-B9		reg. i. V	803.5317 V	erste Z	

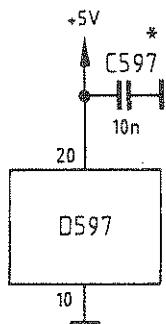


C540, C545, C555
C560, C570, C575
C585, C590, C595

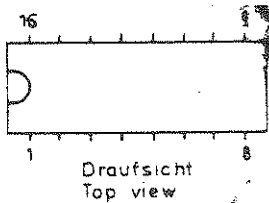


D510, D530, D540
D545, D555, D560
D570, D575, D585
D590, D595, D550
D565, D580, D592

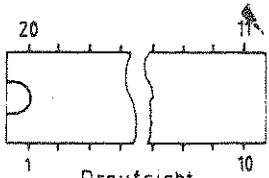
C597



N500, D510, D520, D530
D540, D545, D555, D560
D570, D575, D585, D590
D595, D550, D565, D580
D592

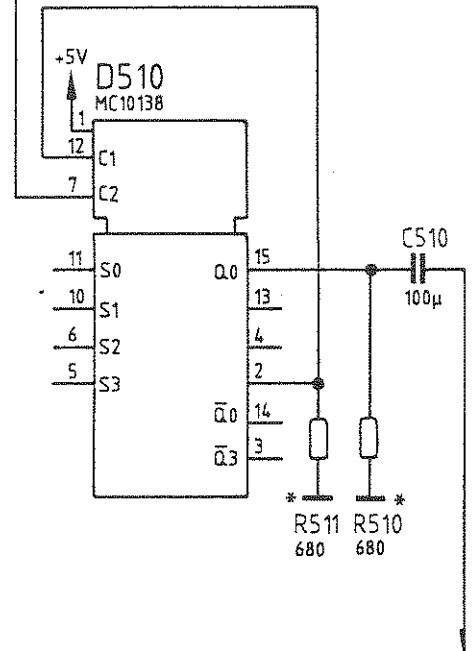


Draufsicht
Top view



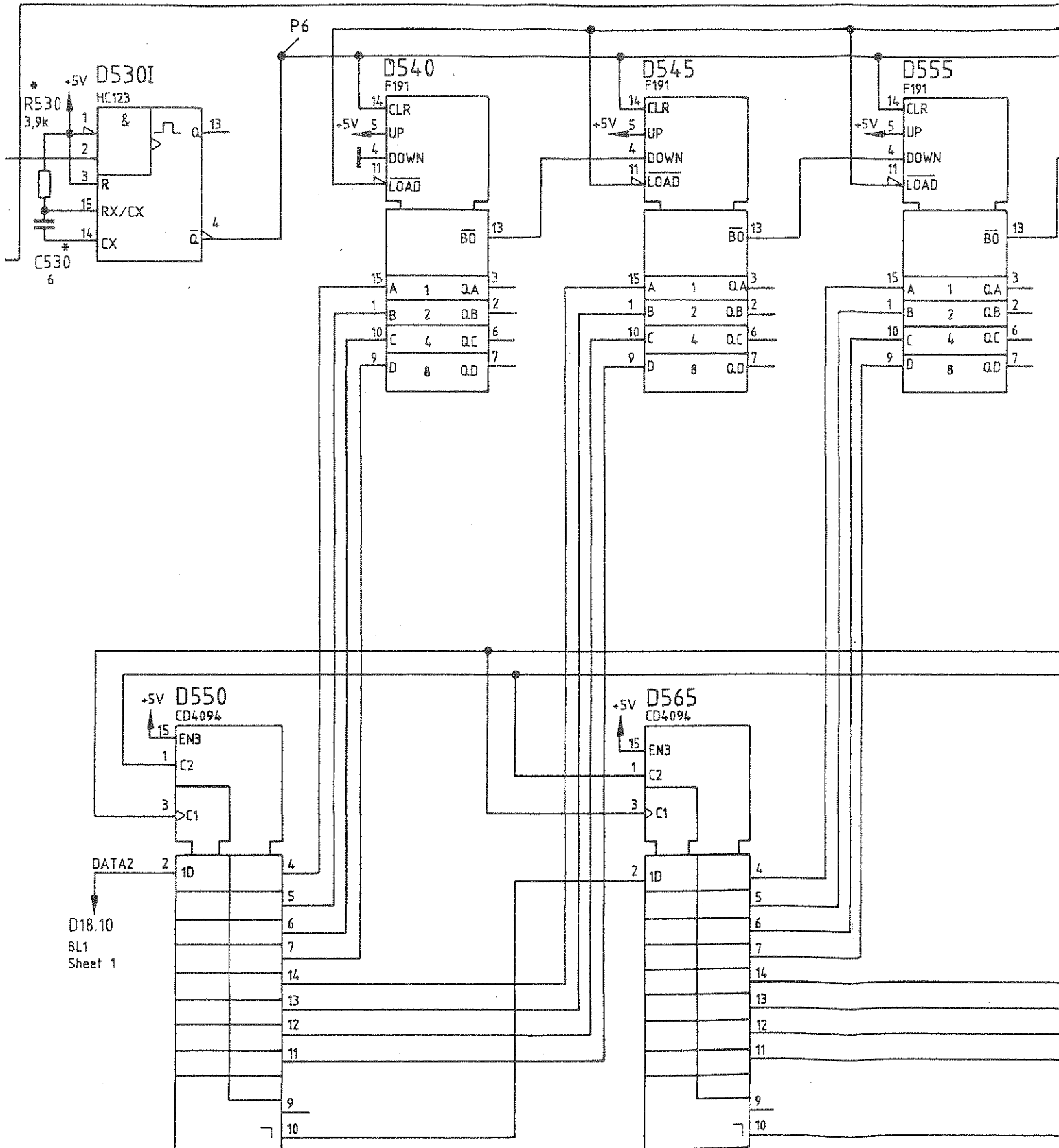
Draufsicht
Top view

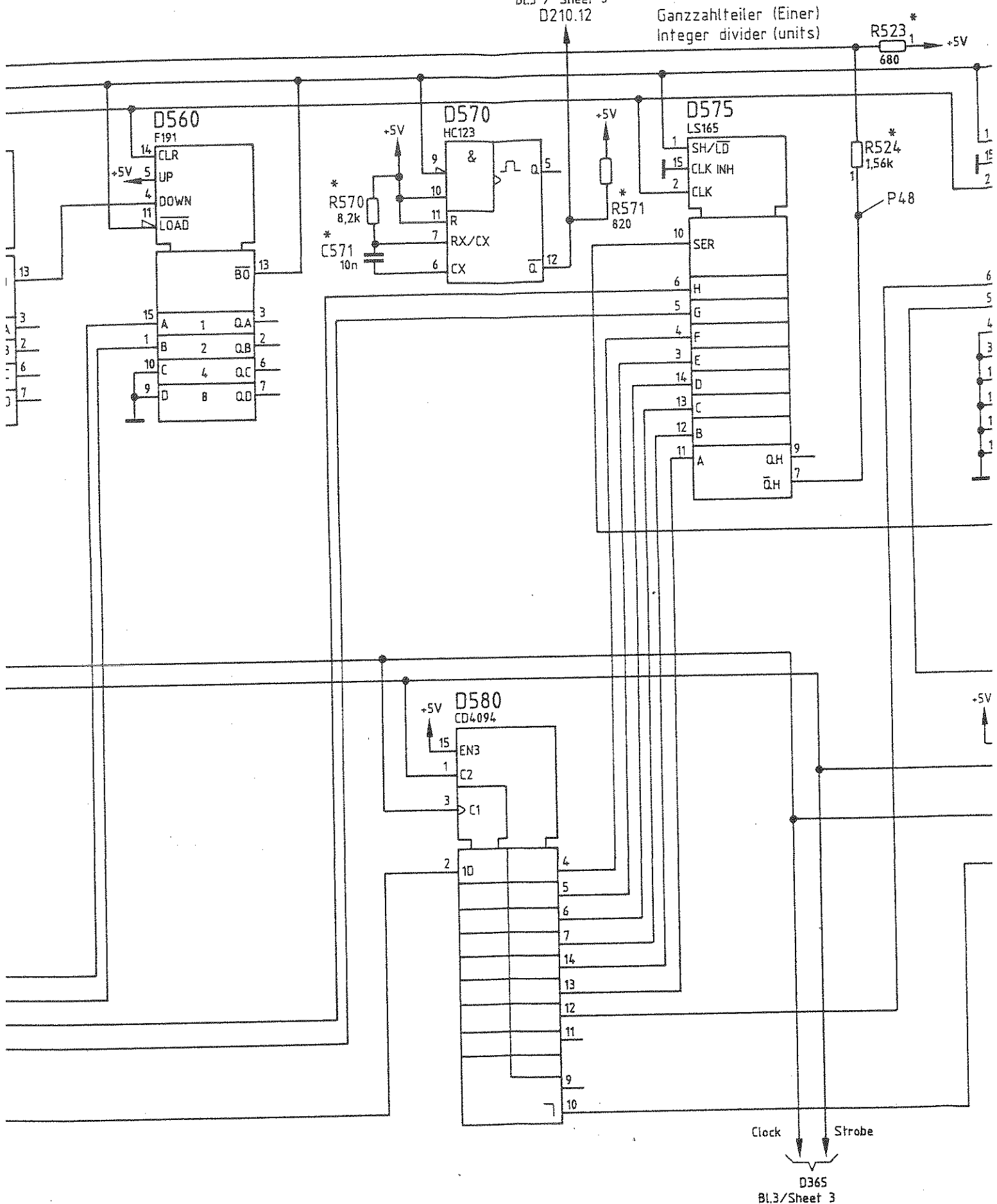
D597



R2:
BL5
She

Ganzzahlteiler (Zehner)
Integer divider (ten)



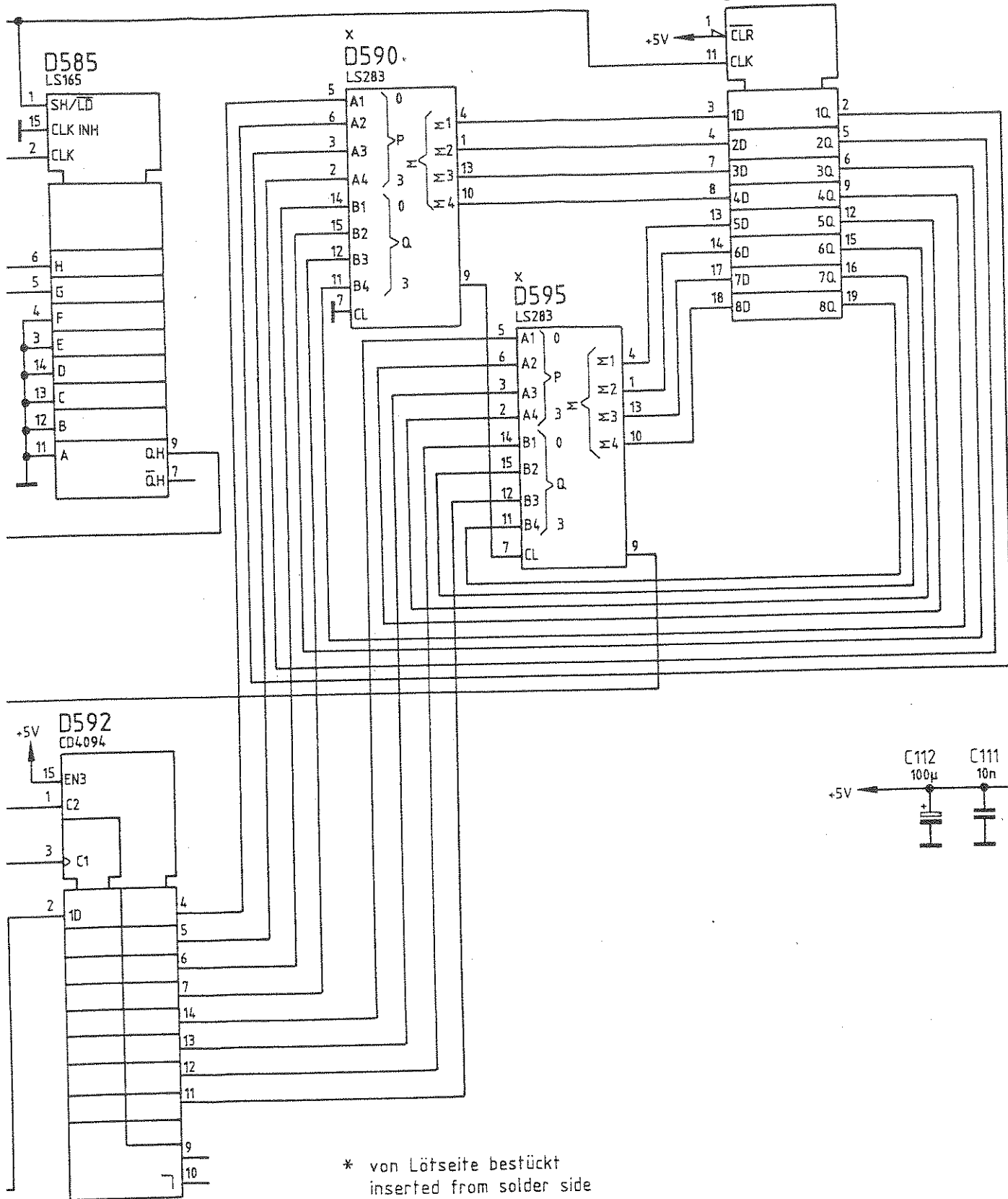


Clock Strobe

D365
Bl.3/Sheet 3

Bruchteiler
Fractional divider

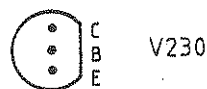
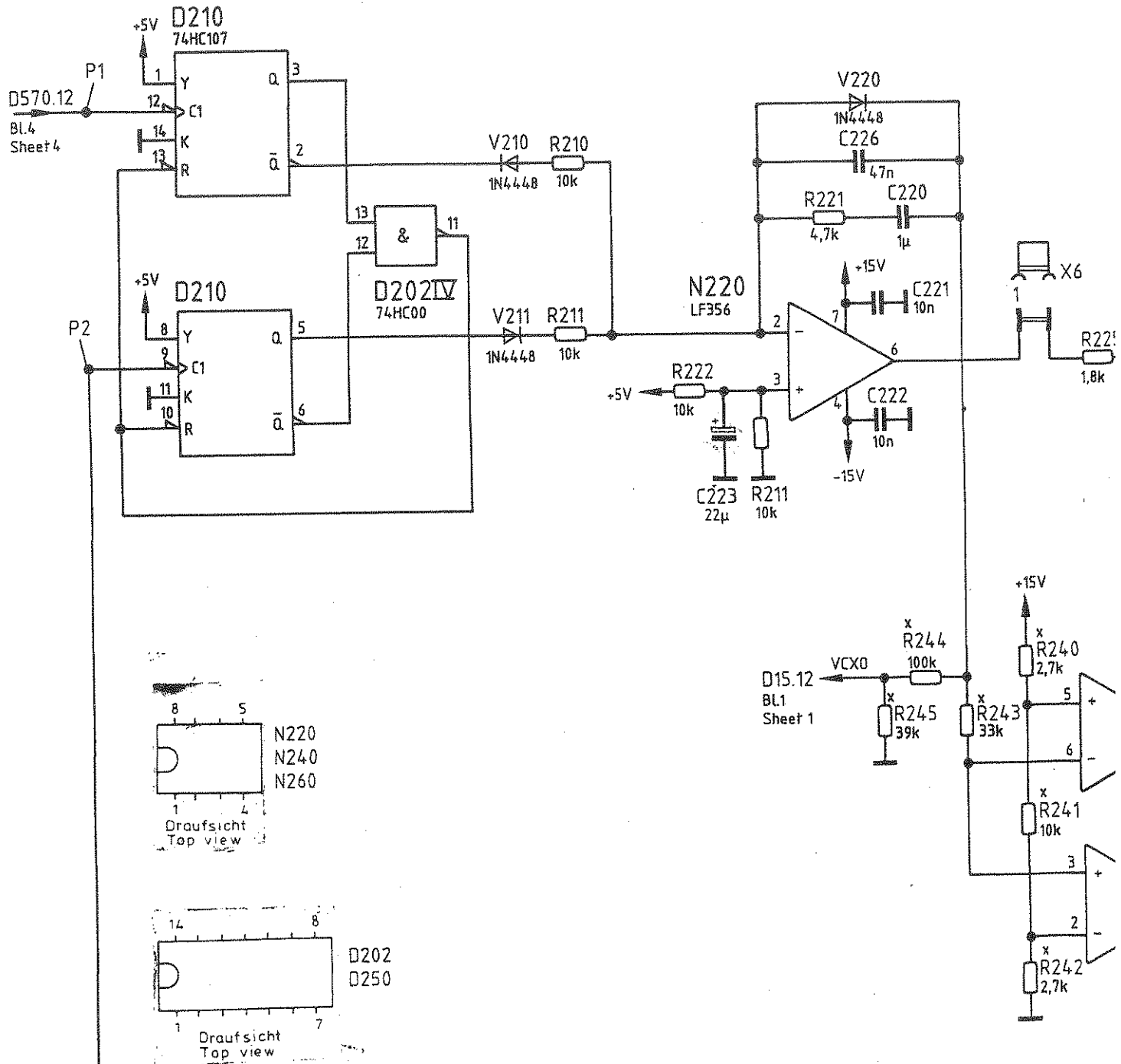
x
D597
LS273

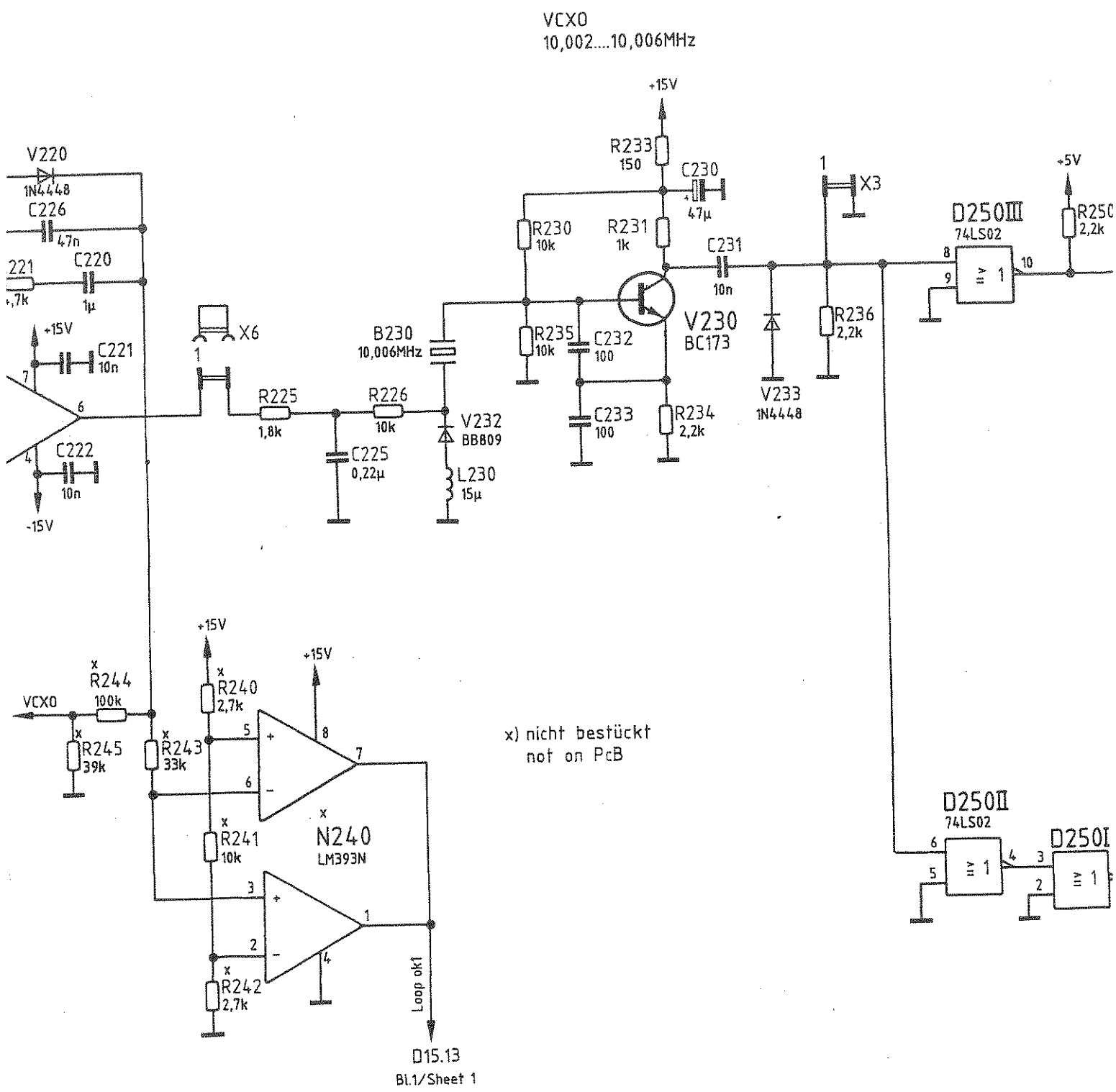


* von Lötseite bestückt
inserted from solder side
x nicht bestückt
not on Pcb

Name	Benennung	Z	Zeichn.-Nr
CO	Duplex-Modulationsmesser Duplex-Modulation Meter		803.6020 S
	zu Gerät CM-B9	reg. I V	803.5317 V
			erste Z.

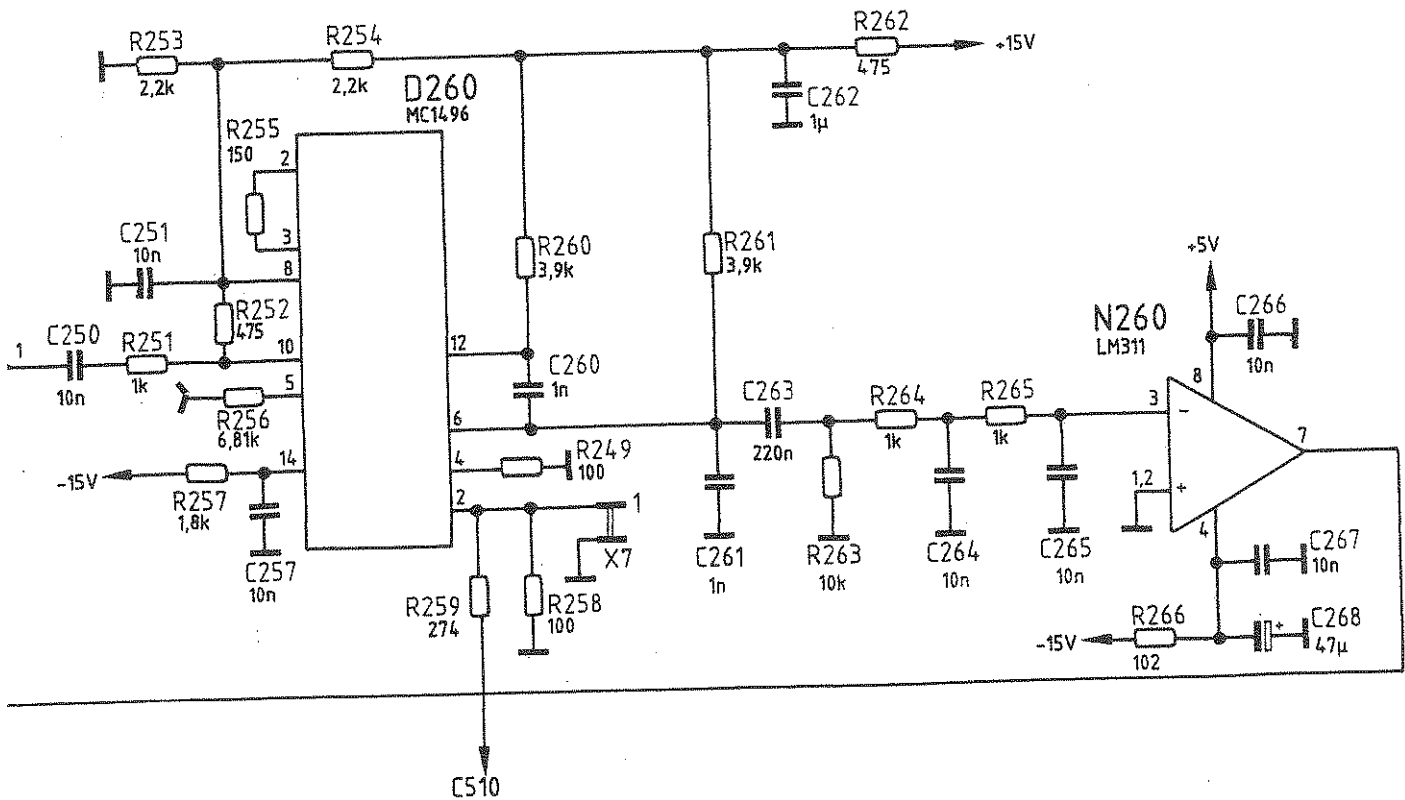
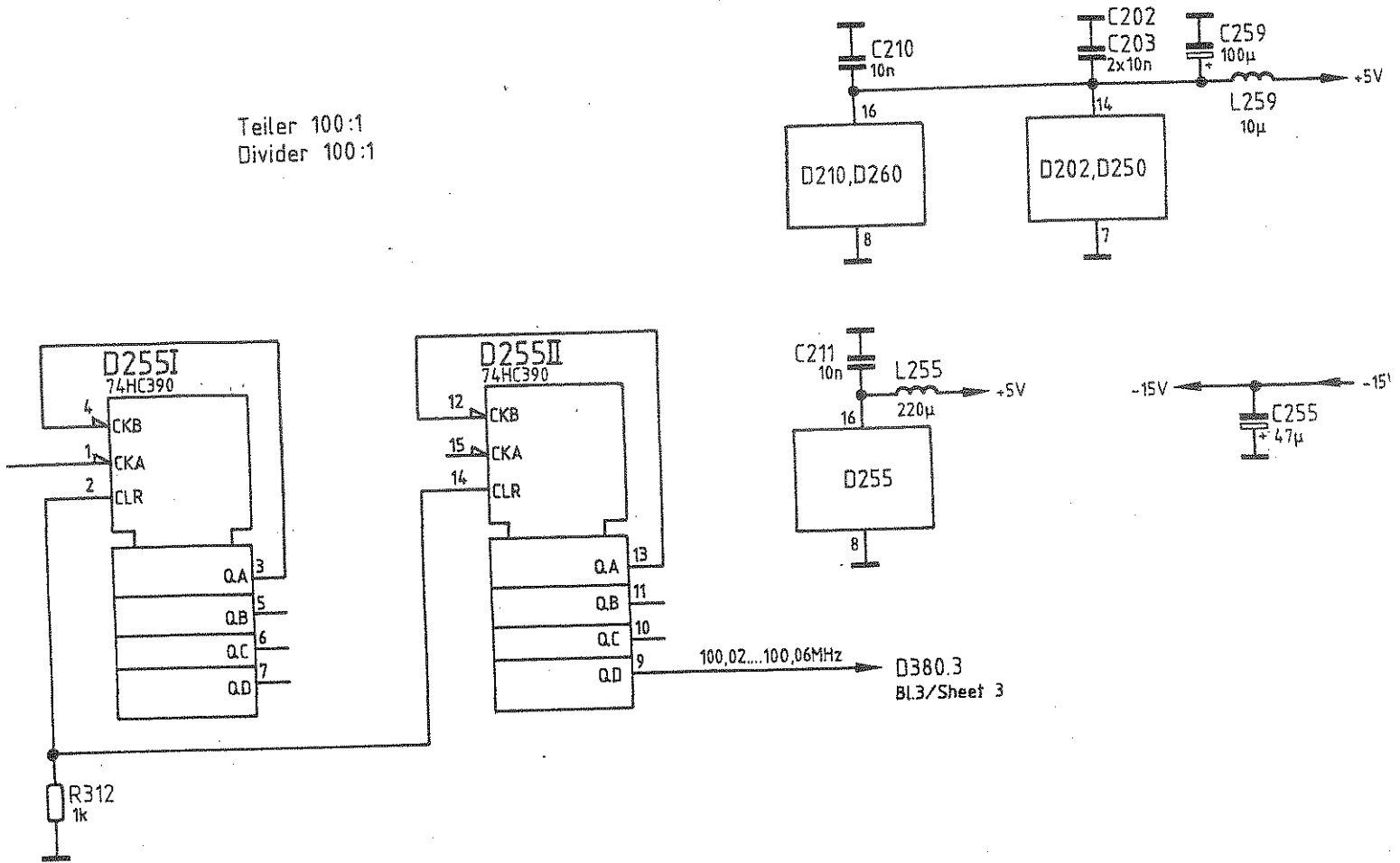
Phasendetektor Phase detector





	A		3.86	CO						IKSA	T
										Bearb.	1
										Gepr.	
	And. Zust.	Anderungs-Mitteilung	Datum	Name	And. Zust.	Anderungs-Mitteilung	Datum	Name	Norm		

Teiler 100:1
 Divider 100:1



C510
 BL.4/Sheet 4

39	Name	Benennung	Duplex-Modulationsmesser Duplex-Modulation Meter	Z	Zeichn.-Nr.	803.6020 S
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			zu Gerät: CM-B9		erste Z.	
7			8		9	10

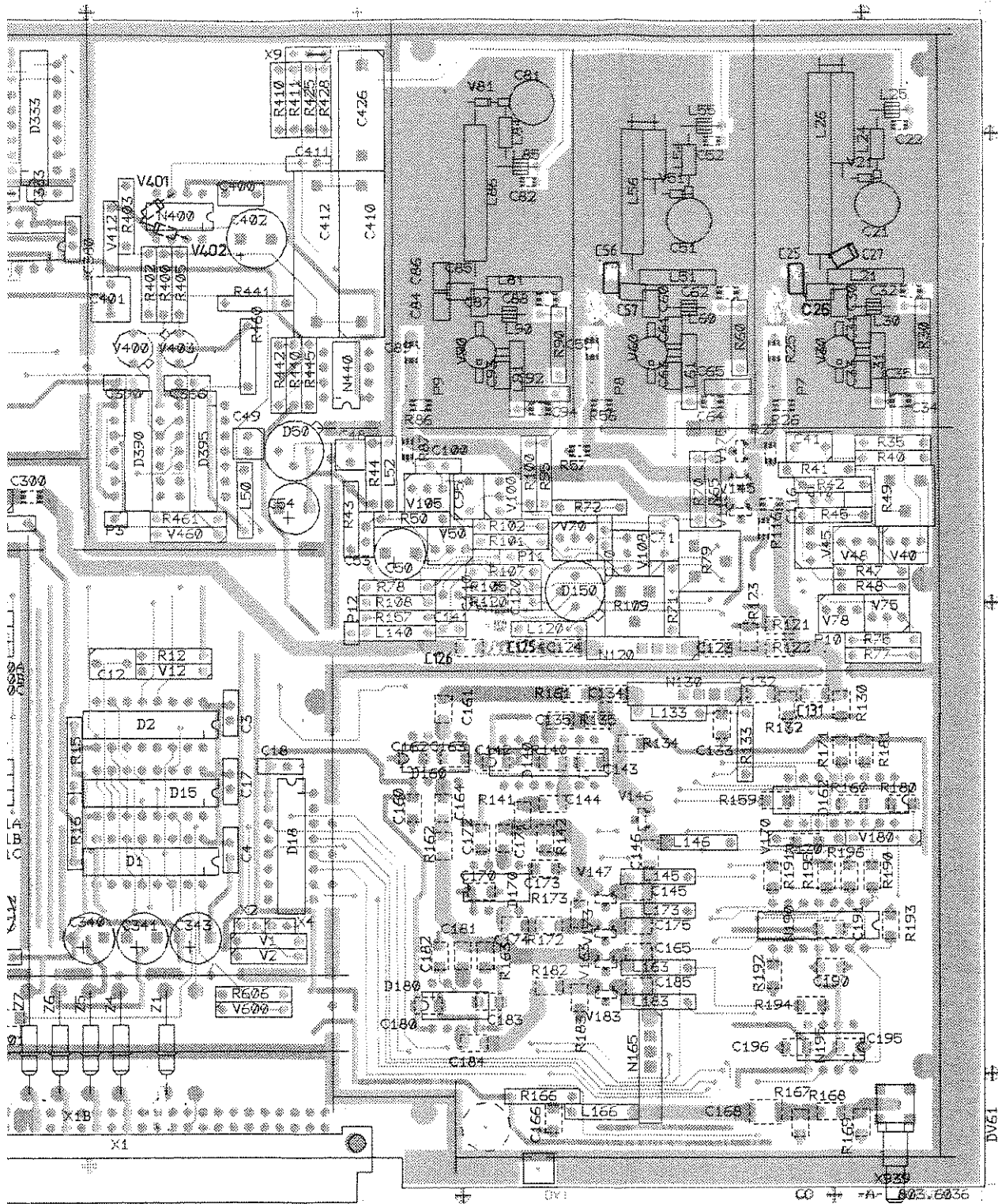
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ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung.

ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

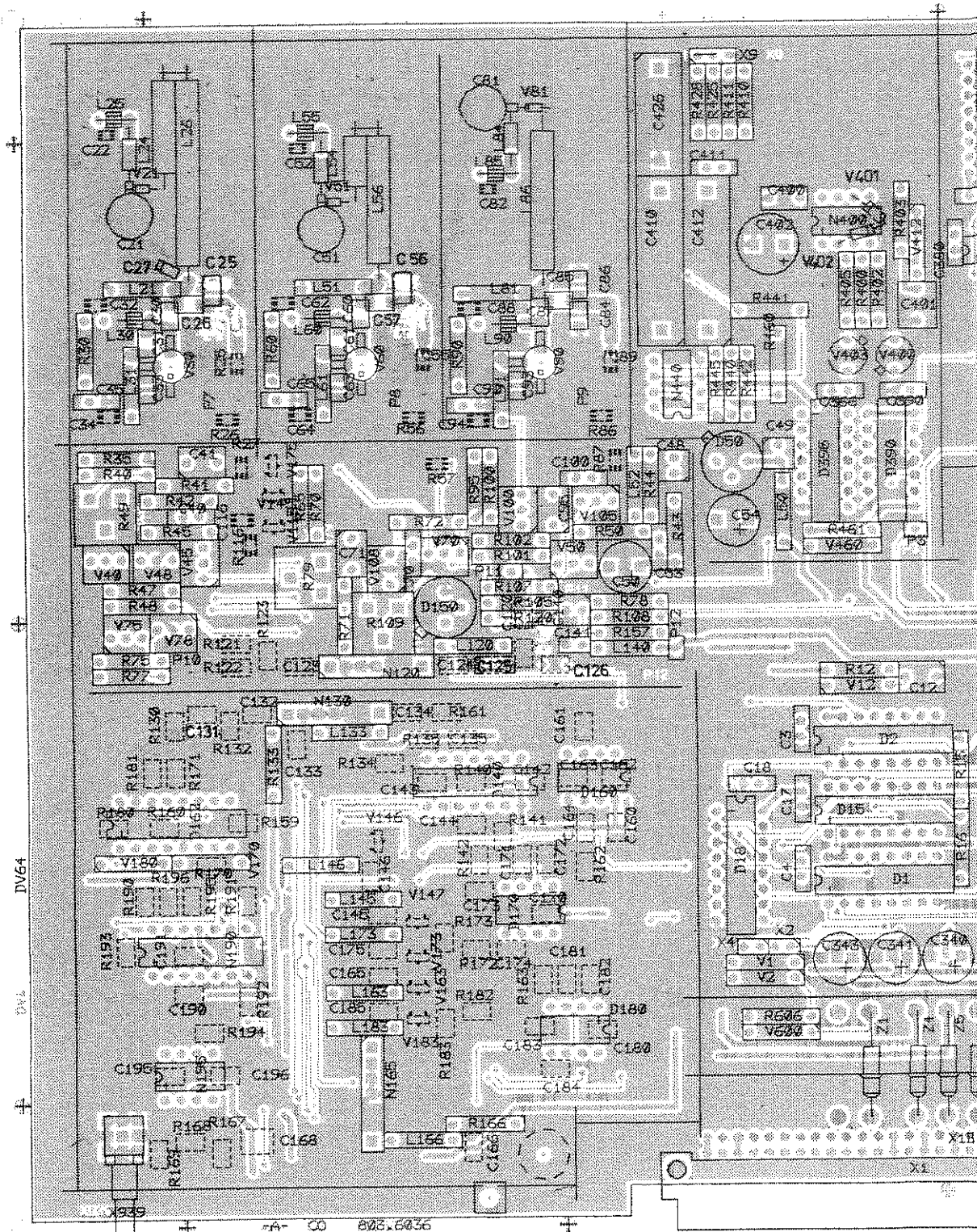
ngsführung Lötseite
solder side



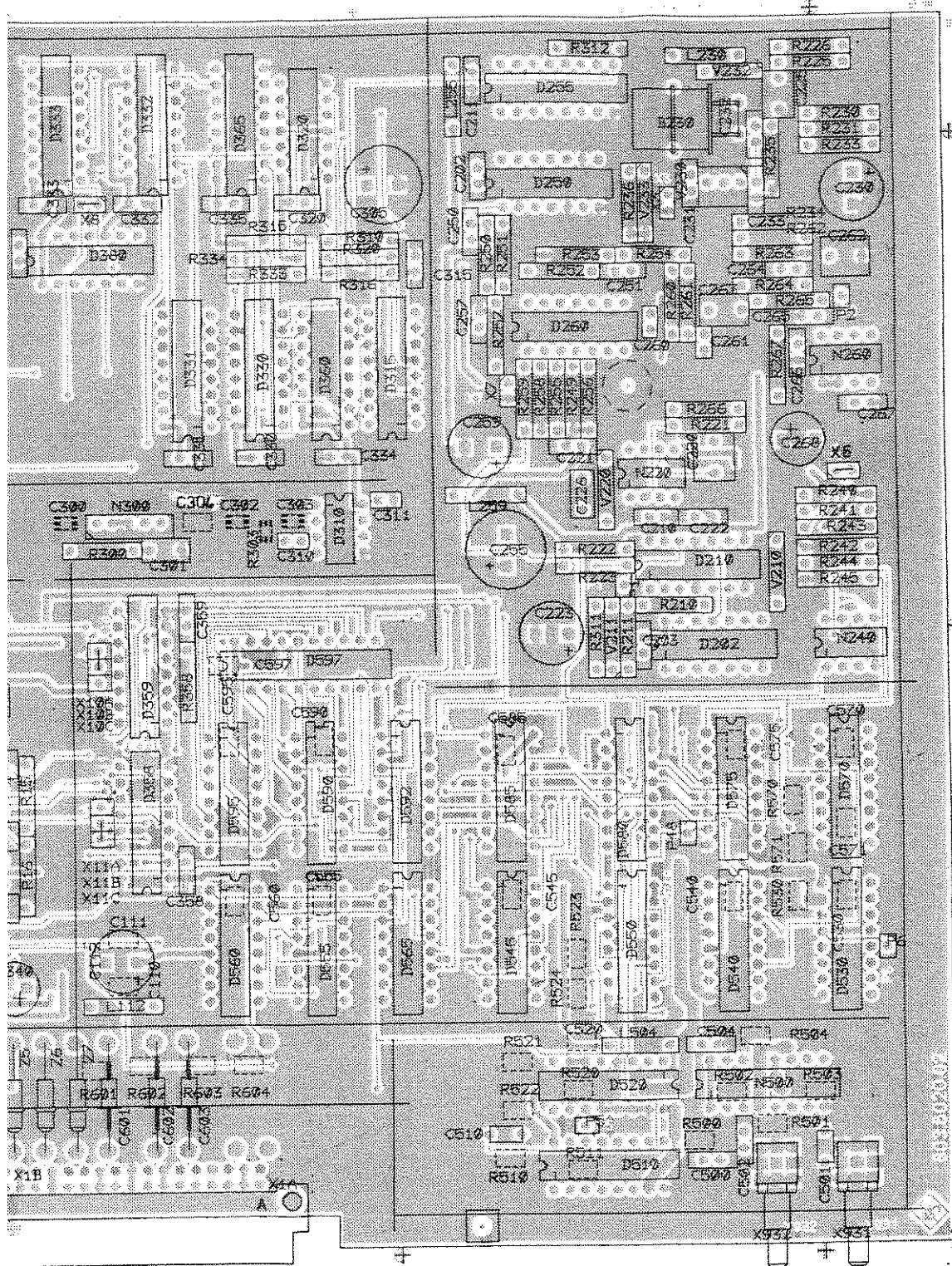
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		3.86	CO							
1KSA	Bearb.	10.85	COS	Tag	Name	Benennung	DUPLEx-MODULATIONSMESSER Z	Zeichn.-Nr.	Blatt-Nr.	V. B
				Gepr.						
				Norm						
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CMT - B9	reg. i. V. 803.5277 V	erste Z.	803.6020.01	Blatt-Nr.	2	V. B



ROHDE & SCHWARZ



Leitungsführung Bauteilseite
component side



A		10.85	COS	Maße ohne Toleranzangabe	Maßstab 1 : 1	
B		32938	3.86		Halbzeug, Werkstoff	
				IKSA	Tag	Name
				Bearb.	10.85	COS
				Gepr.		
				Norm		
				Benennung		
				DUPLIX-MODULATIONSMESSER Z		
				Zeichn.-Nr.		Blatt-Nr.
				803.6020.01		3
				reg. i. V. 803.5317 V		v. Bl.
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CMT-B9		
				erste Z.		



ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

DTMF Decoder Option CM-B11

803.4610.02

5	<u>Service Manual for DTMF Decoder Option CM-B11</u> ...	5.1
5.1	Function Description	5.1
5.2	Testing and Adjustment	5.2
5.2.1	Recording Status	5.2
5.2.1.1	Programming the Tone Sequence Length	5.2
5.2.1.2	Input Amplifier	5.2
5.2.1.3	Decoder Selection	5.2
5.2.1.4	Decoder	5.3
5.2.1.4.1	Oscillator Frequency	5.3
5.2.1.4.2	Output Code	5.3
5.2.1.5	Data Change	5.3
5.2.1.6	Sequence Control Signals	5.4
5.2.2	Read Status	5.4

Component lists
Circuit diagrams
Component layout diagrams

5.1 Function Description

This option processes double-tone sequences to DTMF. The received sequences are already decoded as they enter and the result is stored until called for processing by the microprocessor. The following criteria must first be entered:

- a) - EST mode (early steering):
 fast decoding without tone duration check
- STD mode (steering delayed):
 normal decoding with suppression of too short tones
- b) Number of tones in the expected sequence

A tone sequence can then enter the decoder via the input amplifier D1 ($G = 0.5, 1, 2$) where it is immediately decoded into a 4-bit wide word per tone. The decoder generates a data change pulse each time a word appears. This pulse acts on the clock input of shift register D20 (4 bit wide, 80 bit long) via switches D3, D30 and pulse shaper D25. Thus the word which has just been decoded is transferred to the shift register with each data change pulse.

Each data change pulse also increments the counter D23 which is blocked via switch D24 when the programmed length of the sequence has been reached. The flags TFOK and SCINT are then set to inform the microprocessor that the entered tone sequence has reached the expected length (interrupt possibility). Further information is available to the microprocessor by interrogating D22:

- a) "Tone sequence running" is signalled at D22/5 by monoflop D25 by a Low level. The time constant has been selected such that it is retriggered by each data change in a valid sequence but drops out following an (invalid) pause of 700 ms.
- b) If a further tone does not occur within 700 ms of the last tone, a High level at D22/5 and 6 signals that the tone sequence is finished.

The tone data are now present at the first locations of shift register D20. They must be completely shifted through by the microprocessor before they can be read. This is carried out with the decoder deactivated (D6 and D7 High, only High levels are shifted). With each shift pulse, the word present at the output of D20 is transferred in parallel to register D22 for serial output and the next word from D20 is shifted following the elapse of the time constant of D25 (1 μ s). Thus 4 tone data and 3 sequence data are present with each serial output from D22 to the microprocessor.

5.2 Testing and Adjustment

The module cannot be adjusted. The following tests can be carried out.

5.2.1 Recording Status

D9/14 = H
D10/13 = L
D10/12 = L

5.2.1.1 Programming the Tone Sequence Length

D9/ 5	6	7	Number of double tones
L	L	L	3
H	L	L	4
L	H	L	5
H	H	L	6
L	L	H	7
H	L	H	8
L	H	H	9
H	H	H	10

5.2.1.2 Input Amplifier

At P3: input signal (tone sequence) amplified by factor G

D9/4	D10/11	G
L	L	0.5
L	H	1
H	L	2

5.2.1.3 Decoder Selection

D9/12	D9/13	Signal
H	H	Double-tone sequence at P9

5.2.1.4 Decoder

5.2.1.4.1 Oscillator Frequency

At D5/8: sinewave signal, $f = 3.57 \text{ MHz}$

5.2.1.4.2 Output Code

At $\left[\begin{array}{l} \text{P11 (LSB)} \\ \text{P12} \\ \text{P13} \\ \text{P14 (MSB)} \end{array} \right.$

Bit pattern associated with each tone in a sequence, H and L depending on standard.

DTMF code

f_{Low} [Hz]	f_{High} [Hz]	Character	Output code			
			Q4 14	Q3 13	Q2 12	Q1 11 Pin
6 9 7	1 2 0 9	1	0	0	0	1
6 9 7	1 3 3 6	2	0	0	1	0
6 9 7	1 4 7 7	3	0	0	1	1
7 7 0	1 2 0 9	4	0	1	0	0
7 7 0	1 3 3 6	5	0	1	0	1
7 7 0	1 4 7 7	6	0	1	1	0
8 5 2	1 2 0 9	7	0	1	1	1
8 5 2	1 3 3 6	8	1	0	0	0
8 5 2	1 4 7 7	9	1	0	0	1
9 4 1	1 3 3 6	0	1	0	1	0
9 4 1	1 2 0 9	*	1	0	1	1
9 4 1	1 4 7 7	#	1	1	0	0
6 9 7	1 6 3 3	A	1	1	0	1
7 7 0	1 6 3 3	B	1	1	1	0
8 5 2	1 6 3 3	C	1	1	1	1
9 4 1	1 6 3 3	D	0	0	0	0

5.2.1.5 Data Change

At P10: One TTL pulse per tone

D10/4 = H (EST mode): data change before appearance of associated 4-bit code at P11 to P14

D10/4 = L (STD mode): data change after appearance of associated 4-bit code at P11 to P14

At D25/10: as at P10 but pulses of equal duration, $\tau = 1 \mu\text{s} \pm 50\%$

5.2.1.6 Sequence Control Signals

	TFOK (X1.A4)	SCINT (X1.A22)	D22/5	D22/6
Standby	L	L	H	L
Tone sequence running	L	L	L	L
Programmed sequence length has been reached	H	H	L	L
Tone sequence finished	L	H	H	H

TFOK: H As soon as the programmed number of data changes has
been reached
L 700 ms after start of last data change pulse

SCINT: H As soon as the programmed number of data change pul-
ses has been reached
L With strobe for D8, D9, D10

D22/5: H 700 ms after start of last data change pulse
L As soon as a data change arrives and retriggering of
D25 takes place with further data change

D22/6: H 700 ms after start of last data change pulse if the
programmed number of data changes has been reached
L With strobe for D8, D9, D10

5.2.2 Read Status

D9/14 = L
D10/13 = H
D10/12 = H

At X1.B4 (DATIN):

Sequentially read tone data

With each P/\bar{S} from microprocessor to X1.B8:


4 tone data (MSB first),
3 sequence data ("SCINT", "Counter Reset" and "Tone sequence
finished").



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MÜNCHEN

Schaltteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans


ROHDE & SCHWARZ
AZ
**Datum
Date**
12
0486
**Schaltteilliste für
Parts list for**
**EE DTMF-AUSWERTER
DTMF DECODER**
**Sachnummer
Stock No.**
803.4627.01 SA
**Blatt
Page**
1
**Kennzeichen
Component No.**
**Benennung/Beschreibung
Designation**
**Sachnummer
Stock No.**
**enthalten in
contained in**
C1
**CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C2
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C3
**WIMA MKS/2/63/0,1UF/5%
CC 1NF+-10%63V K2000
CERAMIC CAPACITOR**
CC 022.0784
C4
**VALVO 2222 63051 102
CC 1NF+-10%63V K2000
CERAMIC CAPACITOR**
CC 022.0784
C5
**VALVO 2222 63051 102
CC 1NF+-10%63V K2000
CERAMIC CAPACITOR**
CC 022.0784
C6
**VALVO 2222 63051 102
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C7
**WIMA MKS/2/63/0,1UF/5%
CC 220PF+-2%6X7N750
CAPACITOR**
CC 087.6941
C8
**VALVO 2222 678 58221
CC 220PF+-2%6X7N750
CAPACITOR**
CC 087.6941
C9
**VALVO 2222 678 58221
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C20
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C24
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C26
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C27
**WIMA MKS/2/63/0,1UF/5%
CE 2,2UF-10+50% 63V 9X13
ELECTROLYTIC CAPACITOR**
CE 022.7637
C28
**ROEDERST ELKO EK 2/63
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C29
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C30
**WIMA MKS/2/63/0,1UF/5%
CK 100NF+-5%63V5RM MKT
CAPACITOR**
CK 099.2930
C40
**WIMA MKS/2/63/0,1UF/5%
CE 100UF+-20%25V 8RDX9,5
ELECTROLYTIC CAPACITOR**
803.0580
C41
**MATSUSHITA ECE-A1ESS-101
CE 22UF-10+50% 63V 9X13
ELECTROLYTIC CAPACITOR
ROEDERST EK 00 CB 222 J**
CE 006.7120
803.4627.01 SA BL 1+

 ROHDE & SCHWARZ		AZ Datum Date	Schalteilliste für Parts list for EE DTMF-AUSWERTER DTMF DECODER	Sachnummer Stock No. 803.4627.01 SA	Blatt Page 2
Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.		enthalten in contained in	
C42	CE 100UF+-20%25V 8RDX9,5 ELECTROLYTIC CAPACITOR MATSUSHITA ECE-A1ESS-101	803.0580			
C43	CE 22UF-10+50% 63V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 222 J	CE 006.7120			
C44	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930			
BIS/TO C47 C71	CC 220PF+-2%6X7N750 CAPACITOR VALVO 2222 678 58221	CC 087.6941			
D1	B0 LF156J BIFET OPAMP OPERATIONAL AMPLIFIER MOTOROLA LF 156 J	B0 645.7251			
D2	BJ TL601CP 2X ANALOGSCH ANALOG SWITCH TEXAS TL601CP	BJ 213.4530			
D3	BL CD4052BE 2X4CH.MUX MULTIPLEXER/DEMUTIPLEXER MOTOROLA MC14052BCP	BL 243.1200			
D5	B0 MT8870BE DTMF RECEIVER DTMF RECEIVER MITEL MT8870BE	803.0744			
D6	BL SN74LS253N 2X4TO-1 MUX DUAL MULTIPLEXER TEXAS SN74LS253N	803.0738			
D7	BL SN74LS253N 2X4TO-1 MUX DUAL MULTIPLEXER TEXAS SN74LS253N	803.0738			
D8	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064			
D9	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064			
D10	BL CD4094BF 8BIT SH.REG SHIFT REGISTER RCA CD4094BF	BL 418.0064			
D20	BL AM2847PC 4X80B.SREG QUAD 80B. SHIFTRREGISTER AMD AM2847PC	803.0750			
D22	BL CD4021BE 8BIT SH.REG SHIFT REGISTER RCA CD4021BE	BL 086.7096			
D23	BL CD4017BF DEC.COUNTER COUNTER RCA CD4017BF	BL 086.8057			
D24	BL CD4051BE 8CH. MUX MULTIPLEXER RCA CD4051BE	BL 339.4174			
D25	BL MC14528BCP 2X MONOFLOP MONOSTABLE MULTIVIBRATOR SSS SCL4528BE	BL 086.7315			



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DTMF DECODERSachnummer
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
D26	BL CD4013BF 2XD FLIPFL FLIPFLOP RCA CD4013BF	BL 086.8034	
D30	BJ TL601CP 2X ANALOGSCH ANALOG SWITCH TEXAS TL601CP	BJ 213.4530	
D100	BL CD4052BE 2X4CH-MUX MULTIPLEXER/DEMUTIPLEXER MOTOROLA MC14052BCP	BL 243.1200	
P2	VL WIRE-WRAP PIN BERG NR. 75 403-001	VL 088.4507	
P3	VL WIRE-WRAP PIN BERG NR. 75 403-001	VL 088.4507	
P5	VL WIRE-WRAP PIN BERG NR. 75 403-001	VL 088.4507	
BIS/TO P14			
Q1	ER 560KHZKERAMIKRESONATOR 560KHZ CERAMIC RESONATOR MURATAERIE CSB560P	346.7081	
Q2	EQ 3,579545MHZ CL30 HC43U	EQ 091.0396	
R1	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R2	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116	
R3	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R4	RN 5X3,9KOHM+-2%SIL 6 H5 RESISTOR NETWORK BOURNS 4306R-101-392	RN 317.9273	
R8	RL 0,35W2,00MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,00MOHM 1% TK50	RL 099.8167	
R9	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R10	RL 0,35W2,00MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,00MOHM 1% TK50	RL 099.8167	
R11	RL 0,35W2,00MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,00MOHM 1% TK50	RL 099.8167	
R12	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270	
R13	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R14	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	

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DTMF DECODER**
**Sachnummer
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R15	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R16	DRALORIC SMA0207/10K-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R20	DRALORIC SMA0207/10K-F-D RL 0,35W 1MOHM+-1%TK50 RESISTOR	RL 082.7862	
R30	DRALORIC SMA0207/1M-F-D RN 5X2,2KOHM+-2% SIL6 H5 RESISTOR NETWORK	RN 504.0174	
R35	BOURNS 4306R-101-222 RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R40	DRALORIC SMA0207/10K-F-D RL 0,35W 1MOHM+-1%TK50 RESISTOR	RL 082.7862	
R41	DRALORIC SMA0207/1M-F-D RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	
R42	DRALORIC SMA0207/100HM-F-D RL 0,35W20,00 OHM+-1%TK50 RESISTOR	RL 082.9142	
R43	DRALORIC SMA0207/200HM-F-D RL 0,35W 10,0 OHM+-1%TK50 RESISTOR	RL 082.8852	
R44	DRALORIC SMA0207/100HM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R45	DRALORIC SMA0207/10K-F-D RL 0,35W20,00 OHM+-1%TK50 RESISTOR	RL 082.9142	
R70	DRALORIC SMA0207/200HM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R100	DRALORIC SMA0207/10K-F-D RL 0,35W 20,0KOHM+-1%TK50 RESISTOR	RL 083.1522	
R110	DRALORIC SMA/207/20K-F-C RL 0,35W2,00MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2,00MOHM 1% TK50	RL 099.8167	
V1	AE BZX79/C9V1 0,5W Z-DI ZENER DIODE	AE 012.2503	
V2	VALVO BZX79/C9V1 AE BZX79/C3V3 0,5W Z-DI ZENER DIODE	AE 012.2390	
V3	ITT ZPD3,3 AE BZX55/C2V7 0,5W Z-DI ZENER DIODE	AE 086.8228	
V4	AEG-TELEF. BZX55/C2V7 AE BZX55/C2V7 0,5W Z-DI ZENER DIODE AEG-TELEF. BZX55/C2V7	AE 086.8228	

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DTMF DECODER**
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**Kennzeichen
Component No.**
**Benennung/Beschreibung
Designation**
**Sachnummer
Stock No.**
**enthalten in
contained in**

V5

AD 1N4448 75V 0,15A UDI
DIODE
VALVO 1N4448

AD 012.0700

BIS/TO

V8

X1

FP STECKERL.INDIR.64POLIG
64-PIN INSERT
PANDUIT 100-064-033/999

FP 084.6470

X2

FP BUCHSENLEISTE64P.ABGEW
PANDUIT 100-064-533/999

FP 099.0614

X11

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X12

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X15A

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X15B

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X21A

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X21B

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X22A

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X22B

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X23A

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

FP 242.3600

BERG 75160-102-36

X23B

FP INDIREKT.STECKERL.36P.
PIN CONNECTOR

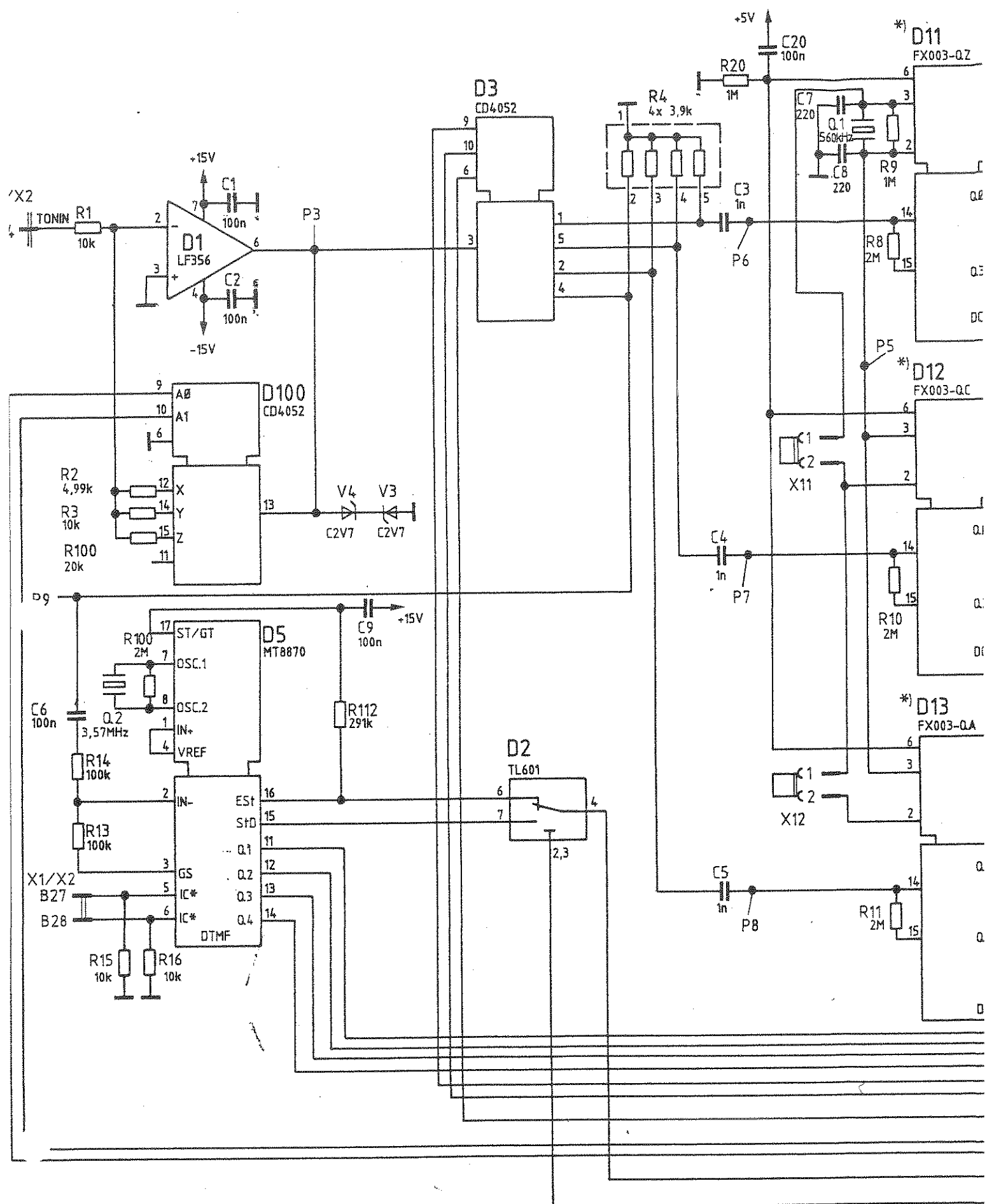
FP 242.3600

BERG 75160-102-36

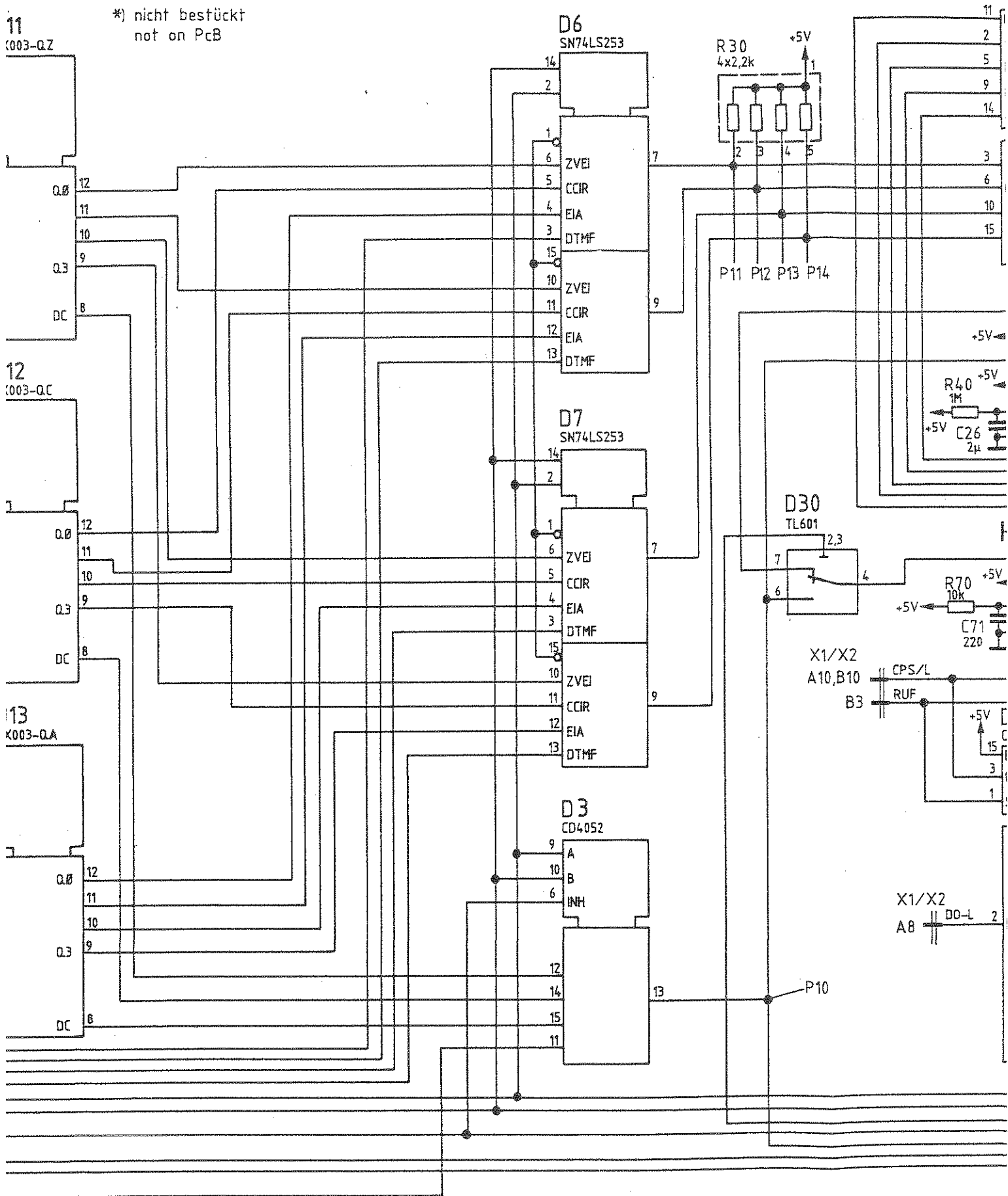
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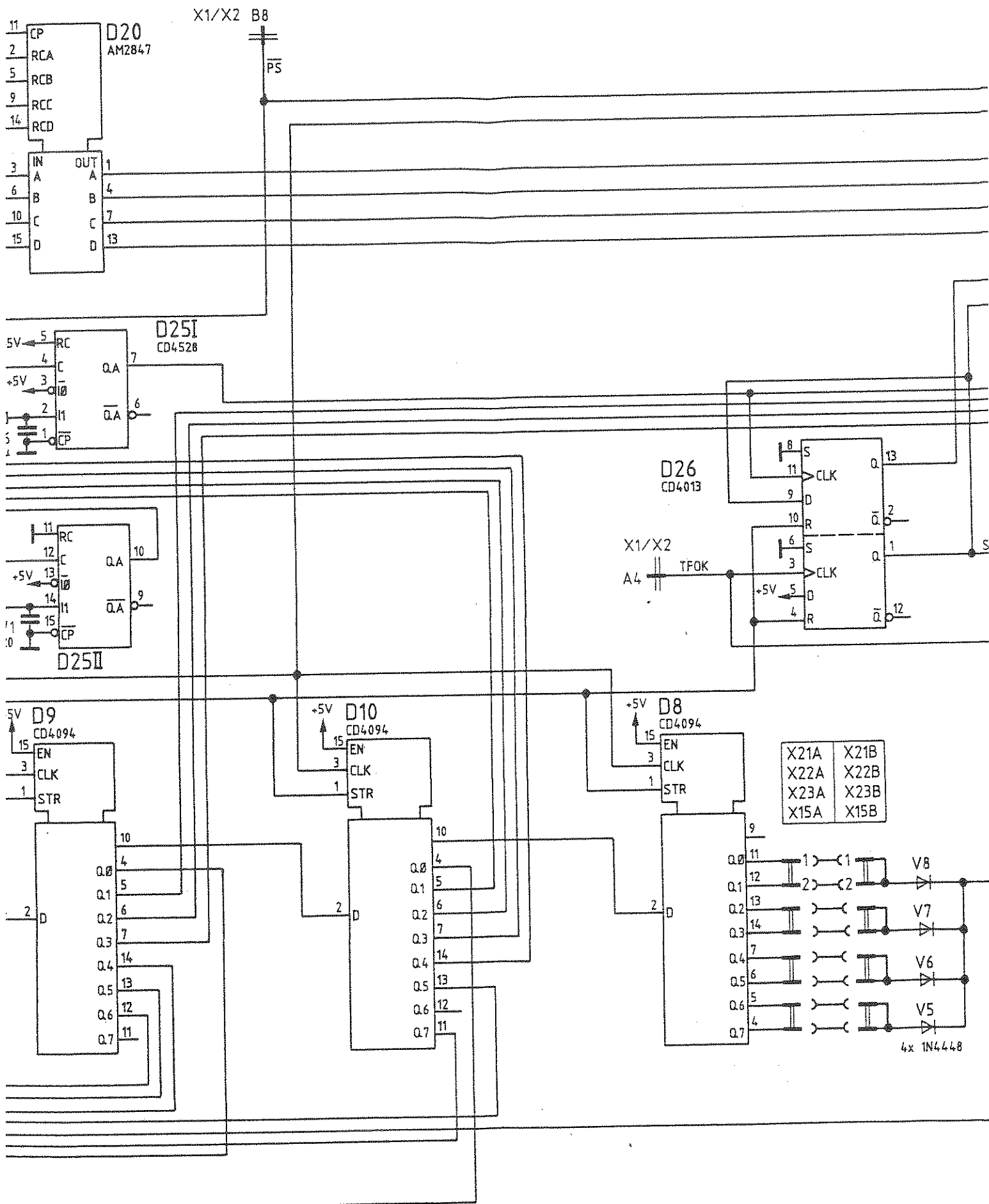
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in			
V173	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99	911.0092				
V175	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99	911.0092				
V180	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V183	AD BAV99 2X70V 0,1 A UDI DIODE VALVO BAV99	911.0092				
V210	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V211	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V220	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V230	AK BC173C NPN 25V 100MA TRANSISTOR INTERMETAL BC173C	010.4444				
V232	AE BB809 26/ 6PF CDI TUNING DIODE VALVO BB809	AE 092.9616				
V233	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V400	AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE VALVO BAV45	AE 252.5386				
V401	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V402	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
V403	AE BAV45 35V PICOAMP.DI LOW LEAKAGE DIODE VALVO BAV45	AE 252.5386				
V412	AE BZX79/C10 0,5W Z-DI ZENER DIODE VALVO BZX79/C10	AE 012.2510				
V600	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700				
W1	DX HF-KABEL	802.6578	802.6455			
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT PANDUIT 100-064-033/999	FP 084.6470				
X3	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542				
		803.6020.01 SA BL23+				

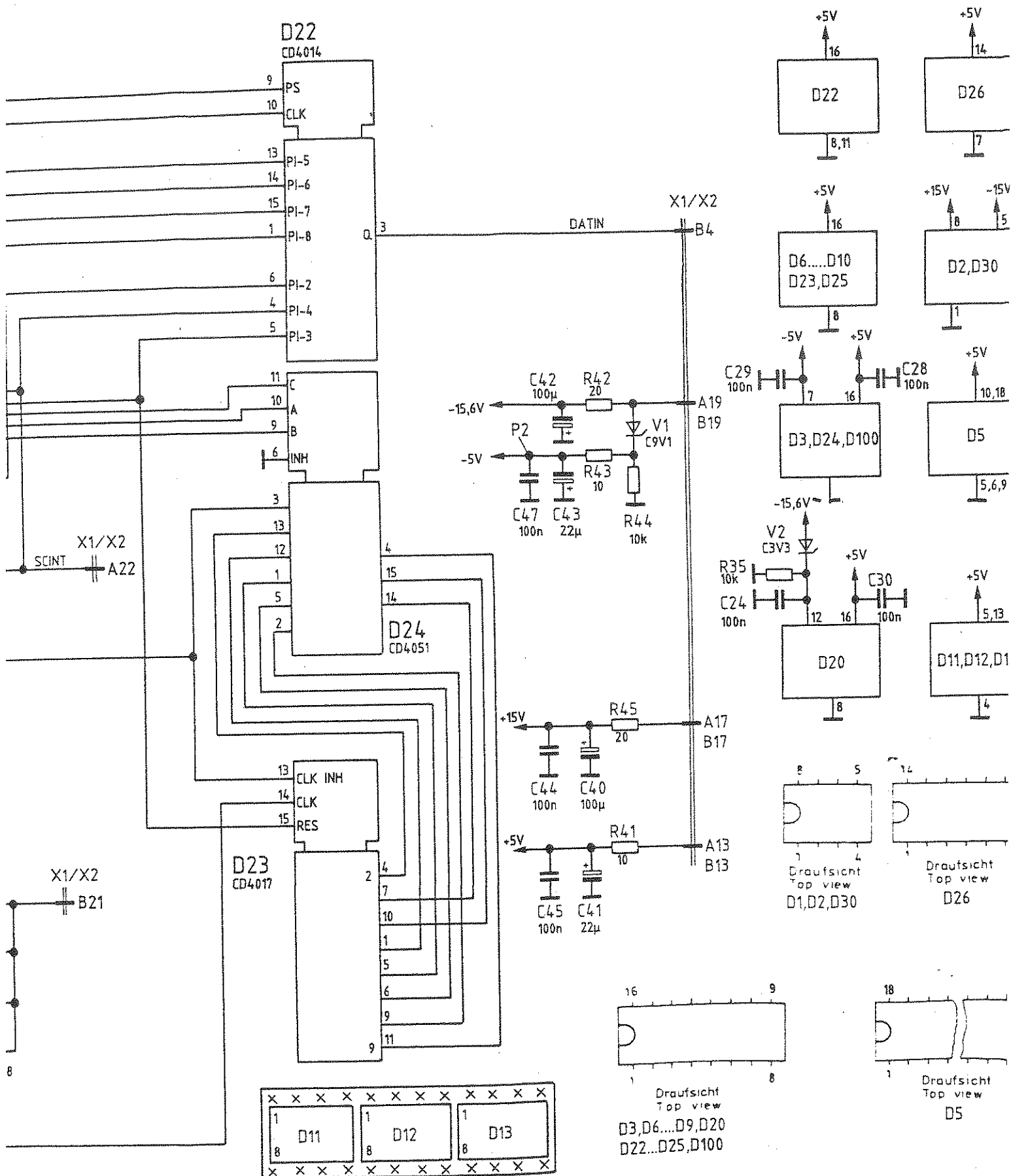
ROHDE&SCHWARZ		AZ	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock Nr.	Blatt Page
		20	0687	ED DUPLEX-MODULATIONS-M	803.6020.01 SA	24
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in	
X6	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
BIS/TO						
X9						
X931	FJ EINBAUSTECKER SYST.SMB			FJ 602.8804		
	ANGLE CONNECTOR					
	ROSENBERG R&S-ZCHNG.602.8804					
X932	FJ EINBAUSTECKER SYST.SMB			FJ 602.8804		
	ANGLE CONNECTOR					
	ROSENBERG R&S-ZCHNG.602.8804					
X939	FJ EINBAUWINKELST. SMC			FJ 249.9684		
	ANGLE CONNECTOR					
	RADIAL R 112 669					
X10A	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
X10B	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
X10C	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
X11A	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
X11B	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
X11C	VL WIRE-WRAP PIN			VL 088.4542		
	WIRE-WRAP PIN					
	BERG NR. 75 403-003					
Z1	LD 10GHZ 50DB100V10A4RDX9			LD 451.4636		
	LEAD THROUGH FILTER					
	ERIE R&S-ZCHNG.451.4636					
Z4	LD 10GHZ 50DB100V10A4RDX9			LD 451.4636		
	LEAD THROUGH FILTER					
	ERIE R&S-ZCHNG.451.4636					
Z5	LD 10GHZ 50DB100V10A4RDX9			LD 451.4636		
	LEAD THROUGH FILTER					
	ERIE R&S-ZCHNG.451.4636					
Z6	LD 10GHZ 50DB100V10A4RDX9			LD 451.4636		
	LEAD THROUGH FILTER					
	ERIE R&S-ZCHNG.451.4636					
Z7	LD 10GHZ 50DB100V10A4RDX9			LD 451.4636		
	LEAD THROUGH FILTER					
	ERIE R&S-ZCHNG.451.4636					
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*) nicht bestückt
not on PCB



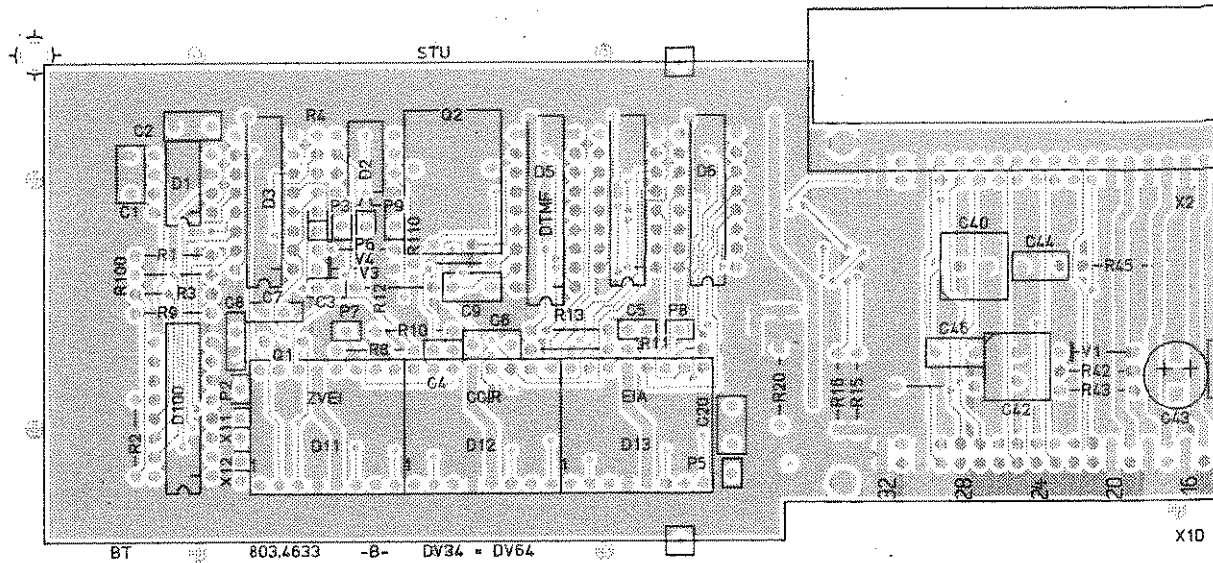




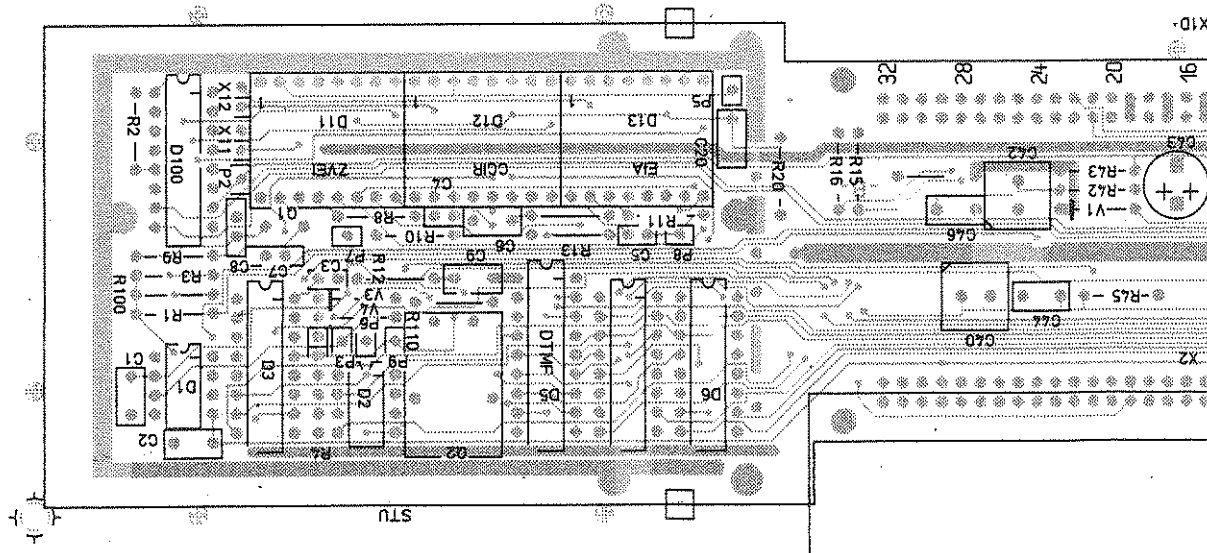
Stromlauf gilt für VAR 02 / Circuit diagram is valid for model 02

	Stromlauf zu	DTMF-Auswerter DTMF decoder	Z	Zeichn.-Nr.	803.4627 S
	CM-B11	reg. i. V. 803.4610 V	erste Z.		

Ansicht und Leitungsfü
View of tracks on comp

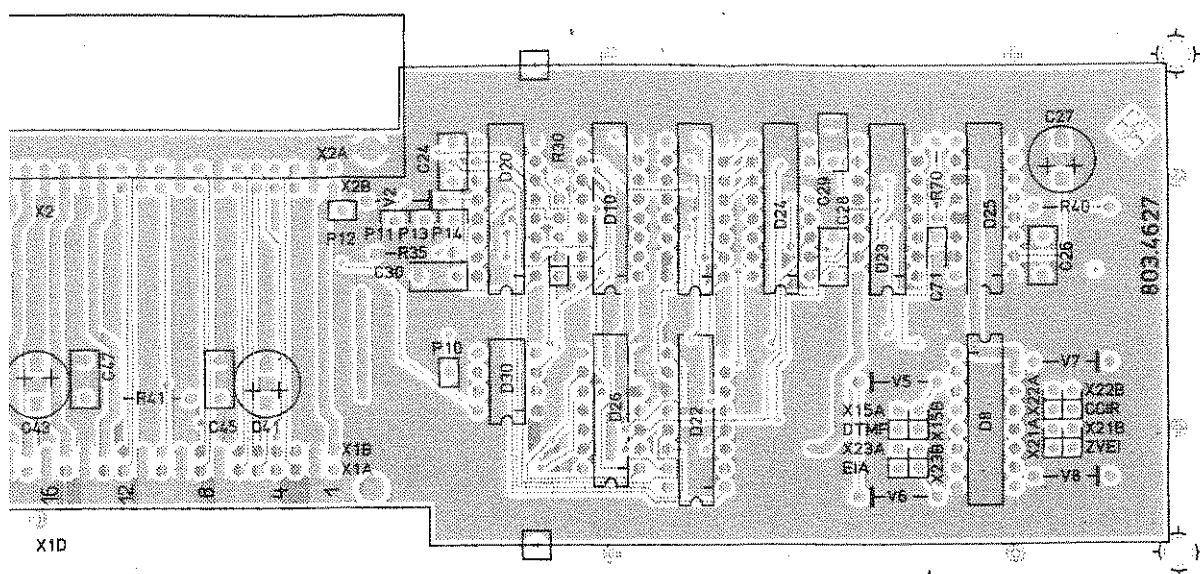


Ansicht und Leitungsfü
View of tracks on solde

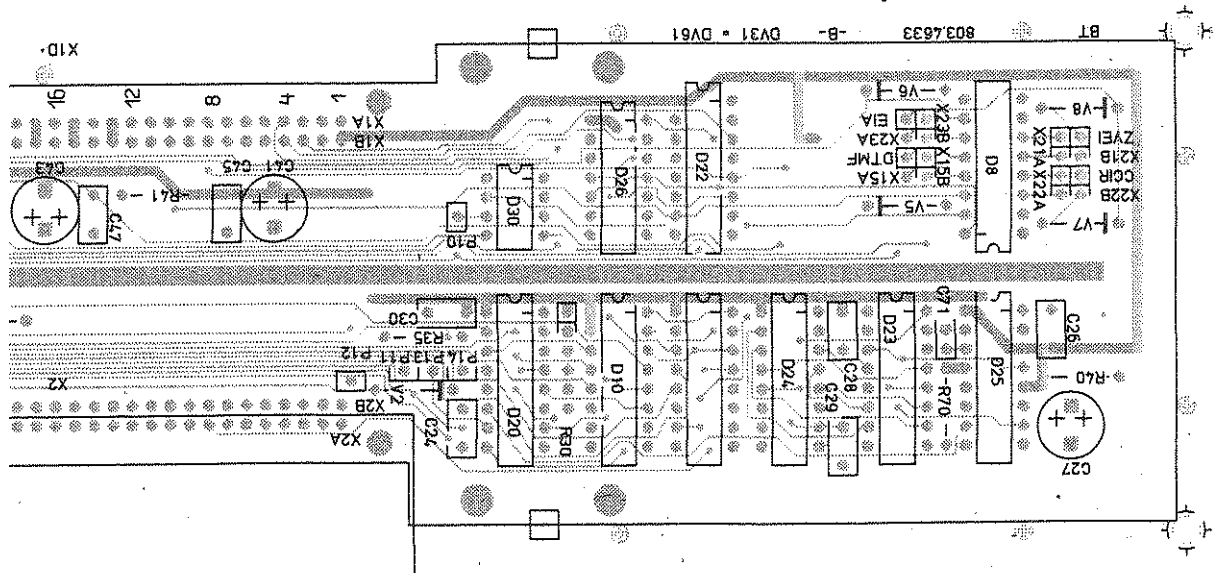



Achtung! MOS - Bauteile
Caution. MOS components

sführung Bauteilseite
omponent side



sführung Lötseite
older side



B		03.85	BT	Maße ohne Toleranzangabe		Maßstab 1 : 1	
						Halbzeug, Werkstoff	
				1KGA	Tag	Name	Benennung DTMF-Auswerter DTMF decoder
				Bearb.	03.85	BT	
				Gepr.			
				Norm			
				 ROHDE & SCHWARZ		Zeichn.-Nr. 803.4627	
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CM - B11		Blatt-Nr. 2	
						v. Bl.	
						reg. i. V. 803.4610 V erste Z.	

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2
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SERVICE INSTRUCTIONS

Autorun Control/Printer Interface

Option CM-B5

803.3314.02

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5.1.2	RAM	5.3
5.1.3	EPROM	5.3
5.1.4	Centronics Interface	5.4
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	Circuit diagrams	
	Component layout diagrams	

5.1 Function Description

When used in conjunction with the CMT, the option enables the following functions:

- + Recording of programs and data for complex programmable routines.
- + Setup of a Centronics interface.
- + Setup of relay contacts which can be directly set by the user via the instrument keyboard.

The module can be divided into the following functional units (see Fig. 5-1):

- + RAM
- + EPROM
- + Internal interface
- + Centronics interface
- + Relay group
- + Battery supply

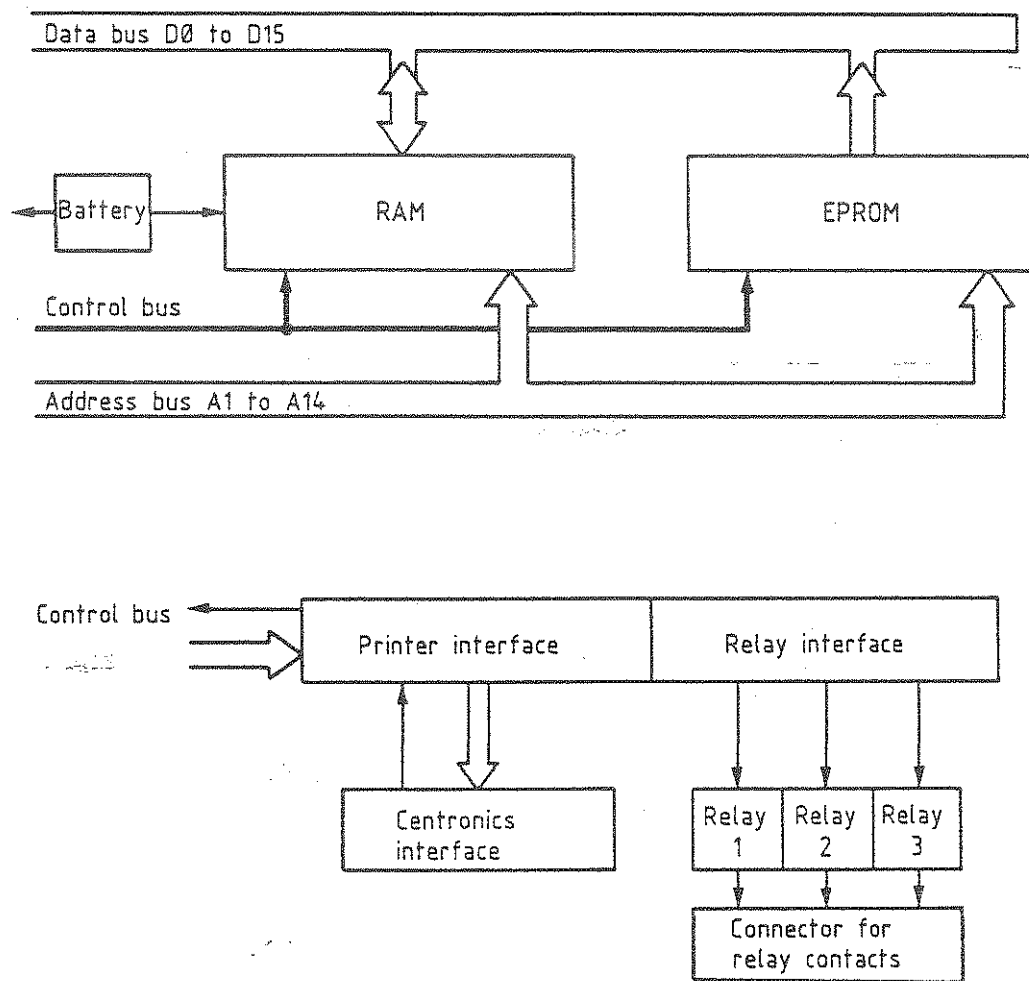


Fig. 5-1 Block diagram of the complete autorun control

5.1.1 Interface

The interface between the autorun control and the CMT comprises the following signal groups:

16-bit wide data bus]	For the memory
14-bit wide address bus		
7-bit wide control bus		
6-bit wide control bus]	For the internal interface
3 power supply lines		
1 line to measure the battery voltage		

The data and address busses enable communication between the memory on the autorun control and the controller of the CMT. The same applies to the control bus which supplies the memory control signals. This bus also contains special selection lines which are exclusively used for the memory ICs of the autorun control.

The control bus enables the controller to address the Centronics interface and the relays via the internal interface. A printer can also transmit a BUSY signal to the controller via this bus.

The three supply lines are used for +5 V, ground and the instrument battery voltage.

The battery voltage of the autorun control can be checked by the instrument via a special line.

5.1.2 RAM

The total storage capacity of the RAMs is 16 Kbyte. The circuitry used means that 8K words at 16 bit each are available for the controller. The RAMs are addressed via special chip select lines. The RAMs on the autorun control have a battery back-up.

5.1.3 EPROM

The storage capacity of the EPROMs is 32 Kbyte. As far as the controller is concerned, this memory comprises 16K words at 16 bit each. The EPROMs are addressed via special chip select lines.

5.1.4 Centronics Interface

This interface is addressed by the controller via a 2-byte serial-to-parallel converter (shift register). One byte provides the data for the printer. The controller uses one special line to inform the printer of the data validity (CENSTR). The BUSY signal of the printer is converted in the internal interface circuit into an interrupt signal for the controller and stored. The CENSTR signal resets this interrupt signal again.

Fig. 5-2 shows the assignment of the individual bits following serial-to-parallel conversion. The following signals are used for this conversion:

CPS-S	Clock
DO-S	Data
ABL	Strobe pulse

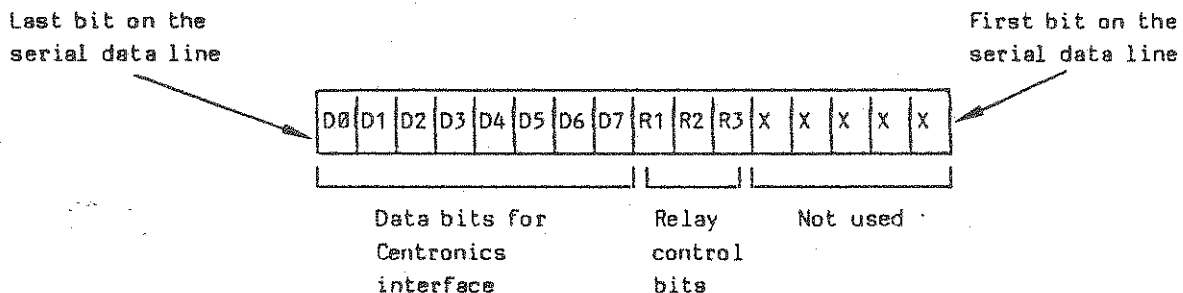


Fig. 5-2 Data at the output of the serial-to-parallel interface

5.1.5 Relay Interface

As can be seen in Fig. 5-2, the control bits for the 3 relays originate in the same shift register which also carries out the serial-to-parallel conversion of the data for the printer interface. Thus the clock, data and strobe are also identical with the signals in Section 5.1.4. The first 5 bits transmitted on the data line are not evaluated.

5.1.6 Battery Supply

A built-in battery buffers the CMOS-RAMs if the module is separated from the instrument. When connected to the instrument, the RAMs of the autorun control are fed by the power pack. With the instrument switched off, backup of the instrument and the autorun control CMOS-RAMs is handled either by the internal battery or the autorun control battery depending on which of the two batteries has a higher charge. Both batteries are used equally if the autorun control is left in the instrument.

5.2 Testing and Adjustment

Adjustment of the module is not necessary. All tests should be carried out using Section 3.



ROHDE & SCHWARZ
MÜNCHEN

Schaltheillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans



ROHDE & SCHWARZ

AI

Datum
Date

12

0387

Schaltteilliste für
Parts list forED ABLAUFST./DRUCK.INTF.
AUTO RUN CONTR/PRINT INTFSachnummer
Stock No.

803.3320.01 SA


Blatt
Page

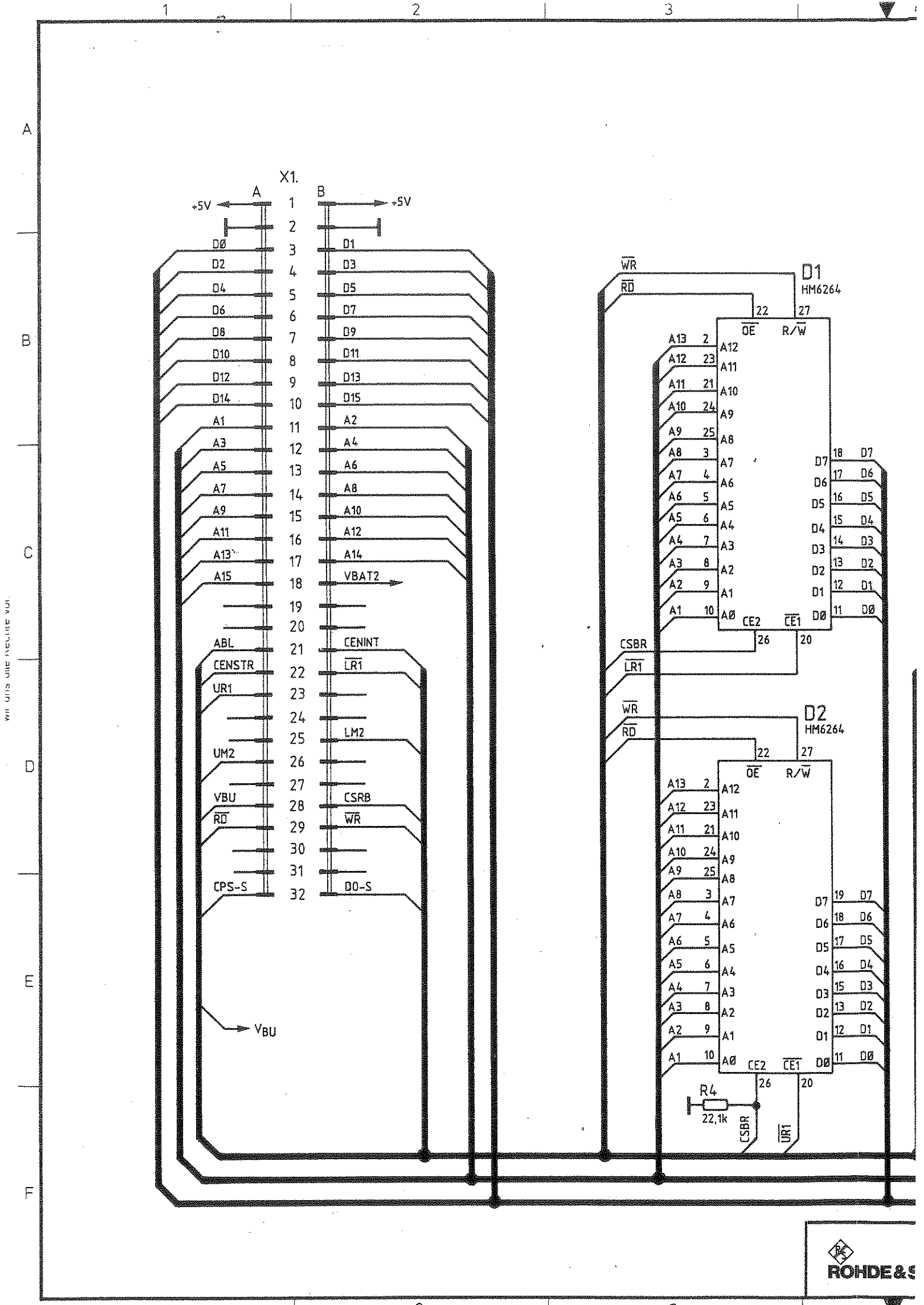
1

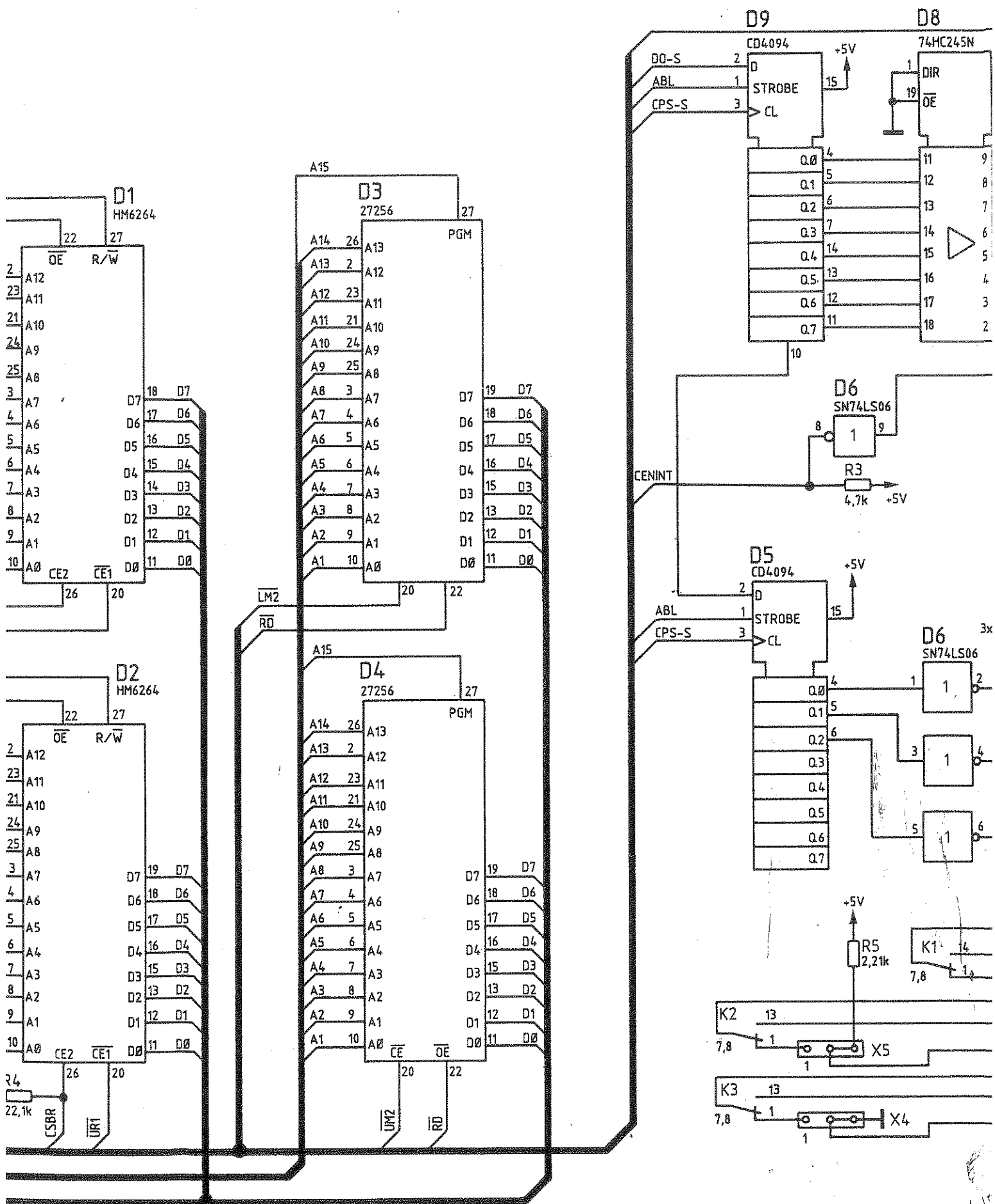
Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

C1	CE 22UF-10+50% 63V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 222 J	CE 006.7120	
C2	CC 220NF+-10%50V7K1200VIE CERAMIC CAPACITOR UNION CARB CK06BX224K	CC 084.5515	
C4	CE 10UF+-20%35V 5RDX5 ELECTROLYTIC CAPACITOR NATION PAN ECE-A1VKS-100	803.0667	
C8	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
D1	BC HM6264LP15 8KX8B.SRAM SRAM HITACHI HM6264LP15	344.7410	
D2	BC HM6264LP15 8KX8B.SRAM SRAM HITACHI HM6264LP15	344.7410	
D3	BC D27256 PROGRAM. PROM ENTHALTEN IN EPROM-SATZ INCLUDED IN SET OF EPROM 803.3866	803.3895	
D4	BC D27256 PROGRAM. PROM ENTHALTEN IN EPROM-SATZ INCLUDED IN SET OF EPROM 803.3866	803.3908	
D5	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726	
D6	BL SN7406N 6XINVERTER IC HEX INVERTER SN7406N TEXAS SN7406N	237.0487	
D8	BL MM74HC245N 8XB.TRANS C OCTAL TRI-ST.TRANSCEIVER MOTOROLA MC74HC245N	BL 571.3242	
D9	BL CD4094BE 8BIT SH.REG SHIFT REGISTER RCA CD4094BE	BL 586.7726	
G1	ED 3,4V LITHIUM-BATTERIE LI BATTERY SAFT LS 3 CNA	565.1687	
K1	SR 5 V 1XU DIL RELAY SIEMENS V23100-V4305-C000	SR 340.4551	
K2	SR 5 V 1XU DIL RELAY SIEMENS V23100-V4305-C000	SR 340.4551	
K3	SR 5 V 1XU DIL RELAY SIEMENS V23100-V4305-C000	SR 340.4551	

803.3320.01 SA BL 1+

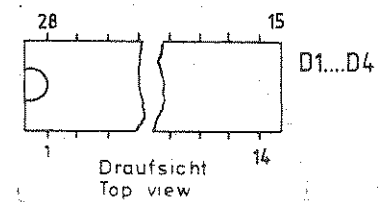
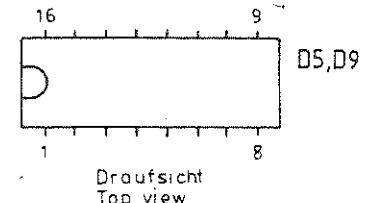
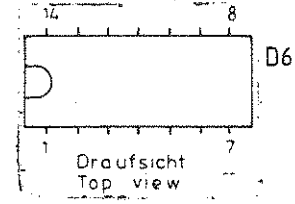
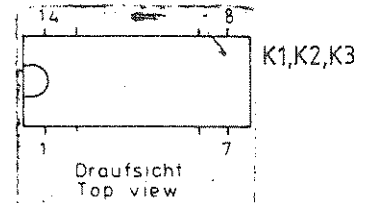
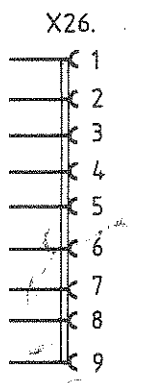
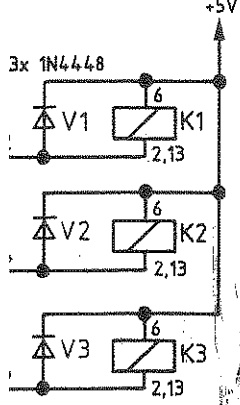
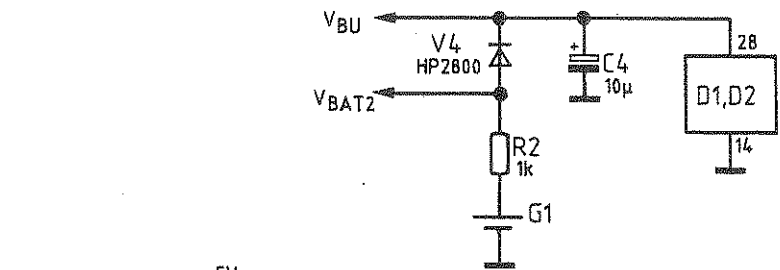
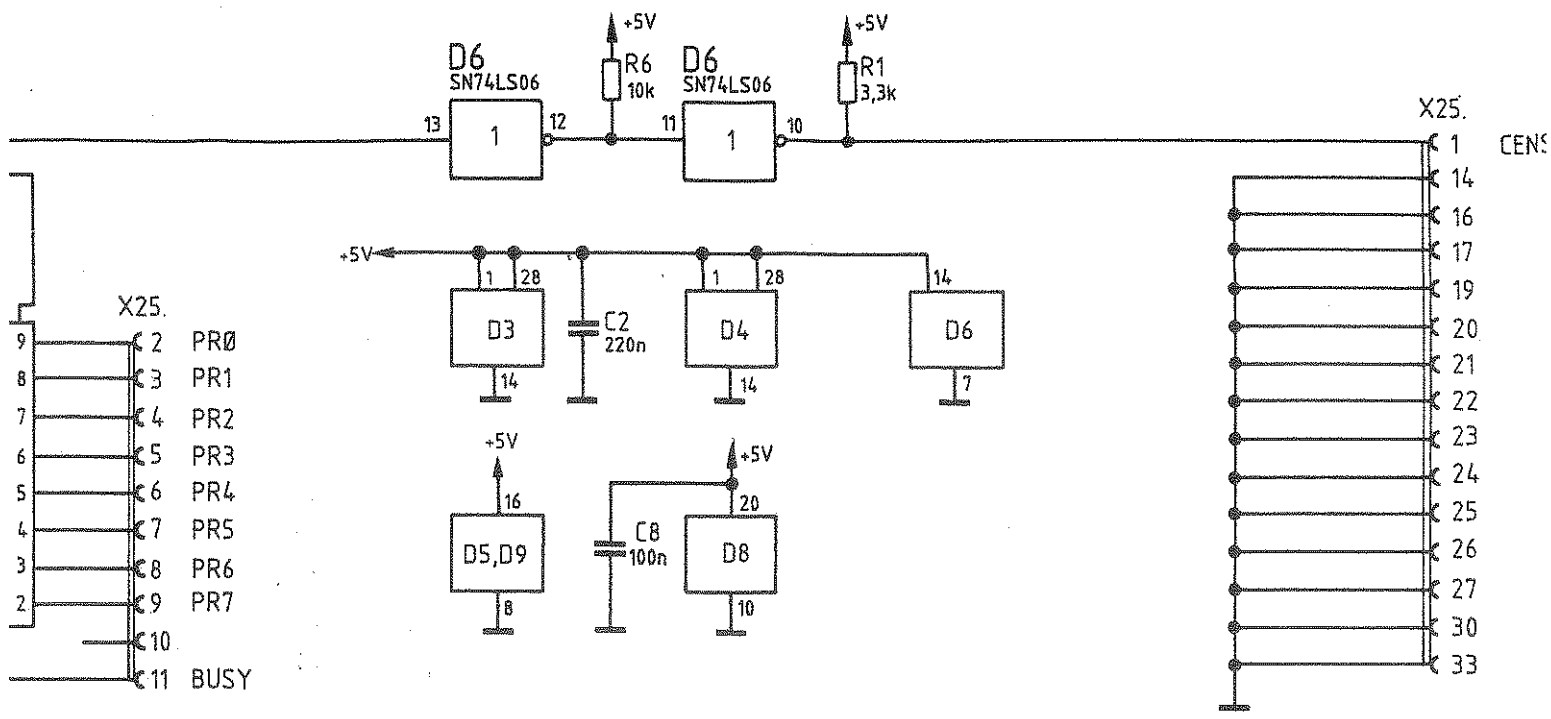
 ROHDE & SCHWARZ		ÄI Datum Date	Schalteilliste für Parts list for ED ABLAUFST./DRUCK.INTF. AUTO RUN CONTR/PRINT INTF	Sachnummer Stock No.	Blatt Page
12		0387		803.3320.01 SA	2
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
R1	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D		RL 083.0990		
R2	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C		RL 082.2160		
R3	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D		RL 083.1097		
R4	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C		RL 083.1545		
R5	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C		RL 082.2477		
R6	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D		RL 083.1297		
V1	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET		AD 012.0700		
BIS/TO					
V3					
V4	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800		AE 012.9066		
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT PANDUIT 100-064-033/999		FP 084.6470		
X4	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003		VL 088.4542		
X5	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003		VL 088.4542		
X25	FM BUCHSENLEISTE 36POL. CONNECTOR AMPHENOL 57LE-40360-27 CO		375.6550		
X26	FM WINKELBUCHSENL.9POL. FEMALE CONNECTOR FCT F9S5-K45		FM 243.1346		
X4B	FP KÜRZSCHLUSSBUCHSE SHORTING PLUG PK 452-70302		FP 491.7042		
X5B	FP KÜRZSCHLUSSBUCHSE SHORTING PLUG PK 452-70302		FP 491.7042		
- ENDE -					
803.3320.01 SA BL 2-					





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A		7.85	CO					1KGA	Tag
B	35514	4.86	CO					Bearb.	4.85
C	35556	2.87	PR					Gepr.	
And. Zust.	Anderungs-Mitteilung	Datum	Name	And. Zust.	Anderungs-Mitteilung	Datum	Name	Norm	



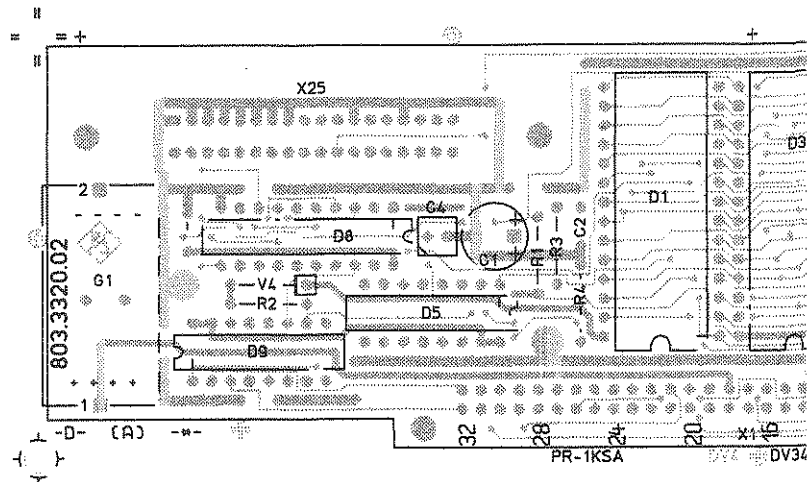
Stromlauf gilt für VAR 02
Circuit diagram is valid for Model 02

Name	Benennung	Zeichn.-Nr.	reg. i. V.	erste Z
CO	Ablaufsteuerung / Auto run control	Z	803.3314 V	803.3320 S
	zu Gerät: CM-B5			

A

Ansicht und Leitungsfü View of tracks on comp

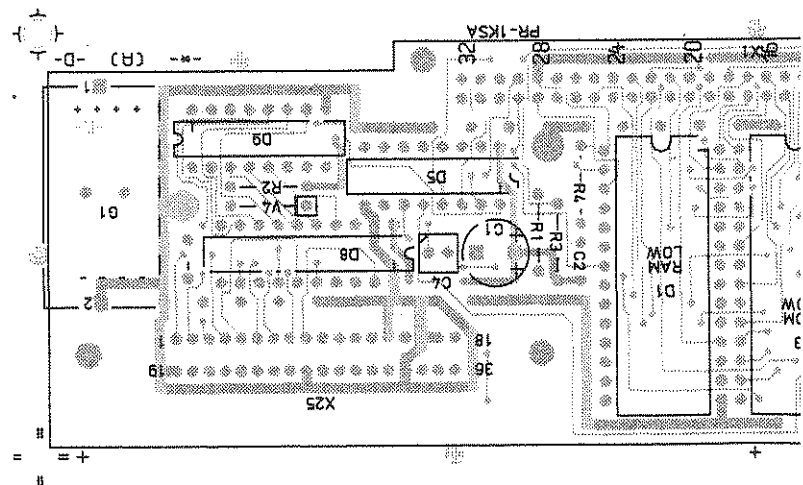
B



C

Ansicht und Leitungsfü View of tracks on solde

D



E

F

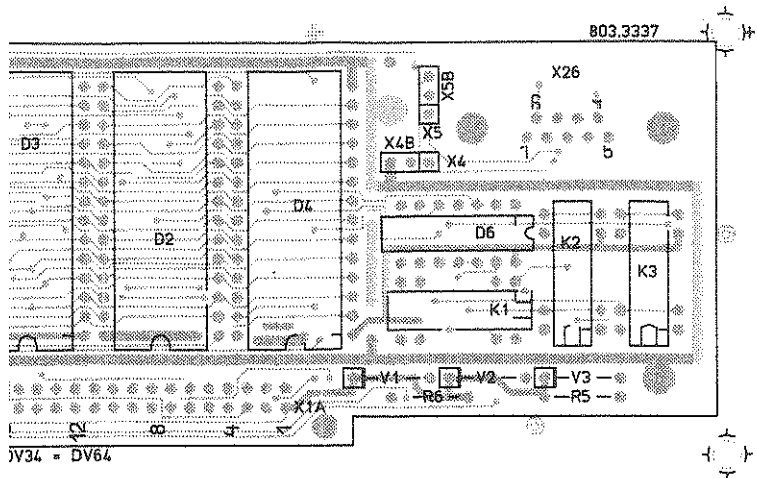
G

Therzu HVC 250

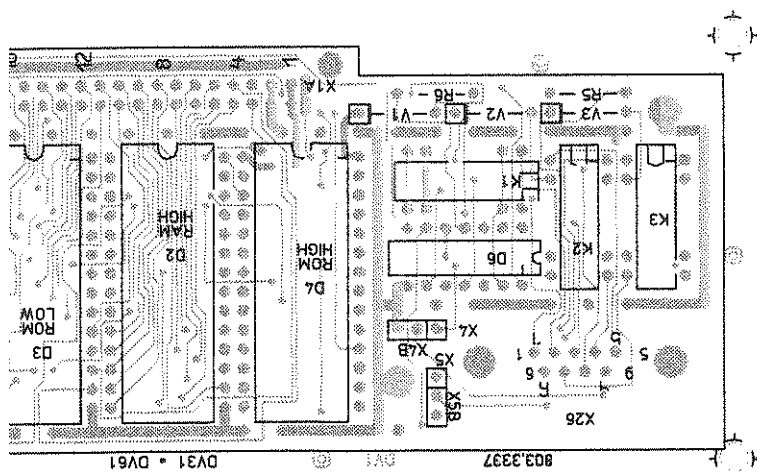


ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling

führung Bauteilseite
component side



führung Lötseite
solder side



G	35556	02.87	PR	Maße ohne Toleranzangabe		Maßstab 1 : 1			
						Halbzeug, Werkstoff			
				1KSA	Tag	Name	Benennung		Z
				Bearb.	02.87	PR	ABLAUFSTEUERUNG		
				Gepr.					
				Norm					
						Zeichn.-Nr.		Blatt-Nr.	
						803.3320.01		2	
						EE		v. Bl.	
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät CMT		reg. i. V. 803.3314 V		erste Z.:	