



**ROHDE & SCHWARZ**

**SERVICE DOCUMENTS**

Display/Keyboard

819.1122.02

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## 5 Service Manual "Display / Keyboard"

### 5.1 Function Description

(See circuit diagram 819.1122 S and Fig. 5-1)

The circuit of the subassembly comprises the following blocks:

- ▶ *LCD drive circuit*
- ▶ *LED drive circuit*
- ▶ *Keyboard matrix*
- ▶ *Spinwheel*
- ▶ *Standby*

#### 5.1.1 LCD Drive Circuit

The three liquid-crystal displays (frequency, modulation, level) are each driven by a driver module in multiplex mode. The segment voltage can be varied using potentiometer R16 in order to adjust the contrast of the segments. Data transfer between the controller subassembly and the drive modules is in serial mode.

#### 5.1.2 LED Drive Circuit

The LEDs are controlled by means of shift registers (D30, D40, D50, D60, D70, D80, D100) connected in series which are loaded serially via a data line (DIS.DAT) and which output the data by means of a common strobe connection.

One output bit is used to program the LCD backlighting.

The timer module D105 generates a flashing signal for the status LED H105. Two bits are also used to program the operating states "On" and "Off".

#### 5.1.3 Keyboard Matrix

The 58 keys are arranged in an 8x8 matrix whose row and column lines are connected to the controller subassembly.

Pressing a key connects the corresponding row line to the column line. The interface module on the controller subassembly recognizes the code characteristic for this key.

A more detailed description of the function can be obtained from the service manual for the module A5, "Controller".

#### 5.1.4 Tachogenerator

The tachogenerator is a magnetized ferrite ring on the spinwheel shaft. The ring is split up into segments whose magnetic field direction alternates. Two Hall sensors offset from one another about the ring's circumference provide information on the direction and angle of rotation.

#### 5.1.5 Standby

The standby LED H110 is powered by the +12 V standby voltage when the instrument is switched on. When the instrument is in operation, the +15 V supply prevents a flow of current through H110 (standby lamp goes out).

## 5.4 Interfaces

### 5.4.1 Analog Interfaces

Supply voltage	+ 5 V	X1,17 X2,17
GND (ground)	⊥	X1, 1, 2, 10, 15, 18, 19, 20 X2, 2
	+ 12 V STBY	X2, 20
	+ 15 V	X2, 19

### 5.4.2 Digital Interfaces

Signal name	Meaning	I = input O = output	Test point	Level
DIS.CLK	Serial data	I	X1, 3	TTL
DIS.DAT	transmission	I	X1, 4	TTL
DIS.BUSY	Display handshake output	O	X1, 11	TTL
DIS.C/D	Display control	I	X1, 8	TTL
DIS.RES	Display reset	I	X1, 16	TTL
DIS.STB1	Display strobe 1 (FREQ.)	I	X1, 5	TTL
DIS.STB2	Display strobe 2 (MODUL.)	I	X1, 6	TTL
DIS.STB3	Display strobe 3 (LEVEL)	I	X1, 7	TTL
LED.STB	LED strobe	I	X1, 9	TTL
KEYB.COL 1	Keyboard matrix column 1	O	X2, 10	TTL
KEYB.COL 2	Keyboard matrix column 2	O	X2, 7	TTL
KEYB.COL 3	Keyboard matrix column 3	O	X2, 8	TTL
KEYB.COL 4	Keyboard matrix column 4	O	X2, 5	TTL
KEYB.COL 5	Keyboard matrix column 5	O	X2, 6	TTL
KEYB.COL 6	Keyboard matrix column 6	O	X2, 3	TTL
KEYB.COL 7	Keyboard matrix column 7	O	X2, 4	TTL
KEYB.COL 8	Keyboard matrix column 8	O	X2, 1	TTL
KEYB.ROW 1	Keyboard matrix row 1	O	X2, 18	TTL
KEYB.ROW 2	Keyboard matrix row 2	O	X2, 15	TTL
KEYB.ROW 3	Keyboard matrix row 3	O	X2, 16	TTL
KEYB.ROW 4	Keyboard matrix row 4	O	X2, 13	TTL
KEYB.ROW 5	Keyboard matrix row 5	O	X2, 14	TTL
KEYB.ROW 6	Keyboard matrix row 6	O	X2, 11	TTL
KEYB.ROW 7	Keyboard matrix row 7	O	X2, 12	TTL
KEYB.ROW 8	Keyboard matrix row 8	O	X2, 9	TTL
DREHG. PULS		O	X1, 14	TTL
DREHG. DIR		O	X1, 13	TTL
PWR.ON		O	X1, 12	



**ROHDE & SCHWARZ**

**Schaltteillisten**

**Stromläufe**

**Bestückungspläne**

**Part lists**


**Circuit diagrams**


**Components plans**

**Listes des pièces détachées**

**Schémas de Circuit**


**Plans des composants**

Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in	
B115	BS UGN3120U HALL-EFF.SW. HALL-EFF.SWITCH	BJ 0336.4750.00	ALLEGRO	UGN3120U		
B116	BS UGN3120U HALL-EFF.SW. HALL-EFF.SWITCH	BJ 0336.4750.00	ALLEGRO	UGN3120U		
C1	CE 1UF+-20%40V SAL ELECTR.CAPACITOR	CE 0007.3905.00	VALVO	2222 128 37108		
C2	CE 1UF+-20%40V SAL ELECTR.CAPACITOR	CE 0007.3905.00	VALVO	2222 128 37108		
C5	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C6	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C7	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8521.00	MURATA	GRM42-6X7R103K 50PT		
C10	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C11	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C12	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8521.00	MURATA	GRM42-6X7R103K 50PT		
C15	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0007.5237.00	PHILIPS_CO	2238 581 55649		
C20	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0007.5237.00	PHILIPS_CO	2238 581 55649		
C25	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C26	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8438.00	MURATA	GRM42-6 X7R 102 K50		
C27	CC 10NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0099.8521.00	MURATA	GRM42-6X7R103K 50PT		
C105	CC 10NF-20+50%7X8R4000 CAPACITOR	CC 0087.7525.00	VALVO	2222 640 51103		
C107	CK 1UF+-5%50V7,5X5,5X10,5 CAPACITOR	CK 0099.2998.00	ERO	MKT 1826-510/054-R		
C110	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0007.5237.00	PHILIPS_CO	2238 581 55649		
C111	CC 100NF+-10%50V X7R 1206 CERAMIC CHIP CAPACITOR	CC 0007.5237.00	PHILIPS_CO	2238 581 55649		
D5	BJ UPD7225G00 LCD DRIV ALPHANUM.LCD CONTR/DRIVER	BJ 0392.5320.00	NEC	D7225G (JG)		
D10	BJ UPD7225G00 LCD DRIV ALPHANUM.LCD CONTR/DRIVER	BJ 0392.5320.00	NEC	D7225G (JG)		
D25	BJ UPD7225G00 LCD DRIV ALPHANUM.LCD CONTR/DRIVER	BJ 0392.5320.00	NEC	D7225G (JG)		
D30	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D40	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D50	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D60	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D70	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D80	BL PC74HC4094T 8ST.BUSREG BUS REGISTER	BL 0804.0977.00	PHILIPS_SE	(PC)74HC4094(D/T)		
D105	BO NE555V TIMER	BO 0418.1383.00	NSC	LM555CN		
H31 ..38	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H41 ..48	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H52 ..58	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H61 ..67	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H74 ..78	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H81 ..84	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H85	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D		
H86	NUR VAR/ONLY MOD: 04 AF HLMP1790 LED3 GN569N LED NUR VAR/ONLY MOD: 04	0007.5250.00	QUALITY	HLMP-1790.7418D		
MENP5 502 3PUA		Alt	Datum Date	Schalttafeliste für Parts list for	Sachnummer Stock No	Blatt-Nr Page
 <b>ROHDE &amp; SCHWARZ</b>		10	04.02.98	ED ANZEIGE/TASTATUR DISPLAY/KEYBOARD	<b>0819.1122.01 SA</b>	1+

Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
H87	AF HLMP1790 LED3 GN569N LED NUR VAR/ONLY MOD: 04	0007.5250.00	QUALITY	HLMP-1790.7418D	
H90	EF 5V OHNE SOCKEL	EF 0063.6906.00	ALBA	715	
..93	LAMP				
H105	AF HLMP1700 LED3 RT626N LED	0099.9134.00	QUALITY	HLMP-1700(Q7182C6RO)	
H110	AF HLMP1790 LED3 GN569N LED	0007.5250.00	QUALITY	HLMP-1790.7418D	
L1	LD 0,33UH10%,220HMO,830A CHOKE	LD 0067.2805.00	DALE	IM2	
N20	BO CA3240AE 2XMOSFETOPAMP DUAL MOSFET-INPUT OPAMP	0302.7040.00	RCA	CA3240AE	
P5	BP AN 127 LCD-MODULE	0826.8587.00	VARITRONIX	R&S 0826.8587	
P10	BP AN 155 LC-DISPLAY	1002.4939.00	PHILIPS	1002.4939	
P25	BP AN 152 LC DISPLAY	0801.1437.00	DATA_MODUL	LC 01092 AN 152	
R1	RN 9X47 KOHM+-2% SIL10 H5 RESISTOR NETWORK	RN 0341.9286.00	BOURNS	4610X-T09-473	
R2	RL 0,60W 1KOHM+-1%TK50 RESISTOR	RL 0082.2160.00	RESISTA	MK2	
R3	RL 0,60W 1KOHM+-1%TK50 RESISTOR	RL 0082.2160.00	RESISTA	MK2	
R5	RG 182 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 0007.5989.00	ROEDERSTEI	D25	
R6	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R7	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R8	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R10	RG 182 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 0007.5989.00	ROEDERSTEI	D25	
R11	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R12	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R13	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R15	RG 46,4KOHM+-1%TK100 1206 CHIP RESISTOR	0007.1860.00	DRALORIC	CB 1206 ...	
R16	RS 0,5W5KOHM+-10%10X10X5 CERMET POTENTIOMETER T	RS 0247.7890.00	SPECTROL	63 M ... TO 10	
R17	RG 5,62KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.0735.00	ROEDERSTEI	D25	
R20	RG 21,5KOHM+-1%TK100 1206 CHIP RESISTOR	0007.0906.00	DRALORIC	CB 1206 ...	
R21	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R22	RL 0,60W 681 KOHM+-1%TK50 RESISTOR	RL 0083.2735.00	RESISTA	MK2	
R25	RG 182 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 0007.5989.00	ROEDERSTEI	D25	
R26	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R27	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R28	RG 100,0KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.1948.00	ROEDERSTEI	D25	
R30	RG 10,0KOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R31	RN 4X1,0KOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R35	RN 4X1,0KOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R40	RG 10,0KOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R41	RN 4X1,0KOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R45	RN 4X1,0KOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
MENP5 502 3PUA AI Datum Date Schaltteilliste für Parts list for Sachnummer Stock No Blatt-Nr Page					
		10 04.02.98	ED ANZEIGE/TASTATUR DISPLAY/KEYBOARD		0819.1122.01 SA 2+

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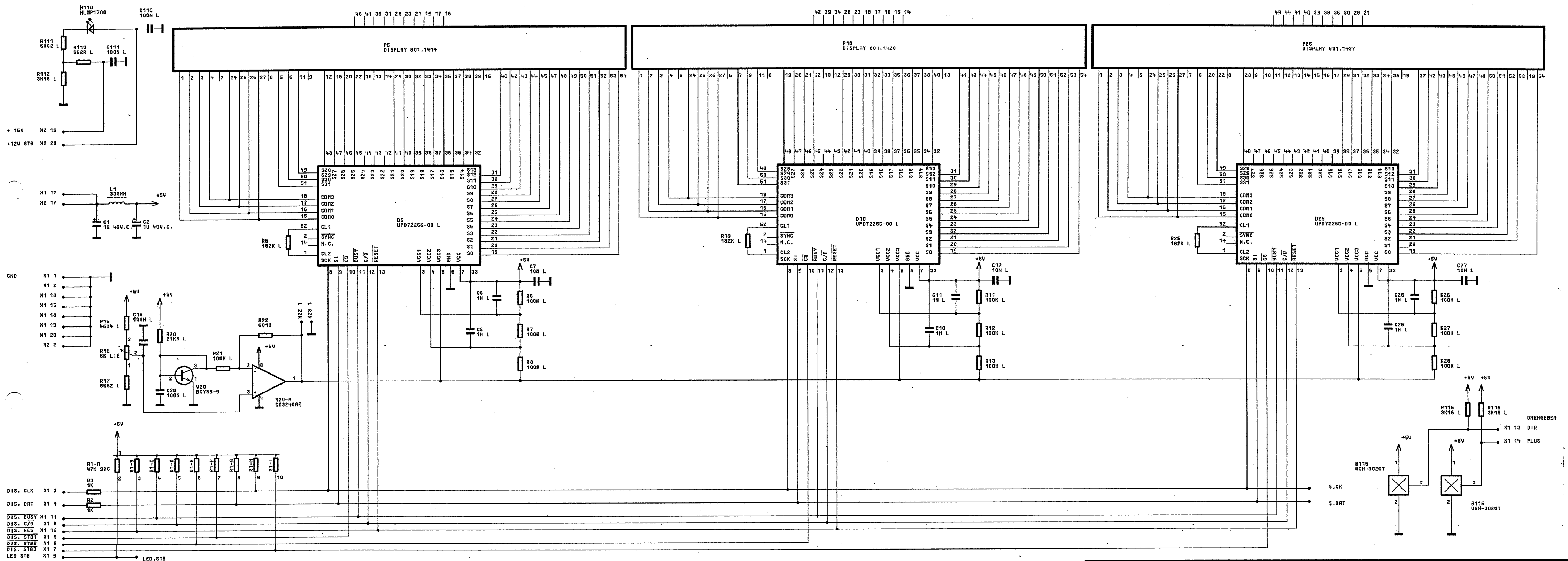
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R50	RG 10,OKOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R51	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R55	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R60	RG 10,OKOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R61	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R65	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R70	RG 10,OKOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R71	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R75	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R80	RG 10,OKOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R81	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R85	RN 4X1,OKOHM+-2%SIL 8 H5 RESISTOR NETWORK	RN 0291.4370.00	BECKMAN	L 08 3 S 102 M*	
R90	RL 0,60W 332 OHM+-1%TK50 RESISTOR	RL 0083.0255.00	RESISTA	MK2	
R105	RG 562 OHM+-1%TK100 1206 CHIP RESISTOR	RG 0006.9068.00	PHILIPS_CO	RC02	
R106	RG 1,0 KO +-1%TK100 1206 CHIP RESISTOR	RG 0006.7271.00	PHILIPS_CO	RC02	
R107	RG 475 KOHM+-1%TK100 1206 RESISTOR CHIP	RG 0007.6079.00	ROEDERSTEI	D25	
R108	RG 10,0 OHM+-1%TK100 1206 CHIP -RESISTOR	RG 0006.8649.00	PHILIPS_CO	RC02	
R109	RG 10,OKOHM+-1%TK100 1206 RG CHIP RESISTOR	RG 0007.0793.00	PHILIPS_CO	RC02	
R110	RG 562 OHM+-1%TK100 1206 CHIP RESISTOR	RG 0006.9068.00	PHILIPS_CO	RC02	
R111	RG 5,62KOHM+-1%TK100 1206 CHIP RESISTOR	RG 0007.0735.00	ROEDERSTEI	D25	
R112	RG 3,16KOHM+-1%TK100 1206 CHIP RESISTOR	0007.0670.00	DRALORIC	CB 1206 ...	
R115	RG 3,16KOHM+-1%TK100 1206 CHIP RESISTOR	0007.0670.00	DRALORIC	CB 1206 ...	
R116	RG 3,16KOHM+-1%TK100 1206 CHIP RESISTOR	0007.0670.00	DRALORIC	CB 1206 ...	
S1 ..8 S11 ..18 S21 ..28 S31 ..38 S41 ..48 S51 ..58 S61 ..67 S68	SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH NUR VAR/ONLY MOD: 04	SB 0238.3850.00	SIEMENS	V42 263-D32-M2	
S71	SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH NUR VAR/ONLY MOD: 04	SB 0238.3850.00	SIEMENS	V42 263-D32-M2	
S72	SB TASTER 1XA OHNE KNOFF PUSHBUTTON SWITCH NUR VAR/ONLY MOD: 04	SB 0238.3850.00	SIEMENS	V42 263-D32-M2	
S90	SB TASTER 1XA OHNE KNOFF PUSH BUTTON SWITCH	0834.9020.00	SIEMENS	V42263-D11-K9	
V20	AK BCY59IX N 45V 200MA TRANSISTOR	AK 0010.5163.00	VALVO	BCY59IX	
V90	AL BD139 N 80V 1A0 TRANSISTOR	AL 0274.8994.00	VALVO	BD139	


MENP5	502 3PUA	AI	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock No	Blatt-Nr Page
 <b>ROHDE &amp; SCHWARZ</b>		10	04.02.98	ED ANZEIGE/TASTATUR DISPLAY/KEYBOARD	<b>0819.1122.01 SA</b>	3+

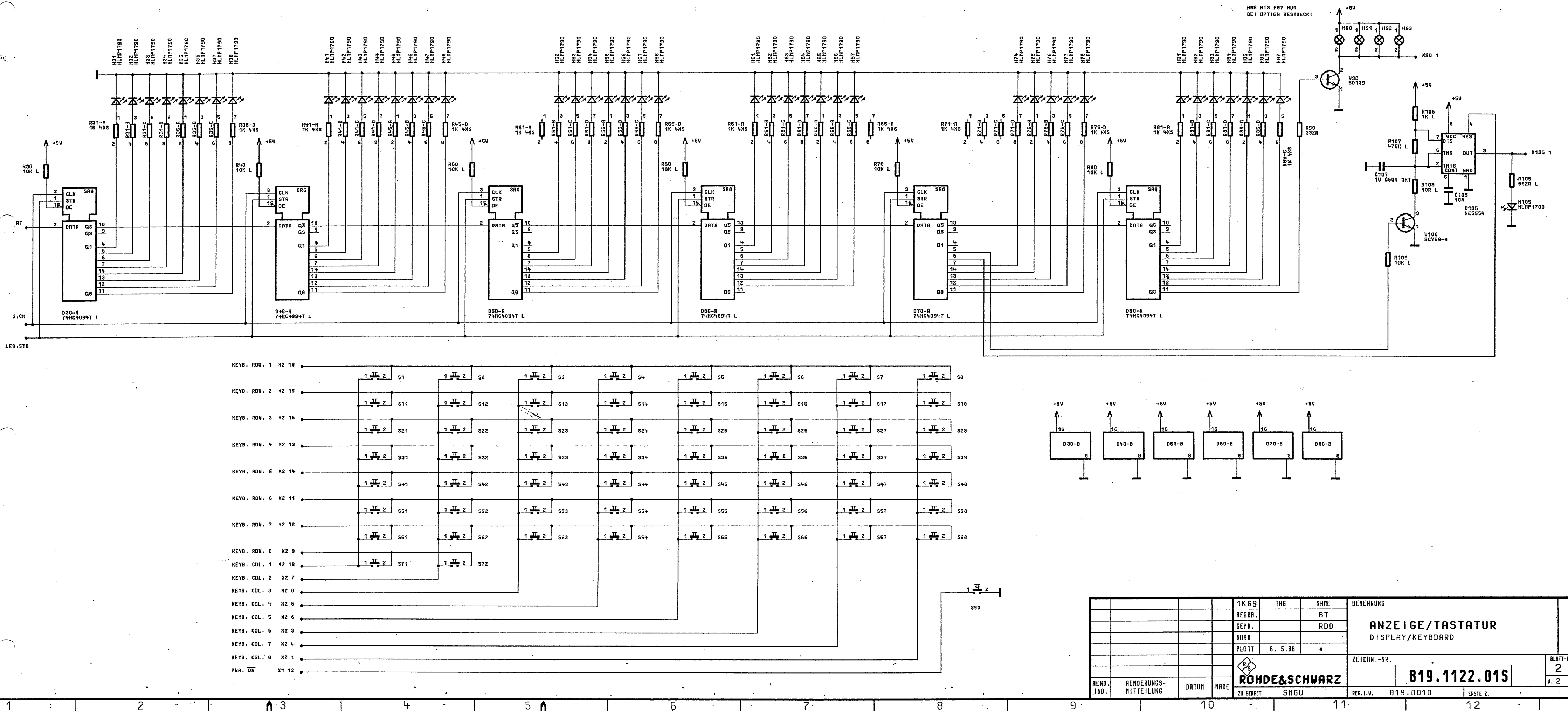


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Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
V108	AK BCY59IX N 45V 200MA TRANSISTOR	AK 0010.5163.00	VALVO	BCY59IX	
X1	DY BUCHSENEINHEIT CONNECTOR UNIT	0820.3019.00			
X2	XX ENTHALTEN IN INCLUDED IN X1"				
X22	FP STIFTFLEISTE 36P.R2,54 PIN CONNECTOR	FP 0242.3600.00	BINDER	742-11-0179-00-36	
X23	FP STIFTFLEISTE 36P.R2,54 PIN CONNECTOR	FP 0242.3600.00	BINDER	742-11-0179-00-36	
X90	2-POLIG FP STIFTFLEISTE 36P.R2,54 PIN CONNECTOR	FP 0242.3600.00	BINDER	742-11-0179-00-36	
X105	1-POLIG FP STIFTFLEISTE 36P.R2,54 PIN CONNECTOR	FP 0242.3600.00	BINDER	742-11-0179-00-36	



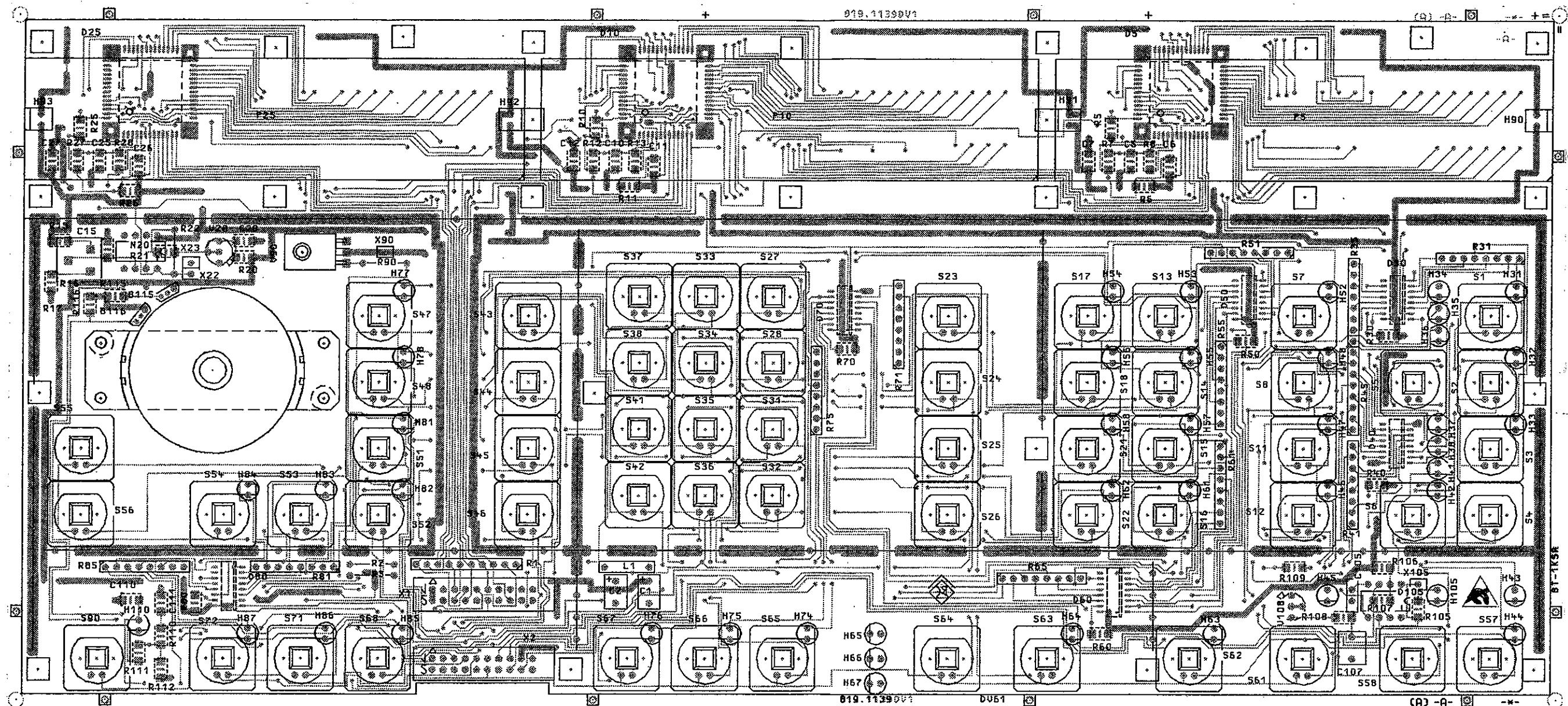
				1KG8	TAG	NAME	BENENNUNG		
				BEARB.		BT	ANZEIGE/TASTATUR DISPLAY/KEYBOARD		
				GEPR.		ROD			
				NORM					
				PLOTT	6. 5.88	*			
							ZEICHN.-NR.		BLATT-NR.
				ROHDE&SCHWARZ			819.1122.015		1
REND. IND.	RENDERUNGS- MITTEILUNG	DATUM	NAME	ZU GERÄT SMGU			REG.-I.V.	819.0010	ERSTE Z.







Ansicht und Leitungsführung Lötseite  
View of tracks on solder side



VARIANTENERKLÄRUNG / VERSION  
VAR 02 - GRUNDAUSFÜHRUNG / BASIC MODEL

Maße ohne Toleranzangabe		Maßstab 1 : 1	
Halbzeug, Werkstoff			
1KGA	Tag	Name	Benennung <b>ANZEIGE / TASTATUR</b> DISPLAY / KEYBOARD
Bearb.	06.88	BT	
Gepr.			
Norm			
		Zeichn.-Nr. <b>819.1122.01</b> ED	
zu Gerät SMGU		reg. i. V. 819.00.10 V erste Z.	
Änd. Zust.	Änderungs-Mitteilung	Tag	Name



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

(hierzu HVC 250)

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