
6. Repair

See circuit diagram, parts list and components layout in the appendix to this repair manual (list on page 0.2).

6.1 Preliminary Remarks

The repair of the Low-Pass Filter FK 852P5 consists of troubleshooting and fault elimination, of measurements, alignments and functional checks, of replacing assemblies and components as well as of a final inspection.

All the information required for repairing the filter down to component level is given in this section.

For all alignment work and measurements the filter has to be supplied with the operating voltages given in the circuit diagram 647.3518S.

All RF measurements on the filter have to be performed with the covers screwed down in place; if necessary, a special test cover has to be produced for this purpose.

With RF measurements ensure that cables and connections are of the right characteristic impedance and that the connecting leads are as short as possible.

Among the components incorporated in the low-pass filter there are MOS, MOSFET and CMOS devices. Devices of this kind are extremely sensitive to high extraneous voltages. Static discharge can produce very high voltage spikes, which are capable of destroying these devices.

For this reason, when work is being carried out in the vicinity of these devices, i.e. unless a special CMOS work station is available, the following minimum requirements should be observed:

- conductive bench and floor coverings,
- chair or stool with conductive coverings
- grounded, metallic work surface and conductive wrist-straps with a resistance of $> 200 \text{ kohms}$, $< 1 \text{ Mohm}$ plus an insulated lead and plug
- soldering irons with safety grounding
- all conductive surfaces, wrist-straps and work surfaces must be interconnected by insulated leads
- supply voltages must be disconnected before soldering is being performed

In general:

When performing any electrical or mechanical repairs on the Low-Pass Filter FK 852P5, only disassemble the unit to the extent necessary for the performing of these repairs.

6.1.1 Troubleshooting Instructions

Any fault that occurs should be localized with the aid of the troubleshooting flowchart given in 6.3.

6.1.2 Restoring the Nominal Characteristics

Any component that is definitely proved to be defective - through use of the troubleshooting flowchart or by performing the alignments, measurements and functional checks - should only be replaced by a component that meets the specifications given in the parts list in the appendix to this repair manual.

Only in this way can the technical data be guaranteed that are given in part 1 of the user manual.

Once components have been replaced, it is absolutely essential that the final test of the low-pass filter, detailed in chapter 6.6 be performed.

6.1.3 Spare Parts

All components and assemblies are subjected to strict quality control before they are built into the low-pass filter.

For components from outside suppliers, e.g. for resistors, capacitors, diodes transistors and integrated through to highly integrated circuits, R&S have set down their own delivery specifications for the purpose of ensuring maximum reliability. For this reason we recommend that only original spare parts be used, for replacing defective components.

When ordering a spare part, please state the following:

Type, ordering code and serial number of equipment, Ident. number of the parts list and designation plus stock number of the component concerned.

All of these details are to be found in the circuit diagram, parts list and components layout attached to this manual.

6.1.4 Important User Information

The following contains details which are essential when referring to Part 6 "Repair". This is in order to prevent misunderstandings at a later stage.

- All voltage measurements are referred to ground, if not stated otherwise.
- Abbreviations in the text, such as ST1.2, BU3.5a and B6.7 are to be understood as follows:

Plug 1 - Pin 2

Socket 3 - Pin 5a

Integrated Circuit 6 - Pin 7

- Every component mentioned is contained in Circuit Diagram 647.3518S. There are therefore no special references to this circuit diagram in the text.
- The repair of the Low-Pass Filter FK 852P5, model 02, is identical to the repair of model 05. Therefore in the following text no further reference is made to the different models.

6.2 Test Equipment

The test equipment specified in the following list will be required for performing the repairs described in this part of the manual.

Equivalent items of test equipment can be used, provided that their technical data are equal or better as those stated.

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6.2.1 Test Equipment List

Item no.	Test equipment, required technical data	Recommended R & S test equipment	Order no.
1	Mobile Tester	SMPF 2 SMFS 2	332.0015.53
2	Power Signal Generator $V_{out} = 0$ to 10 V EMF at 50 ohms 0.1 to 30 MHz		
3	Signal Generator 10 Hz to 30 MHz	SMK	348.0010.02
4	HF Test Receiver, 9 kHz to 30 MHz, - 30 to + 137 dB (μ V)	ESH 2	303.2020.52
5	Spectrum Analyser Frequency range: 0.1 to 100 MHz Sensitivity: > -80 dBm Level indicator range: 80 dB		
6	RF Millivoltmeter with 10 V Insertion Unit, 50 ohms, 10 V and Precision Termination, 50 ohms	URV 4 URV-Z2 RNA	292.5012.03 288.8010.55 272.4510.50
7	Noise Generator, 20 Hz to 30 MHz	SUF 2	282.8819.03
8	Digital Multimeter	UDL 33	388.8011.02
9	RF Step Attenuator 0 to 10 dB	DPSP	334.6010.02
10	Power Splitter/Combiner, 0.1 to 30 MHz	DVS	342.1014.50
11	2 Buffer amplifiers, $v = 17$ dB, $V_{out max} = 25$ dBm		
12	Service Kit	KA 852C1	648.8513.02

6.3 Troubleshooting Flowchart

6.3.1 General

The following troubleshooting flowchart (Fig. 6.1) covers troubleshooting as well as fault elimination in the Low-Pass Filter FK 852P5.

For easy troubleshooting there are, where necessary, cross-references to

other measurements and procedures involved in repair.

The given sequence for the troubleshooting should be adhered to so that faults can be detected and remedied as speedily and rationally as possible.

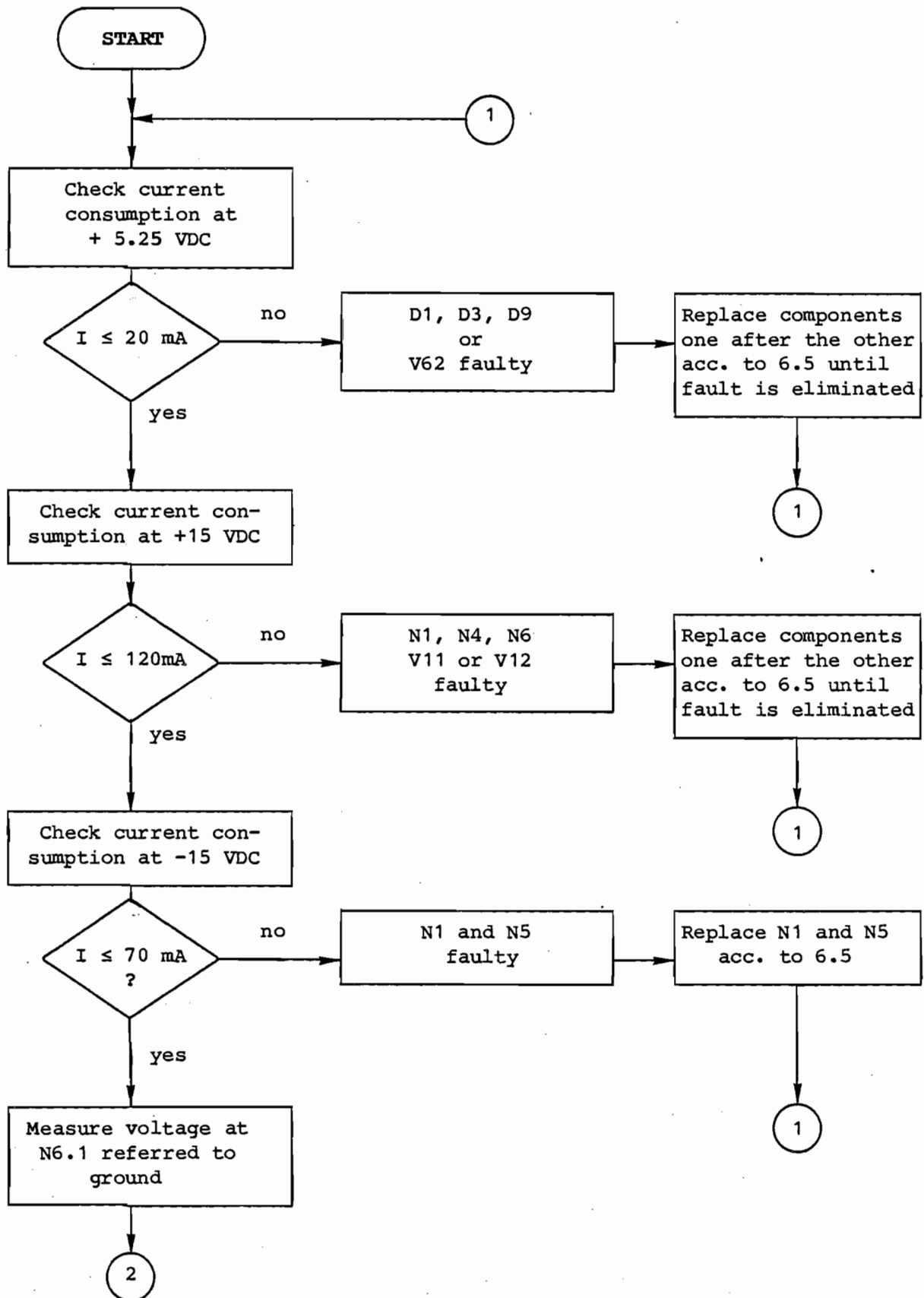


Fig. 6.1 Low-Pass Filter FK 852P5, Troubleshooting Flowchart
(Sheet 1 of 5)

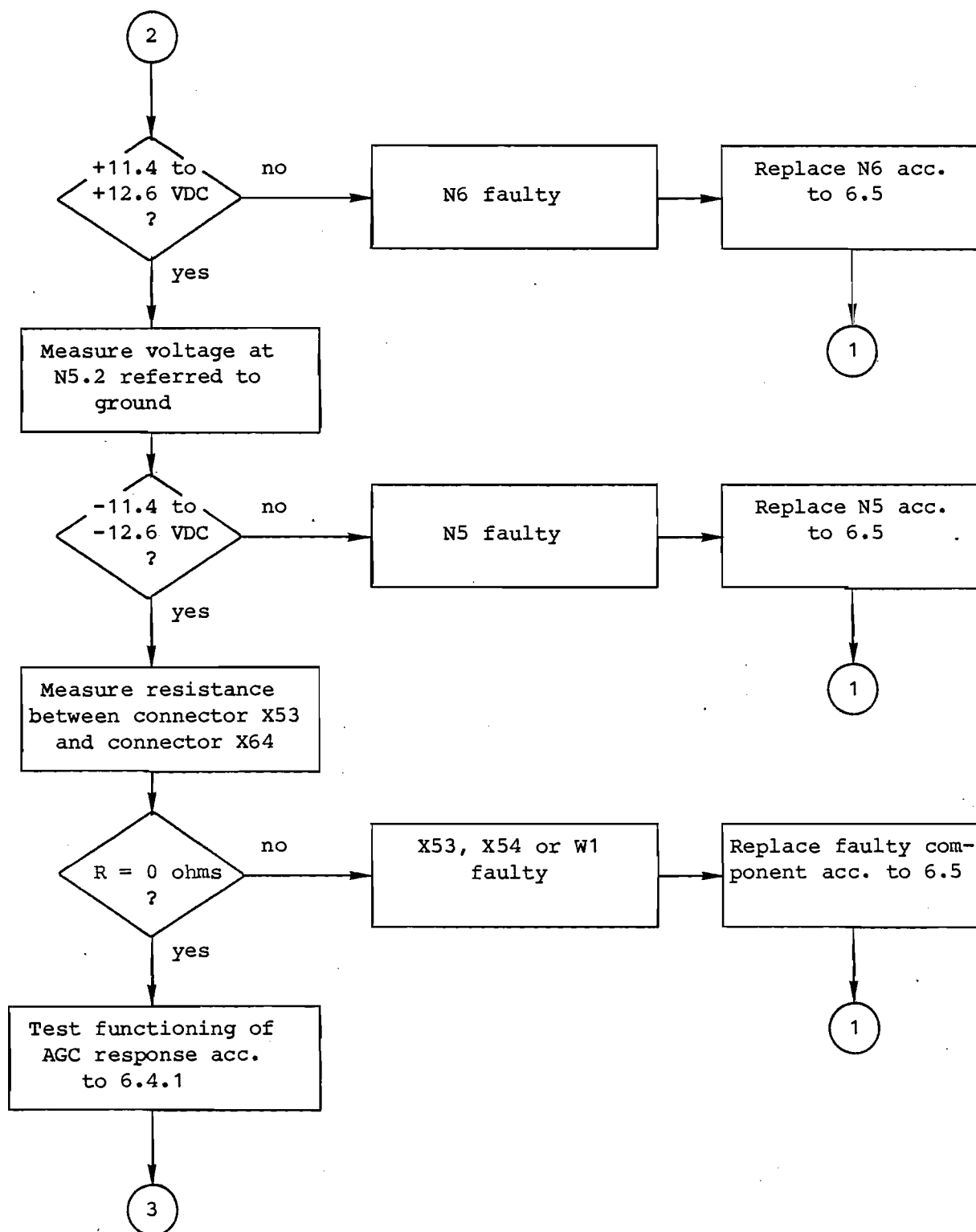


Fig. 6.1 Low Pass Filter FK 852P5, Troubleshooting Flowchart
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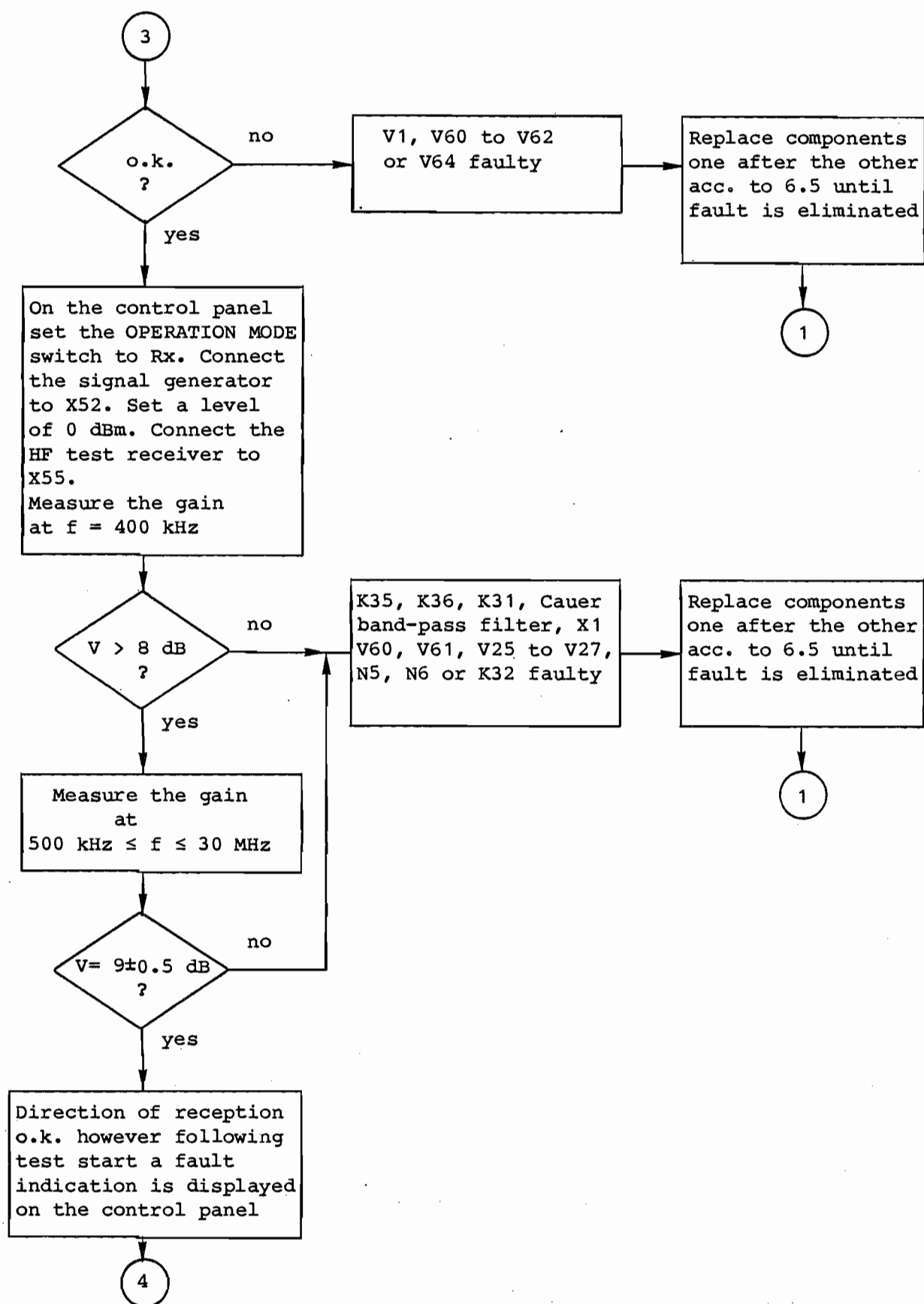


Fig. 6.1 Low-Pass Filter FK 852P5, Troubleshooting Flowchart
(Sheet 3 of 5)

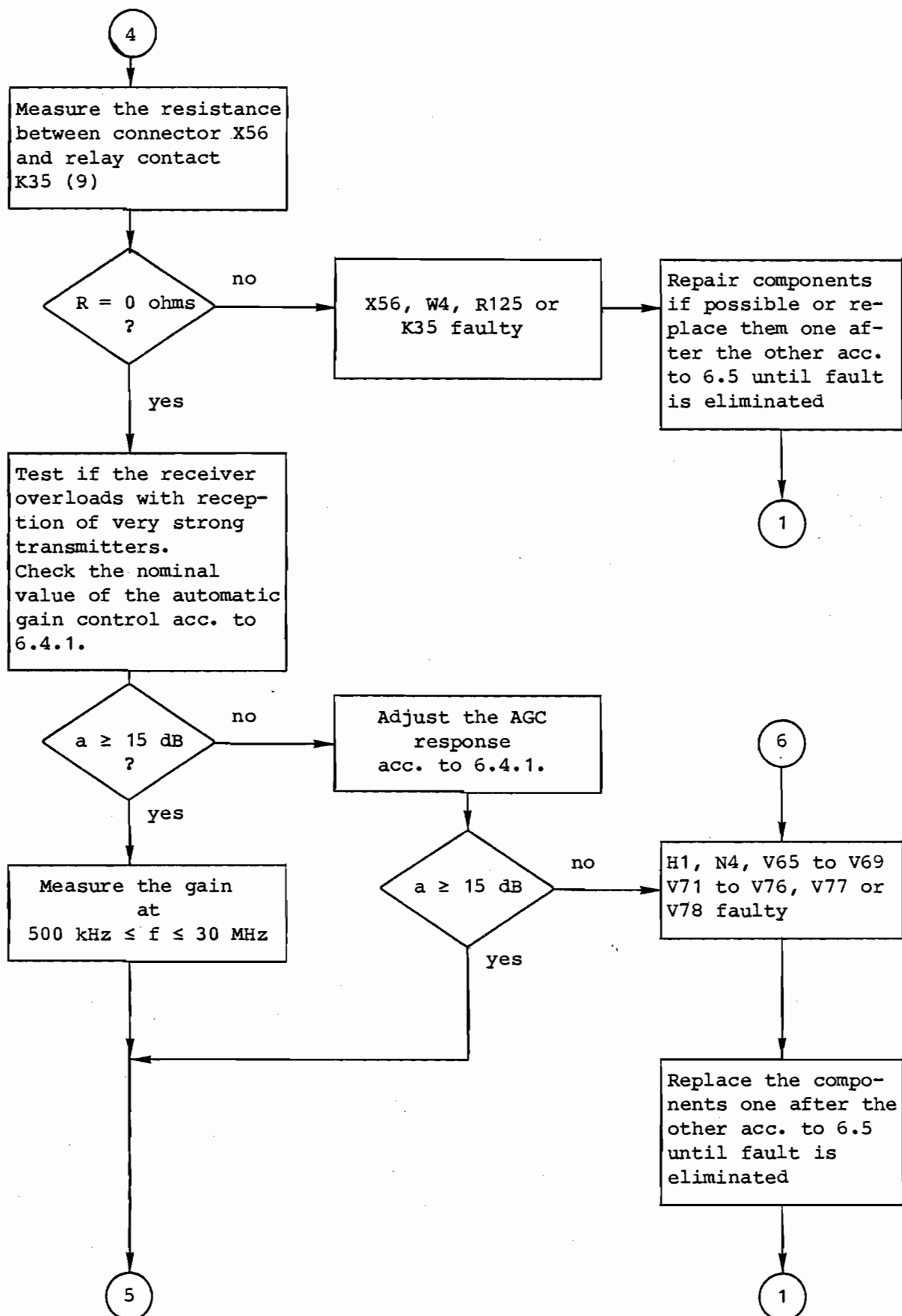


Fig. 6.1 Low-Pass Filter FK 852P5, Troubleshooting Flowchart
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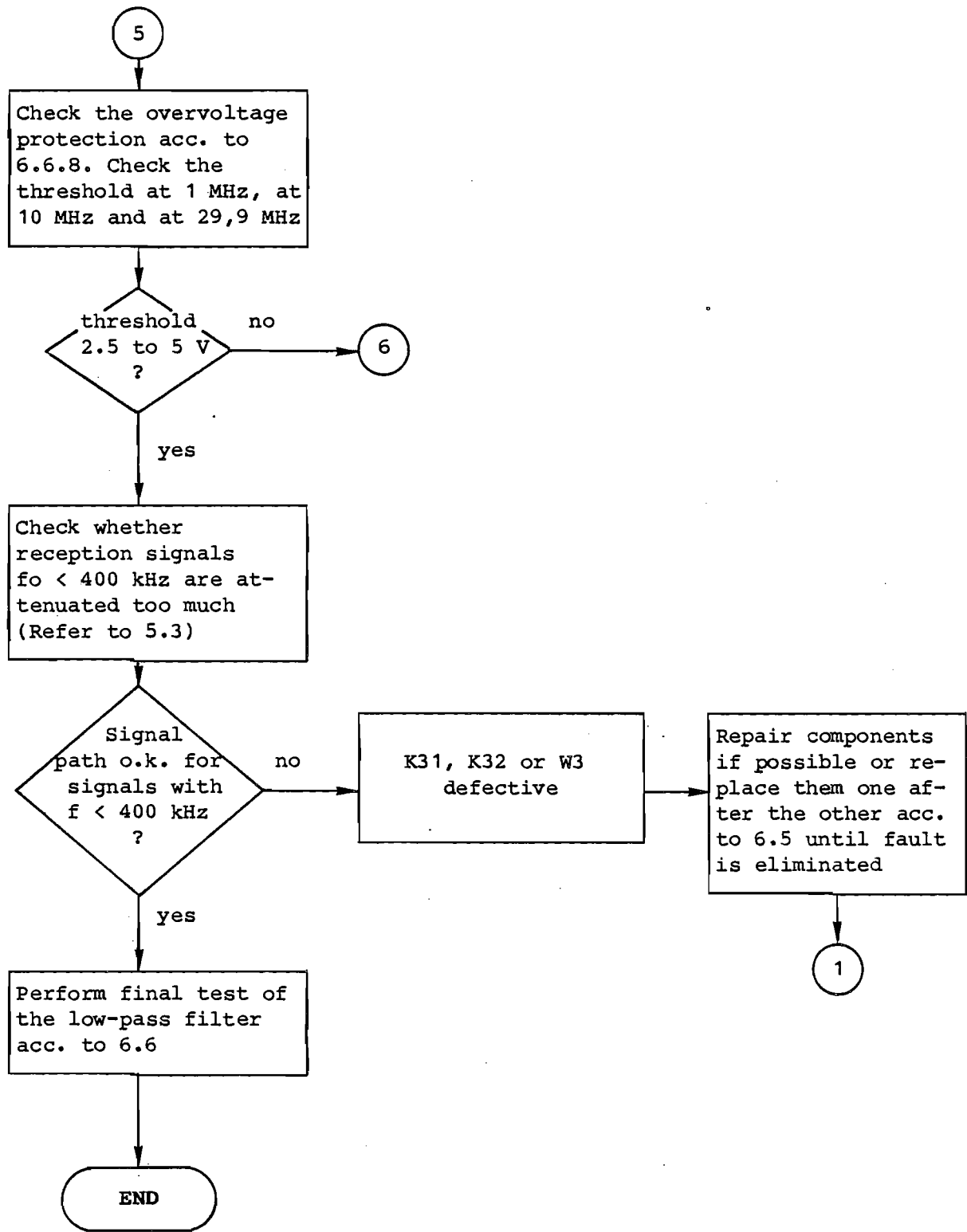


Fig. 6.1 Low-Pass Filter FK 852P5, Troubleshooting Flowchart
(Sheet 5 of 5)

6.4 Measurements, Alignments and Functional Checks

The measurements, alignments and functional checks below are the more detailed procedures to the instructions given in a condensed form in the troubleshooting flowchart. Consequently one will usually undertake these measurements, alignments and functional checks by branching out of the troubleshooting flowchart at a particular point. When the measurement, etc. has been performed, return to the troubleshooting flowchart at the same point where it has been left.

If a fault has been clearly identified beforehand however, one can of course commence with one of these measurements, etc. directly.

For all of these measurements or tests it is assumed that the Low-Pass Filter FK 852P5 is properly adapted to a HF transceiver. For opening the filter, refer to 6.5.

6.4.1. Adjustment of the Automatic Gain Response

Adjust the automatic gain response circuit as follows:

1. On the control panel set the OPERATION MODE switch to Rx.
2. Connect the signal generator to connector X52.
3. Set the signal generator to a frequency of 10 MHz and to an output voltage of -70 dBm.
4. Connect the HF millivoltmeter with 10-V insertion unit to connector X55.

Note:

The connection between X55 and Tx/Rx Section GX 852P1 shall remain.

5. Connect the digital multimeter to connector X51.a21 and ground. Set the digital multimeter to volts.
6. Increase the level of the signal generator until the digital voltmeter indicates 4 ± 0.1 V (control threshold).
7. Note the reading of the RF millivoltmeter.
8. If required, adjust the control threshold (-0.5 dB referred to the output level of the signal generator) by means of potentiometer R100.
9. Increase the level of the HF signal at connector X52 until the digital voltmeter indicates:
 6 ± 0.1 V.
10. Note the reading of the RF millivoltmeter.
11. Determine the control attenuation, which is the difference of the readings from step 7 and step 10.

Nominal value: $a \geq 15$ dB

6.4.2 Functional Test of the Gain

Perform the test as follows:

1. On the control panel set the OPERATION MODE switch to Rx.
2. Connect the signal generator to connector X52 of the low-pass filter.
3. On the signal generator set a level of 0 dB.
4. Connect the HF test receiver to connector X55 of the low-pass filter.

(Continuation)---

(Cont.) Functional Test of the Gain

5. Measure the gain at $f = 400 \text{ kHz}$.
Nominal value: $v > 8 \text{ dB}$
6. Measure the gain at $500 \text{ kHz} \leq f \leq 30 \text{ MHz}$.
Nominal value: $v = 9 \pm 0.5 \text{ dB}$
7. Disconnect the test set-up.

If this final test does not prove satisfactory, the testing and troubleshooting following the flowchart Fig. 6.1 will have to be performed again. Repeat the procedure as many times as is necessary to detect and remedy all faults.

6.5 Replacement of Components

Before replacing any components open the low-pass filter as follows:

1. Remove the top RF cover after undoing the six Phillips screws.
2. Remove the bottom RF cover after undoing the six Phillips screws.
3. The installation is to be performed in the reverse order of the above listed procedure.

Components are to be replaced following usual workshop procedure. No special instructions are required for this.

After replacement of components continue with the troubleshooting flowchart according to Fig. 6.1.

6.6 Final Test of the Low-Pass Filter

After a repair has been carried out, the Low-Pass Filter FK 852P5 must be subjected to the following final test to ensure that its technical data can still be guaranteed.

6.6.1 Current Consumption

Nominal values:

+15 VDC	$\leq 120 \text{ mA}$
+5.25 VDC	$\leq 20 \text{ mA}$
-15 VDC	$\leq 70 \text{ mA}$

6.6.2 Stabilized Voltages

Nominal values:

+12 $\pm 0.6 \text{ VDC}$
-12 $\pm 0.6 \text{ VDC}$

6.6.3 Gain Test

Perform the test as follows:

1. On the control panel set the OPERATION MODE switch to Rx.
2. Connect the signal generator to connector X52 of the low-pass filter.
3. On the signal generator set a level of 0 dB.

(Continuation)---

(Continuation) Gain Test

4. Connect the HF test receiver to connector X55 of the low-pass filter.
5. Measure the gain at $f = 400$ kHz.
Nominal value: $v > 8$ dB
6. Measure the gain at:
 $500 \text{ kHz} \leq f \leq 30 \text{ MHz}$.
Nominal value: $v = 9 \pm 0.5$ dB
7. Disconnect the test set-up.
3. Set the signal generator 1 to a frequency of $f_1 = 29.9$ MHz.
4. Set the signal generator 2 to a frequency of $f_2 = 30$ MHz.
5. Adjust the level at connector X52 to 7 dBm for each signal of f_1 and f_2 .
6. Margin of the intermodulation products:

Nominal value ≥ 42 dB

6.6.4 Selection Test

Test the selection as follows:

1. On the control panel set the OPERATION MODE switch to Rx.
2. Connect the signal generator to connector X52 and adjust to a level of 0 dBm.
3. Connect the HF test receiver to connector X55.
4. Measure the attenuation at the following frequencies:

Nominal values:

- | | |
|------------------------|----------------|
| $f \leq 280$ kHz | $a \geq 15$ dB |
| $f \geq 45$ MHz | $a \geq 15$ dB |
| $f \geq 50$ MHz | $a \geq 25$ dB |
| $f \geq 80$ MHz | $a \geq 50$ dB |

Note:

Reference frequency = 1 MHz

6.6.5 Intermodulation Test

Test the intermodulation as follows:

1. Install the test set-up according to Fig. 6.2.
2. On the control panel set the OPERATION MODE switch to Rx.

6.6.6 Test of the Noise Figure

Determine the noise figure as follows:

1. Install a test set-up according to Fig. 6.3.
2. On the control panel set the OPERATION MODE switch to Rx.
3. Adjust the level of the noise generator to zero.
4. Set the HF test receiver to a reception frequency of 10 MHz.
5. Set the RF step attenuator to 3 dB.
6. Note the reading of the HF test receiver.
7. Set the RF step attenuator to 6 dB.
8. Increase the level of the noise generator until the HF test receiver reaches the reading noted in step 6.
9. The indication at the noise generator for the reading acc. to step 8 determines the noise figure F.

Nominal value for $f = 10$ MHz:

Noise figure F $\leq 3 \text{ kT}_0$.

6.6.7 Test of the Automatic Gain Control

Test the control attenuation according to 6.4.1.

Note:

The comparator N4 switches over as soon as output 14 (test point MP) switches to ≥ 15 VDC.

6.6.8 Test of the Overvoltage Protection

Test the overvoltage protection as follows:

For a RF voltage the nominal value of the threshold is in the range of 2.5 to 5 V at connector X52.

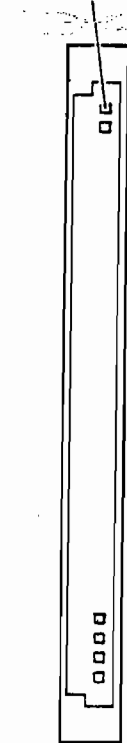
1. Install a test set-up according to Fig. 6.4.
2. On the control unit set the OPERATION MODE switch to Rx.
3. Remove the isolating connector X11 and terminate connector X1 with a 50-ohms termination resistor.
4. Measure at test point MP by means of the digital voltmeter.

5. Test the threshold for the following frequencies:

Test frequency : $f = 1$ MHz
 $f = 10$ MHz
 $f = 29.9$ MHz

6. At the end of the test remove the test set-up and reinstall connector X11.

6.7 External Interfaces

Socket X51	Pin	Signal designation / level
FP multipoint connector, 32-way for PCBs Contact a1 	a1	Not used
	a2	Not used
	a3	Not used
	a4	Not used
	a5	BITE selection
	a6	Strobe 3
	a7	Strobe 4
	a8	Not used
	a9	Strobe 9
	a10	0
	a11	1
	a12	2
	a13	3
	a14	4
	a15	5
	a16	6
	a17	7
	a18	Transmit
	a19	Not used
	a20	Not used
	a21	AGC RF
	a22	Not used
	a23	-15 VDC
	a24	+5.3 VDC
	a25	+5.3 VDC
	a26	+7.25 VDC
	a27	+7.25 VDC
	a28	+15 VDC
	a29	+15 VDC
	a30	Ground
	a31	Ground
	a32	Ground

Plug X52 to X56	Pin	Signal designation / level
FJ fixed connector system SMB 	X52	HF Reception 1
	X53	HF Transmission 2
	X54	HF Transmission 1
	X55	HF Reception 2
	X56	Test spectrum

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NOTES



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5. Description of Function

(See circuit diagram 647.3518S for 5.1 to 5.7)

5.1 Signal Path for Reception

In reception, the HF signal from the antenna is fed via connector X52 to an input low-pass filter which blocks frequencies above 100 MHz from the signal path.

Subsequently the signal is fed via relay contacts K35 and K31 to the Cauet band-pass operating in the frequency range of 0.4 to 30 MHz and from there to the 9-dB amplifier V25, functioning in common base circuit.

Losses of signal level caused by the preceding selection unit are compensated for by this amplifier. Via relay contacts K32 (6.4) and K32 (13.11) the signal is fed to connector X55 from where it is routed to the Tx/Rx Section GX 852P1.

The fixed-voltage regulators N5 and N6 serve to stabilise the working point of amplifier V25. Further they generally improve the power supply of the amplifier V25.

5.2 Signal Path for Reception of High Level HF Signals (> 5 V)

Following the input filter consisting of C90, C91 and L30 the HF reception signal is fed via a fullwave rectifier circuit to the input pins 6 and 7 of comparator N4. Pin 8 of N4 is used for input of the reference voltage.

For input voltages > 5 V at connector X52 the output of N4 at pin 14 is on positive potential. Thereby relay K36 deenergizes and the associated contacts K36 switch the 40-dB attenuator consisting of R123 and R124 into circuit.

In this way the low-pass filter and subsequent following modules are protected against possible destruction due to overvoltage.

For repair purposes test point MP14 has been provided which is located at pin 14 of the comparator N4.

5.3 Signal Path for Reception of Frequencies below 400 kHz

For reception of frequencies below 400 kHz the band-pass filter and amplifier V25 are bypassed by contacts K31 (4.8) and K32 (8.4).

5.4 HF Gain Control

The automatic gain control (AGC) voltage from the Tx/Rx Section GX 852P1 is applied via connector X51.a21 to pin 6 of amplifier N1. The reference voltage, adjustable by means of potentiometer R100, is fed to amplifier N1.1 which amplifies the control voltage and feeds it to the PIN diodes V60 and V61. These PIN diodes conduct more or less depending upon the value of the control voltage.

The HF reception signal that is applied to these PIN diodes is thereby attenuated by up to 15 dB.

5.5 Signal Path for Transmission

In transmission the HF signal from the Tx/Rx Section GX 852P1 is just routed through the low-pass filter. The signal arrives at connector X53. Via cable W1 it is fed to connector X54 and then to the HF amplifier.

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5.6 Control of the Low-Pass
Filter

The control of the low-pass filter is effected by means of data and strobe signals from the Processor GS 852P1. These control signals arrive at connector X51 and are subsequently buffered intermediately in the D-type flipflops D1 and D3. From there they are transferred to the level converter D9 that triggers the driving transistors for the relays. In the test mode D9 triggers the comparator N4.

5.7 Test Operation

In test operation BITE signals generated by the Processor GS 852P1 drive the data inputs X51.a10, a.11 and the strobe 9 input X51.a9 of the low-pass filter. The memory output D9.1 switches a low level to comparator N4, pin 12. Thereby comparator N4 output at pin 14 is set to +15 VDC. Subsequently relay K36 is deenergized and its associated contacts switch the 40-dB attenuator consisting of R123 and R124 into circuit for level matching.

The memory output D9.2 drives transistor V12 which in turn energizes relay K35. Relay contact K35 (8.4) switches off the reception antenna from the following signal path. Via relay contact K35 (9.13) the signal path is now free for the test signal.

Memory output D9.2 and transistor V12 additionally energize relay K34. Thereby a 20-dB attenuator consisting of R18 to R20 is switched into circuit for further level matching.

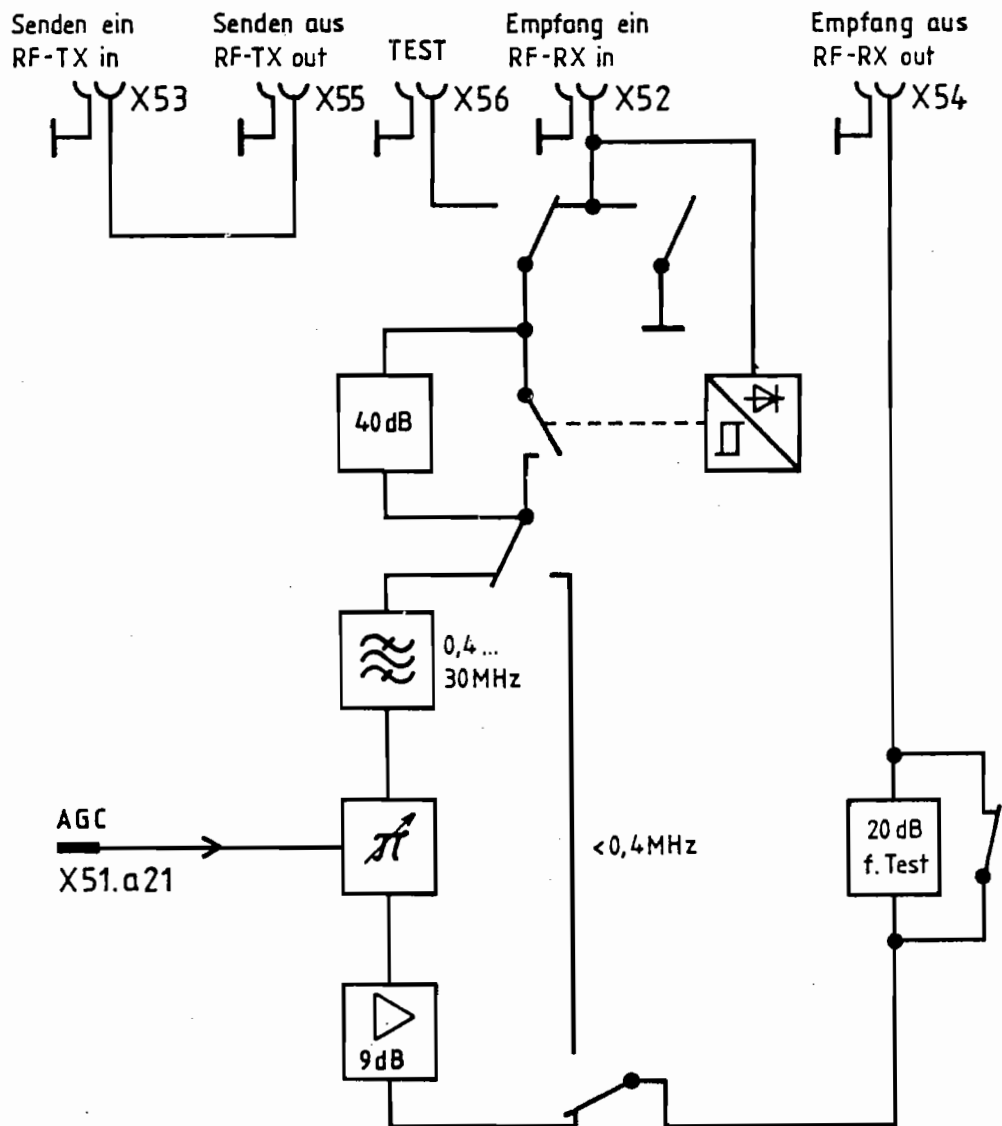
The test signal consisting of a 900-kHz line spectrum with a bandwidth of 30 MHz is fed as a simulated antenna signal to the input of the Low-Pass Filter FK 852P5 at connector X56. From there the test signal is routed via the 40-dB attenuator consisting of R123, R124 and R125 to the Cauer band-pass filter.

Next the test signal is routed via the 9-dB amplifier V25, the 20-dB attenuator consisting of R18, R19 and R20 to connector X55. From X55 the test signal is routed to the Tx/Rx Section GX 852P1 where it is used to test the sensitivity of the HF receiver.

- PASS FILTER 30 MHz
5 2 P 5

Manual
Description of Function

- 5.3/5.4



Low-Pass Filter FK 852P5, Block Diagram

LOW - PASS FILTER FK 852 P 5

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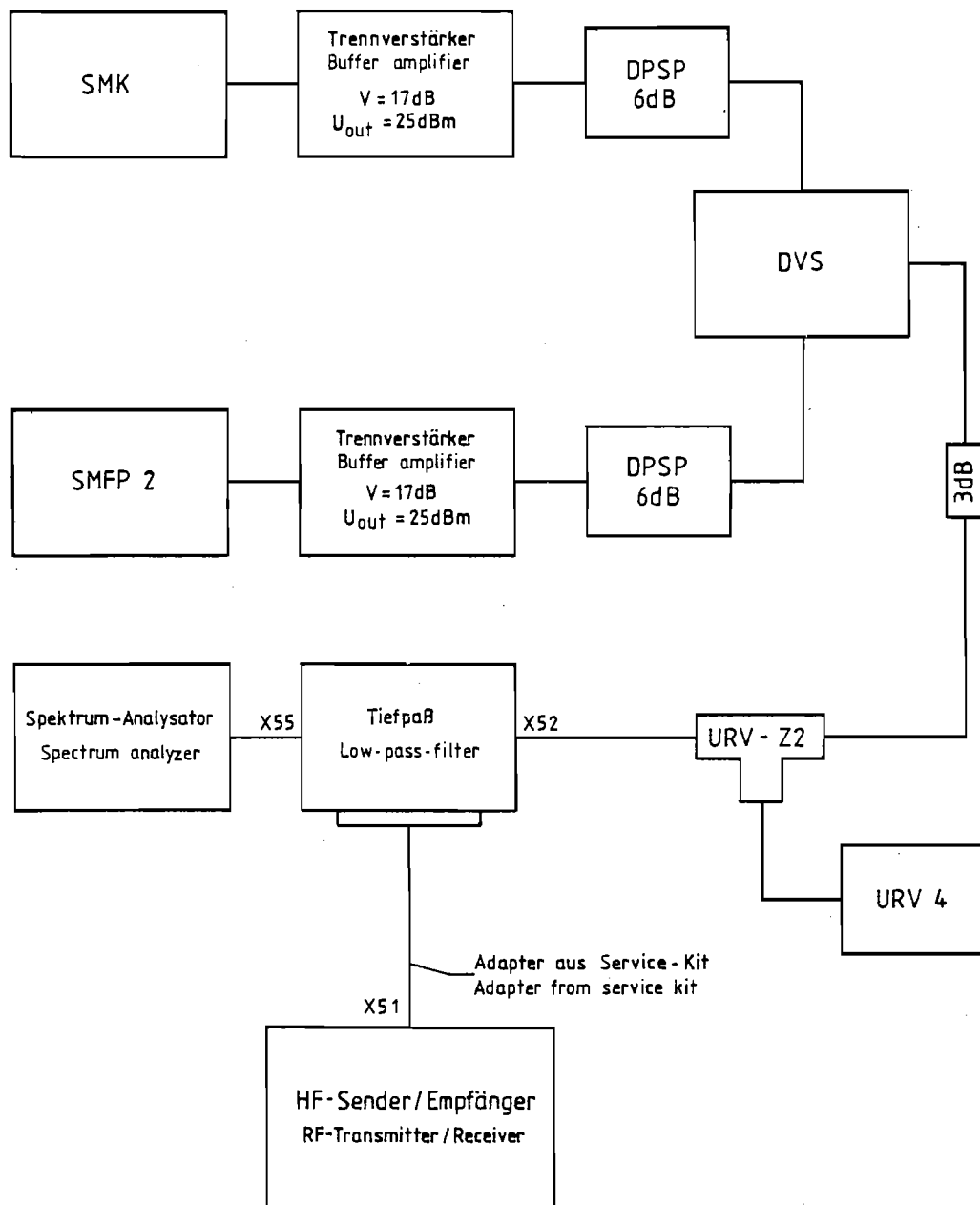


Fig. 6.2 Test Set-up for the Intermodulation Test

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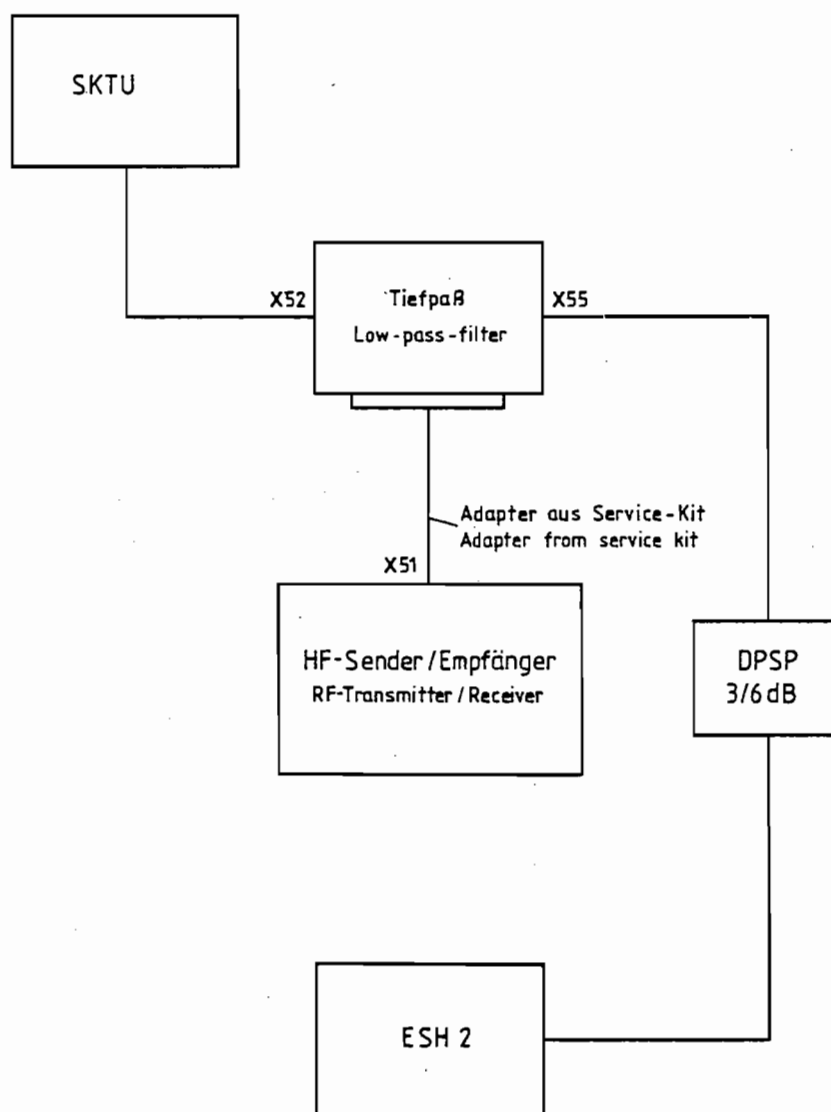


Fig. 6.3 Test Set-up for the Noise Figure Test

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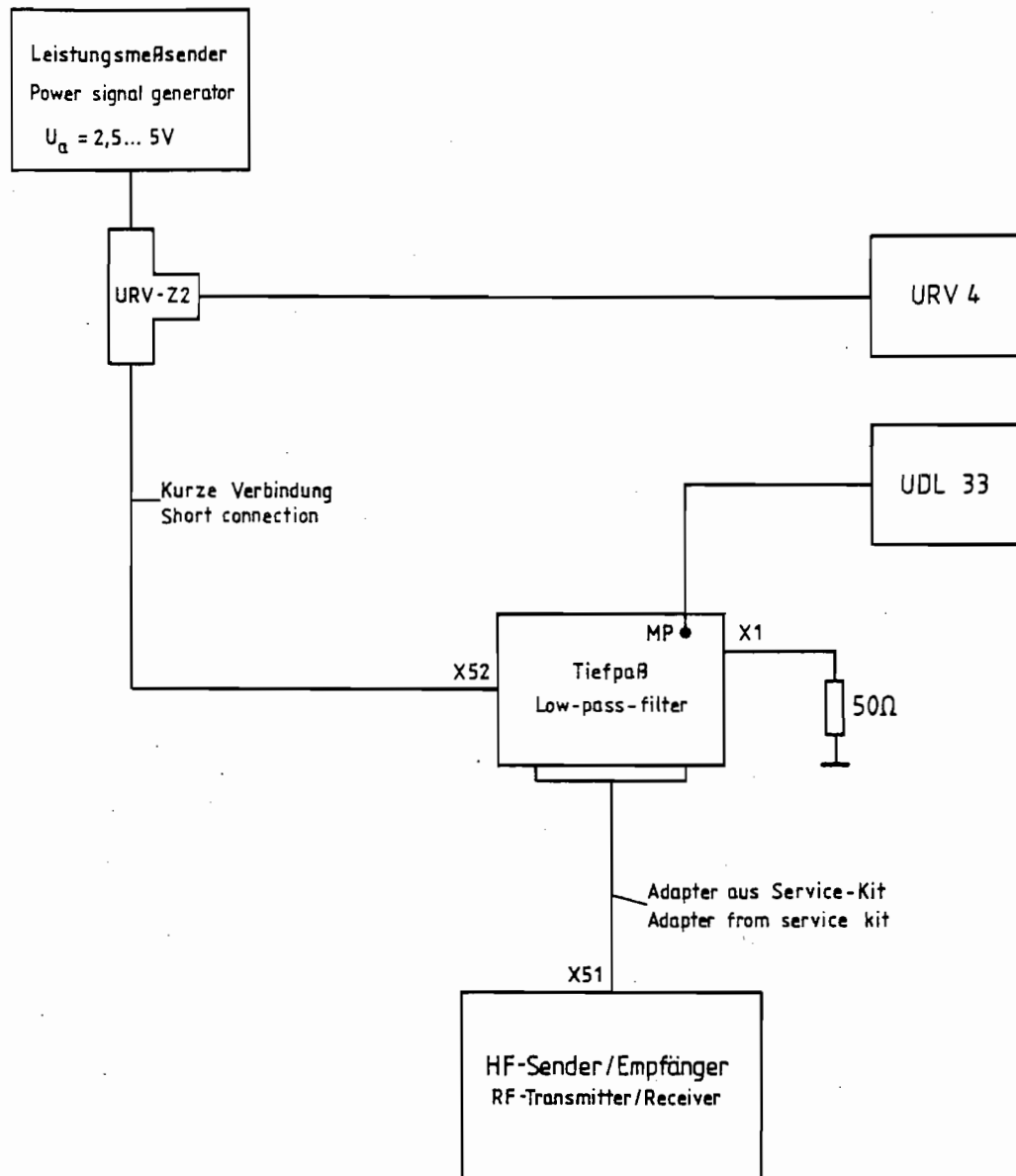
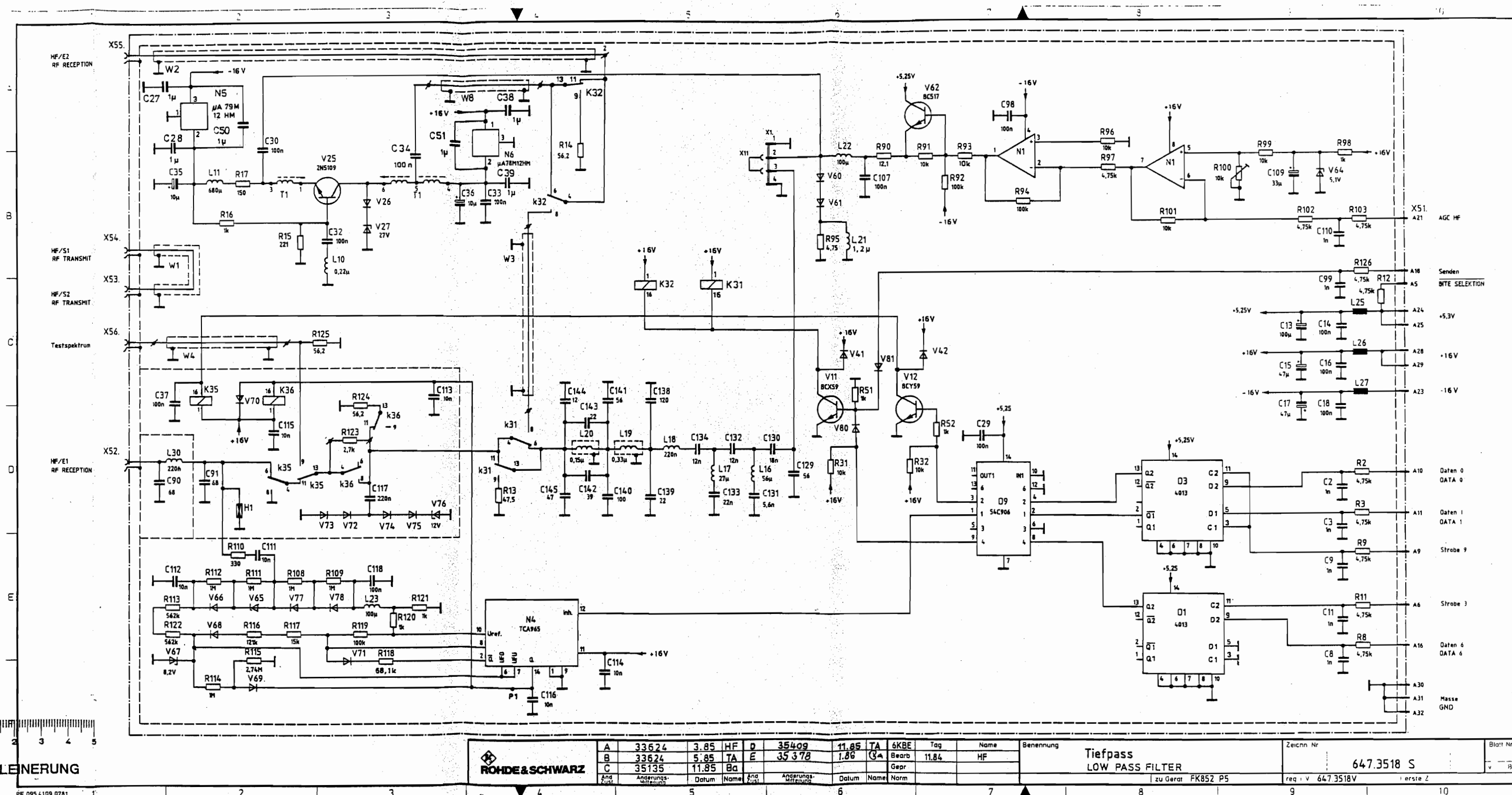


Fig. 6.4 Test Set-up for the Overvoltage Protection Test



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Schalteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans



647.3518.01 SA BL 1-

**ROHDE & SCHWARZ**

ÄZ

Datum
DateSchaltteilliste für
Parts list forED TIEFPASS
LOW-PASS FILTERSachnummer
Stock No.

647.3530.01 SA

Blatt
Page

1

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

.	VARIANTENERKL. / VERSIONS VAR 02 = GRUNDAUSFUEHRUNG MOD 02 = BASIC MODEL		
C2	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB M39014/01-1397	CC 068.4047	
C3	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB M39014/01-1397	CC 068.4047.	
C8	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB M39014/01-1397	CC 068.4047	
C9	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB M39014/01-1397	CC 068.4047	
C11	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB M39014/01-1397	CC 068.4047	
C13	CE 100UF-10+50% 16V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00CB 310 D	CE 006.7165	
C14	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C15	CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 247 G	CE 006.7142	
C16	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C17	CE 47UF-10+50% 40V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 247 G	CE 006.7142	
C18	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C27	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB M39014/02-1403	CC 084.5538	
C28	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB M39014/02-1403	CC 084.5538	
C29	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C30	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C32	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C33	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	

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07	1185			
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in
C34	CC 100NF+-10%50V5K1200VIE CAPACITOR		CC 084.5350	
C35	UNION CARB M39014/01-1433 CE 10 UF+-20%25V 7X 5X11 ELECTROLYTIC CAPACITOR		CE 023.5980	
C36	ERO-TANTAL ETR3-10/25 CE 10 UF+-20%25V 7X 5X11 ELECTROLYTIC CAPACITOR		CE 023.5980	
C37	ERO-TANTAL ETR3-10/25 CC 100NF+-10%50V5K1200VIE CAPACITOR		CC 084.5350	
C38	UNION CARB M39014/01-1433 CC 1UF+-10%50V7K1200VIEL CAPACITOR		CC 084.5538	
C39	UNION CARB M39014/02-1403 CC 1UF+-10%50V7K1200VIEL CAPACITOR		CC 084.5538	
C50	UNION CARB M39014/02-1403 CC 1UF+-10%50V7K1200VIEL CAPACITOR		CC 084.5538	
C51	UNION CARB M39014/02-1403 CC 1UF+-10%50V7K1200VIEL CAPACITOR		CC 084.5538	
C90	UNION CARB M39014/02-1403 CG 68PF+-5%TKF14X5X3 250V CAPACITOR		CG 417.8426	
C91	JAHRE 49.46/68/5/250 CG 68PF+-5%TKF14X5X3 250V CAPACITOR		CG 417.8426	
C98	JAHRE 49.46/68/5/250 CC 100NF+-10%50V5K1200VIE CAPACITOR		CC 084.5350	
C99	UNION CARB M39014/01-1433 CC 1NF+-10%200V5K1200VIEL CAPACITOR		CC 068.4047	
C107	UNION CARB M39014/01-1397 CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR		CC 068.4060	
C109	UNION CARB M39014/01-1415 CE 33 UF+-20%10V 7X 5X11 ELECTROLYTIC CAPACITOR		CE 087.0343	
C110	ERO-TANTAL TA-ELKOETR3-33/10 CC 1NF+-10%200V5K1200VIEL CAPACITOR		CC 068.4047	
C111	UNION CARB M39014/01-1397 CK 10NF+-20%630V QUADER CAPACITOR		CK 024.7763	
C112	ROEDERST MKT1822-310/6 CK 10NF+-20%630V QUADER CAPACITOR		CK 024.7763	
C113	ROEDERST MKT1822-310/6 CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR		CC 068.4060	
BIS/TO		UNION CARB M39014/01-1415		
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C116			
C117	CK 220NF+-20%100V QUADER PLASTIC-FOIL CAPACITOR ROEDERST MKT1822-422/0	CK 006.5056	
C118	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
C129	CC 56PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C560J2G1CA	CC 060.0742	
C130	CK 18NF+-1%63V7,50AX13 KP CAPACITOR SIEMENS B33531-A5183-F	CK 099.1933	
C131	CC 5,6NF+- 5%100V NPO VIE CAPACITOR ERIE 8737-100-COG-5,6NF-J	CC 060.0988	
C132	CK 12NF+-1%63V7,5QUX13 KP CAPACITOR SIEMENS B33531-A5123-F	CK 340.6760	
C133	CK 22NF+-1%63V8X8X11 KP CAPACITOR SIEMENS B33531-A5223-F	CK 213.4553	
C134	CK 12NF+-1%63V7,5QUX13 KP CAPACITOR SIEMENS B33531-A5123-F	CK 340.6760	
C138	CC 120PF+- 5%100V NPO VIE CERAMIC CAPACITOR UNIONCARB C052C121J2G1CA	CC 060.0788	
C139	CC 22PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C220J2G1CA	CC 060.0694	
C140	CC 100PF+- 5%100V NPO VIE CERAMIC CAPACITOR UNIONCARB C052C101J2G1CA	CC 060.0771	
C141	CC 56PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C560J2G1CA	CC 060.0742	
C142	CC 39PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C390J2G1CA	CC 060.0720	
C143	CC 22PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C220J2G1CA	CC 060.0694	
C144	CC 12PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C120J2G1CA	CC 060.0665	
C145	CC 47PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C470J2G1CA	CC 060.0736	
D1	BL CD4013BF 2XD FLIPFL FLIPFLOP RCA CD4013BF	BL 086.8034	
D3	BL CD4013BF 2XD FLIPFL FLIPFLOP RCA CD4013BF	BL 086.8034	
		647.3530.01 SA	BL 3+

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Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in
D9	BL MM54C906J 6XN-CH.BUFF N-CHANNEL BUFFER OD NSC MM54C906J		BL 418.0264	
H1	SU RD9,7X6 M.DRAHTANSCHL. SPARK-GAP VOLTAGE DISCHAR SIEMENS B1-A230		SU 210.6161	
K31	SN GEPOLT 2XU 12V RELAY		645.6810	
	SDS DS2E-DC12V			
K32	SN GEPOLT 2XU 12V RELAY		645.6810	
	SDS DS2E-DC12V			
K35	SN GEPOLT 2XU 12V RELAY		645.6810	
	SDS DS2E-DC12V			
K36	SN GEPOLT 2XU 12V RELAY		645.6810	
	SDS DS2E-DC12V			
L10	LD 0,22UH10%0,140HM1,045A CHOKE		LD 067.2786	
	DELEVAN DROSSEL1025-04			
L11	LD 680 UH10%60,00HMO,030A CHOKE		LD 067.3201	
	DELEVAN DROSSEL1025-88			
L16	LD 56UH+-2% 7,2RDX14 HF-COIL		645.7445	
	JAHRE 74.11-56R0 TOL.+-2%			
L17	LD 27UH+-2%0,3A 2,75 OHM CHOKE		LD 567.3987	
	JAHRE 74.11-27R0G			
L18	LD 0,22UH+-2% 2A0,035 OHM CHOKE		523.7770	
	JAHRE 74.11-R220G			
L19	LD 0,33UH+-2% 2A 0,0650HM CHOKE		LD 567.4019	
	JAHRE 74.11-R330G			
L20	LD 0,15UH+-2% 3,0A0,030HM CHOKE		LD 567.4002	
	JAHRE 74.11-R150G			
L21	LD 1,20UH10%0,180HMO,620A CHOKE		LD 067.2870	
	DELEVAN DROSSEL1025-22			
L22	LD 100 UH10%8,000HMO,084A CHOKE		LD 067.3101	
	DELEVAN DROSSEL1025-68			
L23	LD 100 UH10%8,000HMO,084A CHOKE		LD 067.3101	
	DELEVAN DROSSEL1025-68			
L25	LD 150UH BEI 0,17A 6,20HM CHOKE		LD 026.4055	
	JAHRE 72.10-1500K			
L26	LD 150UH BEI 0,17A 6,20HM CHOKE		LD 026.4055	
	JAHRE 72.10-1500K			
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
L27	LD 150UH BEI 0,17A 6,20HM CHOKE	LD 026.4055	
L30	JAHRE 72.10-1500K LD SPULE COIL	647.0831	
N1	BO MC1558JG 2X OPAMP OPERATIONAL AMPLIFIER	BO 275.0816	
N4	NSC LM1558J BO TCA965 FENSTER-DISKIM DISCRIMINATOR	BO 279.2213	
N5	SIEMENS TCA965 BO UA79M12HM-12VOA5 VREGL VOLTAGE REGULATOR	645.7739	
N6	FAIRCHILD MA79M12AM BO UA78M12HM+12VOA5 VREGL VOLTAGE REGULATOR	BO 580.9362	
R2	FAIRCHILD MA78M12HM RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R3	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R8	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R9	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R11	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R12	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R13	DRALORIC SMA0207/4,75K-F-D RL 0,35W 47,5 OHM+-1%TK50 RESISTOR	RL 082.9507	
R14	DRALORIC SMA0207/47,5OHM-F-D RL 0,35W 56,2 OHM+-1%TK50 RESISTOR	RL 082.9571	
R15	DRALORIC SMA0207/56,2OHM-F-D RL 0,35W 221 OHM+-1%TK50 RESISTOR	RL 083.0084	
R16	DRALORIC SMA0207/221OHM-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	
R17	DRALORIC SMA0207/1K-F-C RD 1,2W 150 OHM+-3% WIRE WOUND RESISTOR	RD 087.5345	
R31	SAGE 1000S150OHM+3% 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
R32	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R51	DRALORIC SMA0207/10K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	
R52	DRALORIC SMA0207/1K-F-C RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	
R90	DRALORIC SMA0207/1K-F-C RL 0,35W 12,10 OHM+-1%TK50 RESISTOR	RL 082.8930	
R91	DRALORIC SMA0207/12,10HM-F-D RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R92	DRALORIC SMA0207/10K-F-D RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	
R93	DRALORIC SMA0207/100K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R94	DRALORIC SMA0207/10K-F-D RL 0,35W 100KOHM+-1%TK50 RESISTOR	RL 082.1764	
R95	DRALORIC SMA0207/100K-F-C RL 0,35W 4,75 OHM+-1%TK50 METALFILMRESISTOR	RL 099.8021	
R96	RESISTA MK2 4,75 OHM 1% TK50 RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R97	DRALORIC SMA0207/10K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R98	DRALORIC SMA0207/4,75K-F-D RL 0,35W 1KOHM+-1%TK50 RESISTOR	RL 082.2160	
R99	DRALORIC SMA0207/1K-F-C RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R100	DRALORIC SMA0207/10K-F-D RS 0,5W 10KOHM+-10%10X10X5 CERMET POTENTIOMETER T	RS 247.7903	
R101	BOURNS 3386F-1-103 RL 0,35W 10,0KOHM+-1%TK50 RESISTOR	RL 083.1297	
R102	DRALORIC SMA0207/10K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R103	DRALORIC SMA0207/4,75K-F-D RL 0,35W 4,75KOHM+-1%TK50 RESISTOR	RL 083.1097	
R108	DRALORIC SMA0207/4,75K-F-D RL 0,35W 1MOHM+-1%TK50 RESISTOR	RL 082.7862	
R109	DRALORIC SMA0207/1M-F-D RL 0,35W 1MOHM+-1%TK50 RESISTOR	RL 082.7862	
	DRALORIC SMA0207/1M-F-D		

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R110	RF 0,5W 330 OHM+-5% DEPOS.-CARBON RESISTOR RESISTA SK4/330OHM5%	RF 007.1319	
R111	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R112	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R113	RL 0,35W 562 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/562K-F-C	RL 083.2664	
R114	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R115	RL 0,35W 2.74MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 2.74MOHM+-1%TK50	RL 099.8980	
R116	RL 0,35W 121KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/121K-F-C	RL 083.2070	
R117	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400	
R118	RL 0,35W 68,1KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/68,1K-F-C	RL 082.2602	
R119	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R120	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R121	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R122	RL 0,35W 562 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/562K-F-C	RL 083.2664	
R123	RD 10W 2,7KOHM+-3%IND.ARM WIRE WOUND RESISTOR DALE NH-10 2,7KOHM 3%	645.7416	
R124	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R125	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R126	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
T1	LU UEBERTRAGER TRANSFORMER	647.0825	
V11	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX	AK 010.5163	

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	07	1185		647.3530.01 SA	8
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in
V12	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V25	AK BFW16A NPN 40V >1GHZ TRANSISTOR VALVO BFW16A			AK 010.4644	
V26	AD BAV21 250V 0,25A UDI DIODE INTERMETAL BAV21			AD 082.6837	
V27	AE BZX55/B27 0,5W Z-DI ZENER DIODE VALVO BZX55/B27			AE 615.9085	
V41	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V42	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V60	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55			645.7345	
V61	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55			645.7345	
V62	AK BC517 NPN 30V DARL. TRANSISTOR TEXAS BC517			AK 282.2133	
V64	AE BZX55/B5V1 0,5W Z-DI ZENER DIODE VALVO BZX55/B5V1			AE 262.5837	
V65	AD BAV21 250V 0,25A UDI DIODE INTERMETAL BAV21			AD 082.6837	
V66	AD BAV21 250V 0,25A UDI DIODE INTERMETAL BAV21			AD 082.6837	
V67	AE BZX55/B8V2 0,5W Z-DI ZENER DIODE VALVO BZX55/B8V2			AE 012.2178	
V68	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
BIS/TO					
V71					
V72	AD BAV10 60V 0,3 A UDI DIODE VALVO BAV10			AD 012.9437	
BIS/TO					
V75					
V76	AE BZT03/C12 3.2W Z-DI ZENER DIODE VALVO BZT03/C12			AE 007.4182	
V77	AD BAV21 250V 0,25A UDI DIODE INTERMETAL BAV21			AD 082.6837	
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Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

V78

AD BAV21 250V 0,25A UDI
DIODE

AD 082.6837

V80

INTERMETAL BAV21
AD 1N4448 75V 0,15A UDI
DIODE

AD 012.0700

V81

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

AD 012.0700

W1

DX KABEL

647.3918

W2

DX KABEL

647.3924

W3

DX KABEL

647.3930

W4

DX KABEL

647.3947

W8

DX KABEL

647.3953

X1

FP INDIREKT. STECKERL. 36P.
PIN CONNECTOR
BERG 75160-102-36
4-POLIG/4 PINS

FP 242.3600

X11

FP KURZSCHLUSSBUCHSE
SHORTING PLUG
PK 452-70302

FP 491.7042

X51

FP STECKERLEISTE 32POL.
MULTIPOINT CONNECTOR
PANDUIT 100-232-033/999

FP 514.4550

X52

FJ EINBAUSTECKER SYST. SMB
FIXED CONNECTOR
ROSENBERG 59S601-200D2

FJ 063.5116

BIS/TO

X56

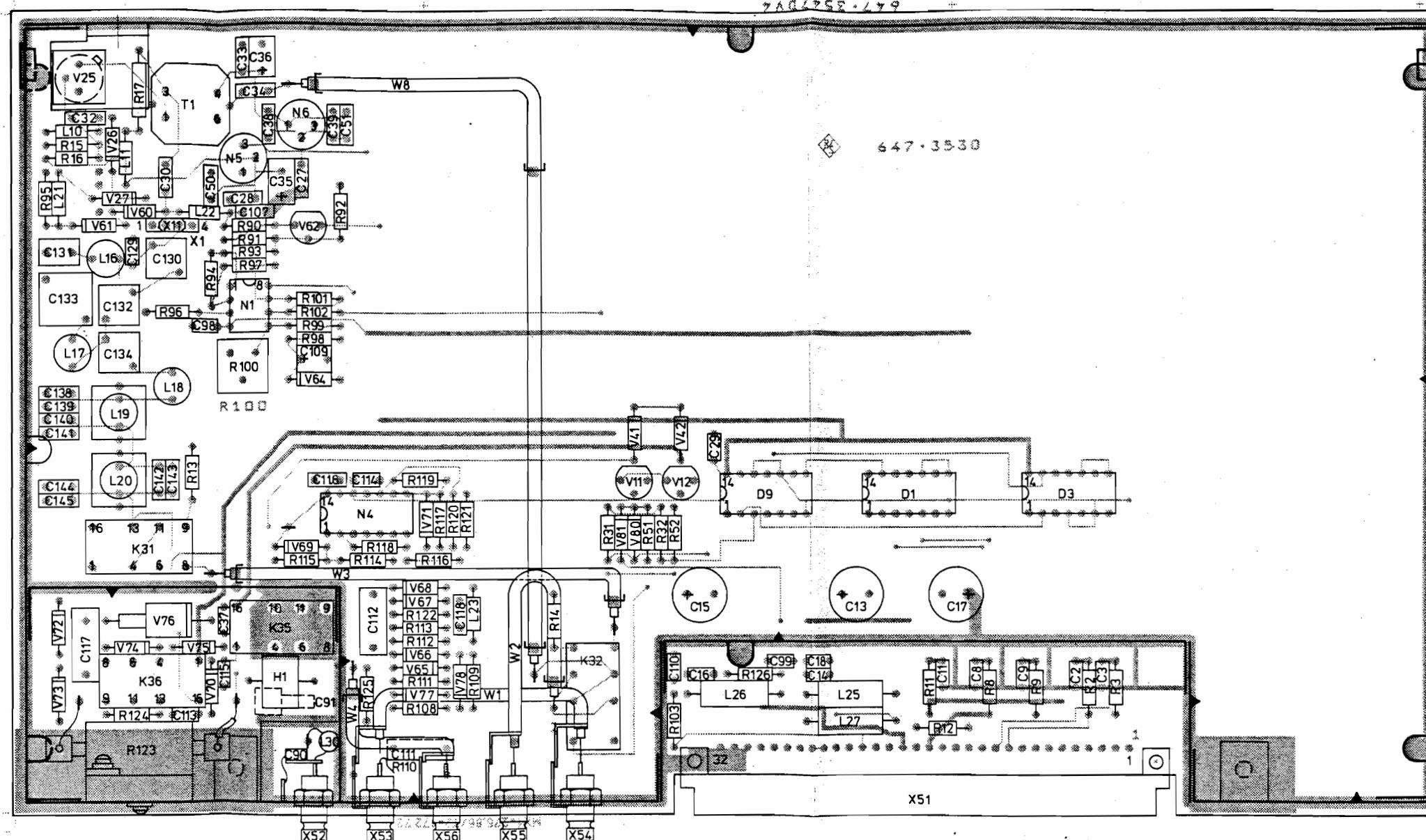
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Ansicht und Leitungsführung Bauteilseite
View of tracks on component side

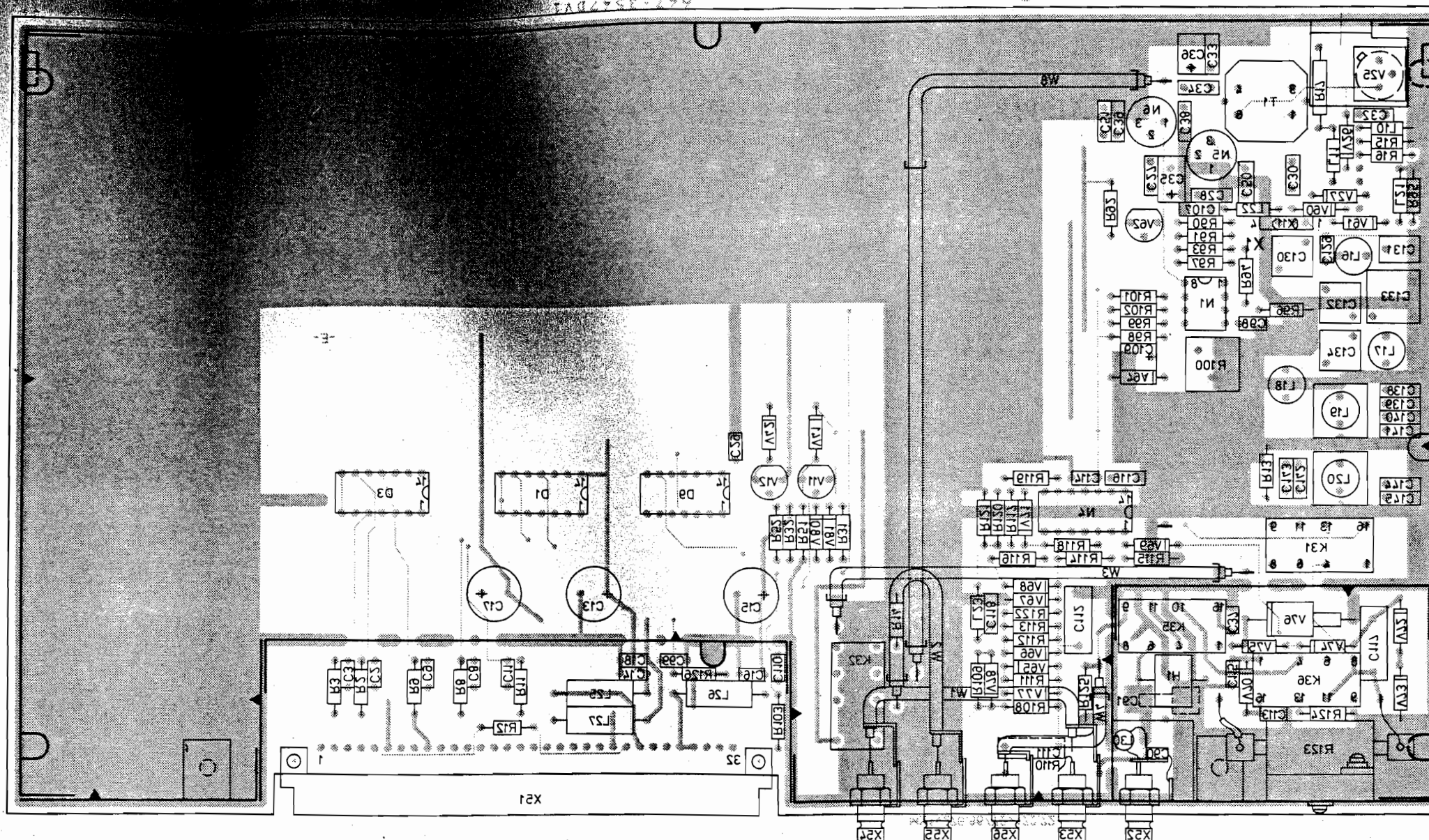


Variantenerklärung siehe SA
EXPLANATION OF MODELS
SEE PARTS LIST

G	354 09	11.85	TA	Maße ohne Toleranzangabe	Maßstab 1 : 1	Benennung	Z
H	35714	02.86	WI				
				6KBE	Tag	Name	Tiefpaß LOW - PASS FILTER
				Bearb.	11.85	TA	
				Gepr.			
				Norm			
				</			



Ansicht
View of



Variantenerklärung siehe SA
EXPLANATION OF MODELS
SEE PARTS LIST

G	35409	11.85	TA	Maße ohne Toleranzangabe	Maßstab 1 : 1	Halbzeug, Werkstoff	Benennung	Z
H	35714	02.86	WI					
				6KBE	Tag	Name	Tiefpaß LOW - PASS FILTER	
				Beord.	11.85	TA		
				Gepr.				
				Norm				
				ROHDE & SCHWARZ			Zeichn.-Nr.	Blatt-Nr.
							647.3530	3
And	Anderungs-	Tag	Name	zu Gerät FK 852 P5			reg. v. 647.3518 V	erste Z. 647.3518
Zust.	Mitteilung							v. Bl.

HF / IF UNIT
GX 085P1

Repair Manual
Part 6: Repair

- 6.1 -

6. Repair

See circuit diagram, parts lists and components layouts in the appendix to this repair manual (list on page 0.3).

6.1 Preliminary Remarks

The repair of HF/IF Unit GX 085P1 consists of troubleshooting and fault elimination, of measurements, alignments and functional checks, of replacing components and of a final test.

All the information required for repairing the HF/IF unit down to component level is given in this part.

6.1.1 Troubleshooting Instructions

Any fault that occurs should be localized by checking the nominal values on the testpoints with the aid of the troubleshooting flowcharts in 6.3..

6.1.2 Restoring the Nominal Characteristics

Any component that is definitely proved to be defective - through use of the troubleshooting flowcharts or by performing the measurements, alignments and functional checks - should only be replaced for a component that meets the specifications given in the parts lists in the appendix to this repair manual.

Only in this way can the technical data be guaranteed that are given in part 1 of the user manual.

Once components have been replaced, it is absolutely essential that the final

test of the HF/IF unit be performed as detailed in 6.7.

6.1.3 Alignment

After manufacture and before going into the test department the HF/IF unit is artificially aged according to requirement XVN 016.

This ensures high stability of the nominal values once they have been set. Should non-aged components be used in the course of repair, a certain drift of individual values has to be expected.

For this reason it is advisable to carry out an occasional check of the values stated in 6.4.

Note:

Not all of the resistors labelled as trimming values in the circuit diagram are required for alignment. They are in the process of being replaced by fixed resistors.

6.1.4 Spare Parts

All components and modules are subjected to strict quality control before they are installed in the HF/IF unit.

(Continuation)---

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n--(Continuation) Spare Parts

For components from outside suppliers, e.g. resistors, capacitors, diodes, transistors and integrated through to highly integrated circuits, R&S have set down their own delivery specifications for the purpose of ensuring maximum reliability. For this reason we recommend that only original spare parts be used as replacements for defective components.

When ordering a spare part, please state the following:

type, ordering code and serial number of equipment, identity number of parts list and designation plus stock number of component concerned.

All of these details are to be found in the circuit diagram, parts lists and components layouts attached to this manual.

6.1.5 Important User Information

The following points are important when carrying out repairs. These are mentioned to avoid any misunderstandings.

- o All measurements on the HF/IF unit have to be performed with the covers screwed down in place; if necessary, a special test cover has to be produced for this purpose.
- o With HF measurements ensure that cables and connections are of the right characteristic impedance and that the connecting leads are as short as possible.
- o All measurements are referred to ground unless stated otherwise.
- o The abbreviations that appear in the test, e.g. X6.a1 and D7.1, are to be interpreted as follows:

X6.a1 connector X6, pin a1

D7.1 integrated circuit, pin 1

- o All the components mentioned in the following text and diagrams are shown in circuit diagram 651.8310.01S, pages 1 to 4. Consequently the circuit diagram will not be repeatedly mentioned in the instructions, instead the appropriate page will be referred to.

- o For all alignments and measurements the HF/IF unit has to be supplied with the operating voltages given in the circuit diagram.

- o Disconnect the operating voltage before undertaking any soldering work on the module or a subassembly of it.

C A U T I O N ! C M O S ! ! !

- o Among the components installed in the HF/IF unit there are MOS, MOSFET and CMOS devices. Devices of this kind are extremely sensitive to high extraneous voltages. Static discharge can produce very high voltage spikes, which are capable of destroying these devices. Electrostatic charge is only felt with voltages of more than 3000 V. Sparks are only produced upwards of 5000 V. Less than 10 % of these values is sufficient to destroy semi-conductors, however, or to degrade their parameters, e.g. bipolar transistors (400 V), ECL and Schottky (300 V), VMOS and CMOS (150 V), MOSFETs (100 to 200 V). A person sitting at a workbench alone can produce approx. 500 V of static.

(Continuation)---

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---(Continuation) Important User
Information

For this reason, when work is being carried out in the vicinity of these devices, i.e. unless a special CMOS workstation is available, the following minimum requirements should be observed:

- o conductive bench and floor coverings
- o chair or stool with conductive covering
- o grounded, metallic work-surface, conductive wrist-straps with a resistance of $> 200 \text{ kohms}$ $< 1 \text{ Mohm}$ plus an insulated lead and plug
- o soldering iron with safety grounding

- o all conductive surfaces, wrist-straps and work-surfaces must be interconnected by insulated leads
- o supply voltages must be disconnected before any soldering is undertaken

6.2 Test Equipment and Special Tools

The test equipment and special tools specified in the following list will be required for performing the repairs described in this part of the manual.

Equivalent items of test equipment can be used provided their technical data are as good as or better than those stated here.

6.2.1 Test Equipment List

Test equipment, required technical data	Recommended R&S unit	Ordering code
Polyskop 0 to 30 MHz with logarithmic amplifier demodulator	SWOB 5 SWOB 5-E3 SWOB 5-Z1	333.0019.52 349.3512.02 333.7513.52
Signal generator 10 Hz to 140 MHz	SMK	348.0010.02
Radio test assembly	SMFP 2	332.0015.53
HF millivoltmeter with HF insertion unit, 50 ohms, 10 V termination, 50 ohms	URV 4 URV-Z2 RNA	292.5012.03 288.8010.55 272.4510.50
Noise generator 1 Hz to 100 MHz	SKTU	100.4688.50
Digital multimeter	UDL 33	388.8011.02
Resistor 1 kohm		
Service kit	KA 085C1	.699.4015.02

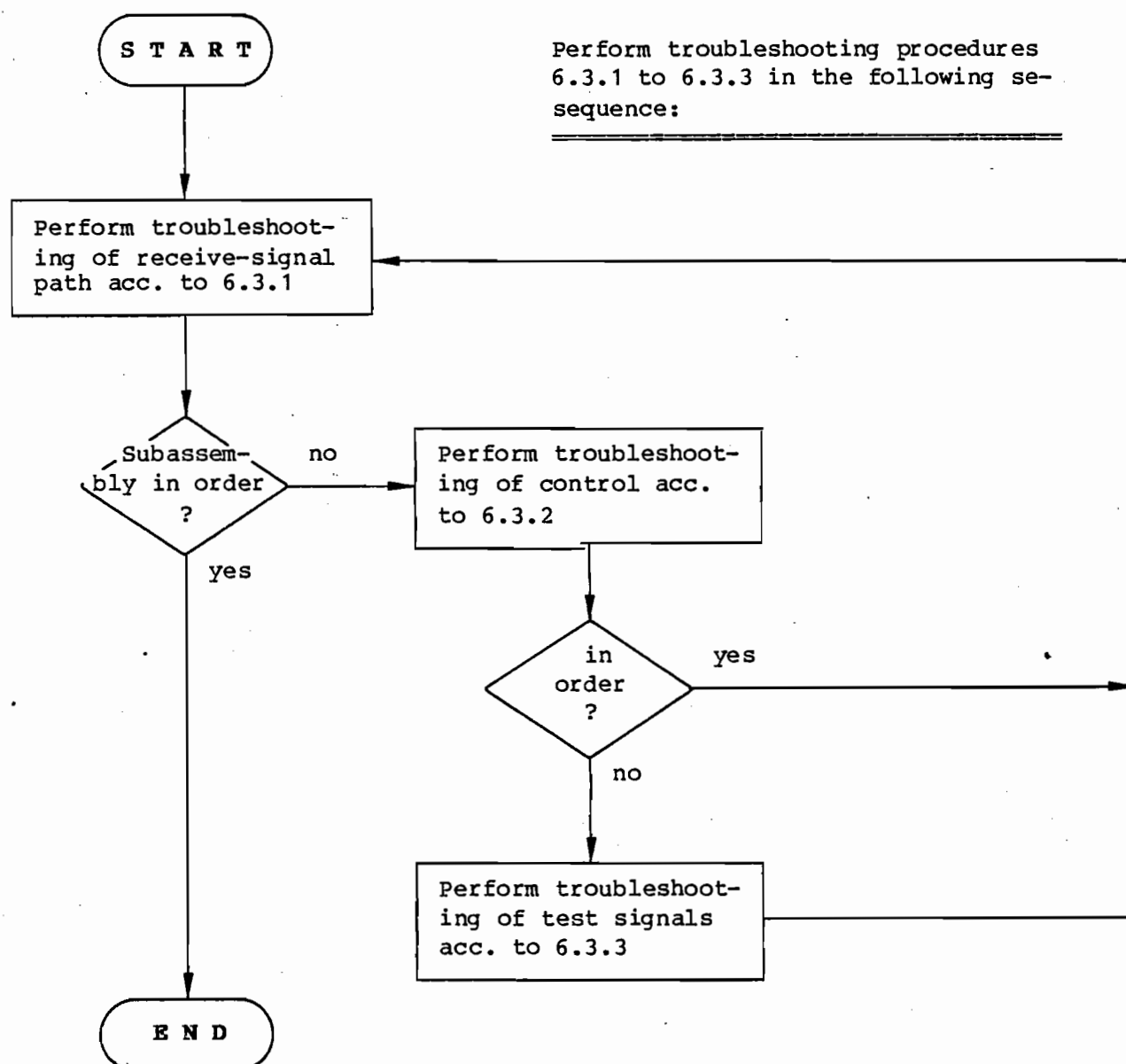
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6.3 Troubleshooting Flowcharts

The troubleshooting is based on the following premises:

- o the HF/IF unit has been pinpointed as defective
- o the HF/IF unit is adapted in the receiver
- o the operating voltages are present



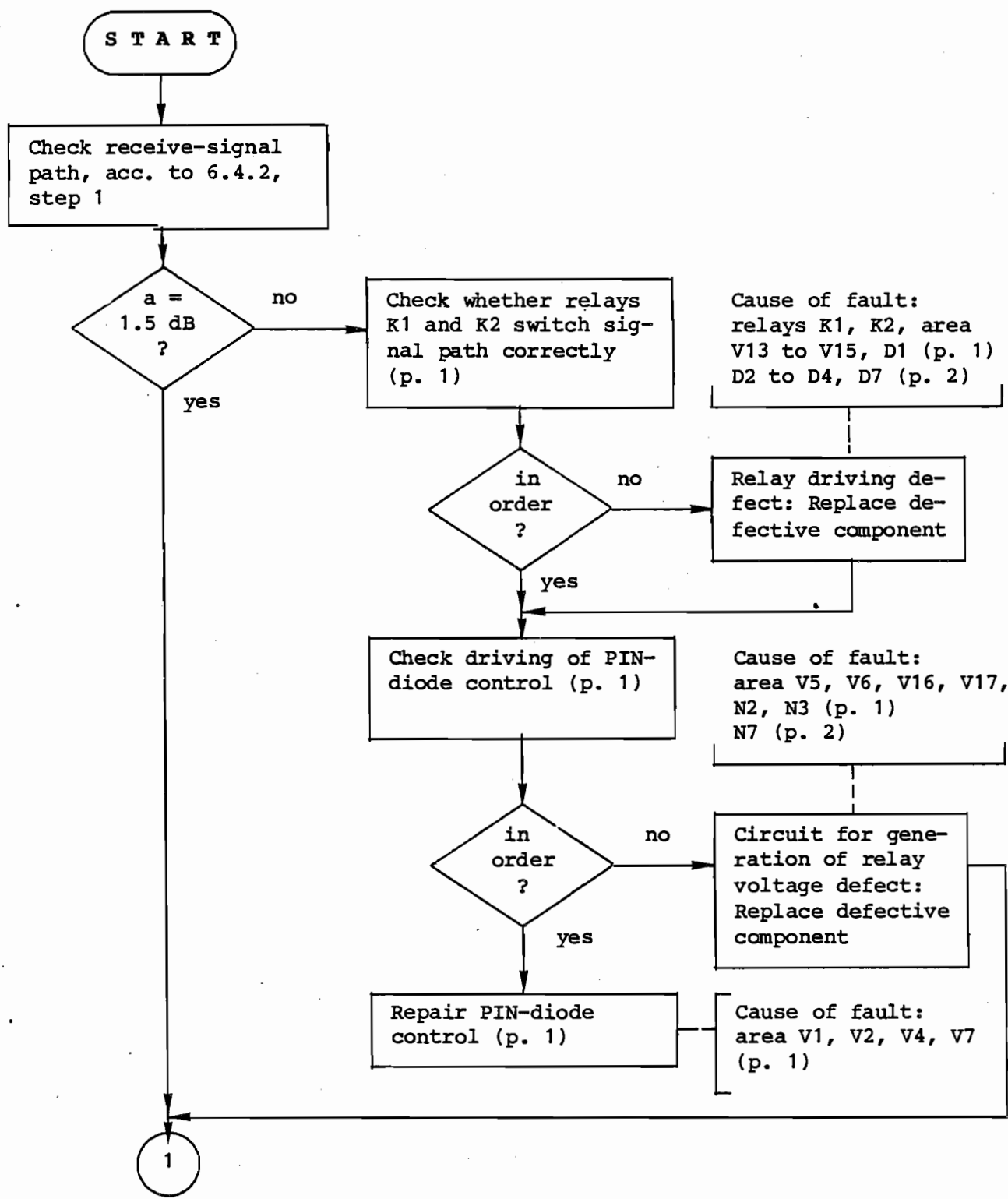
6.3.1 Troubleshooting: Receive-signal Path

(See Circuit Diagram 651.8310.01S, pages 1 to 4)

The troubleshooting described here clarifies the possible causes of degraded reception.

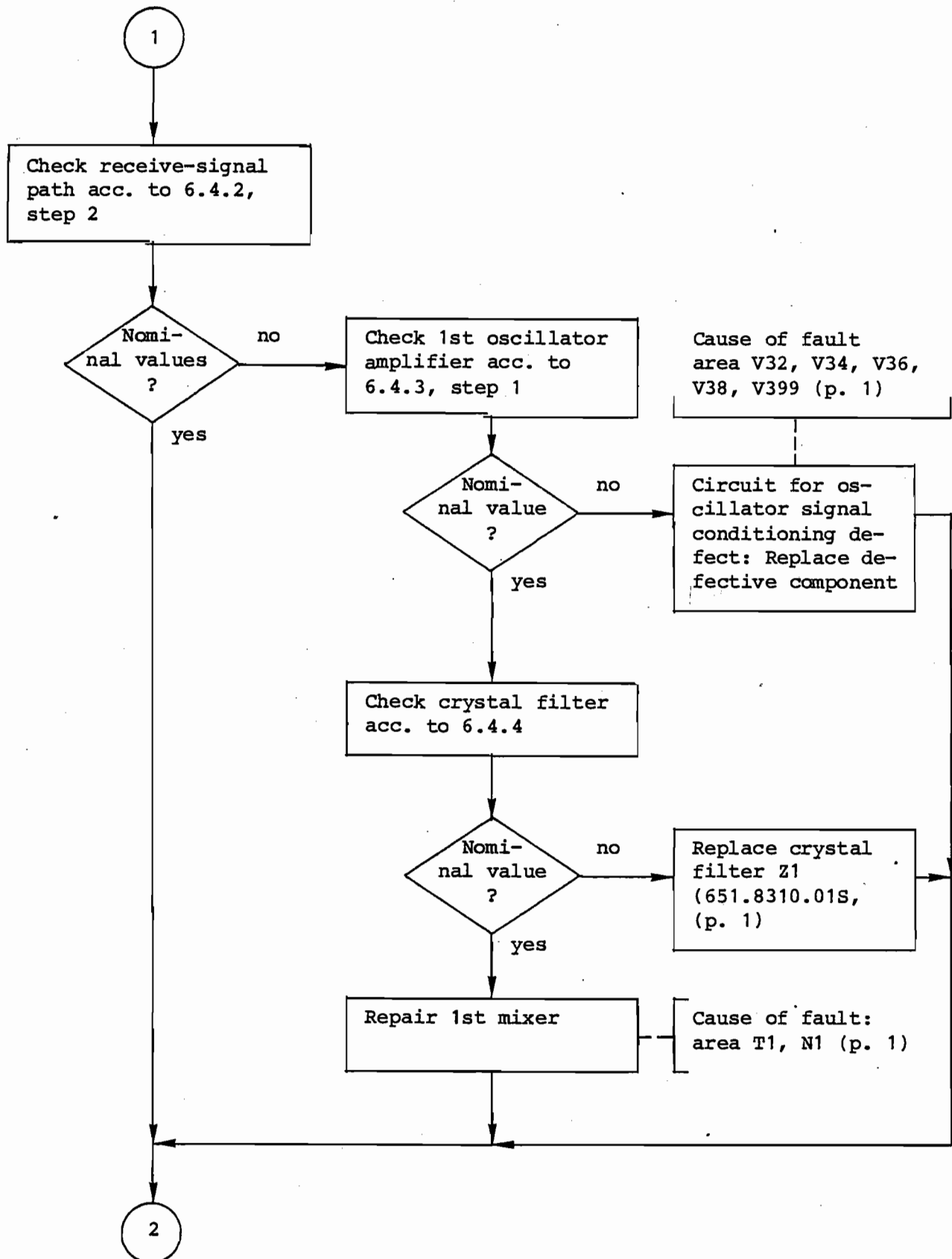
Requirements for troubleshooting:

- o HF and IF gain control are functioning



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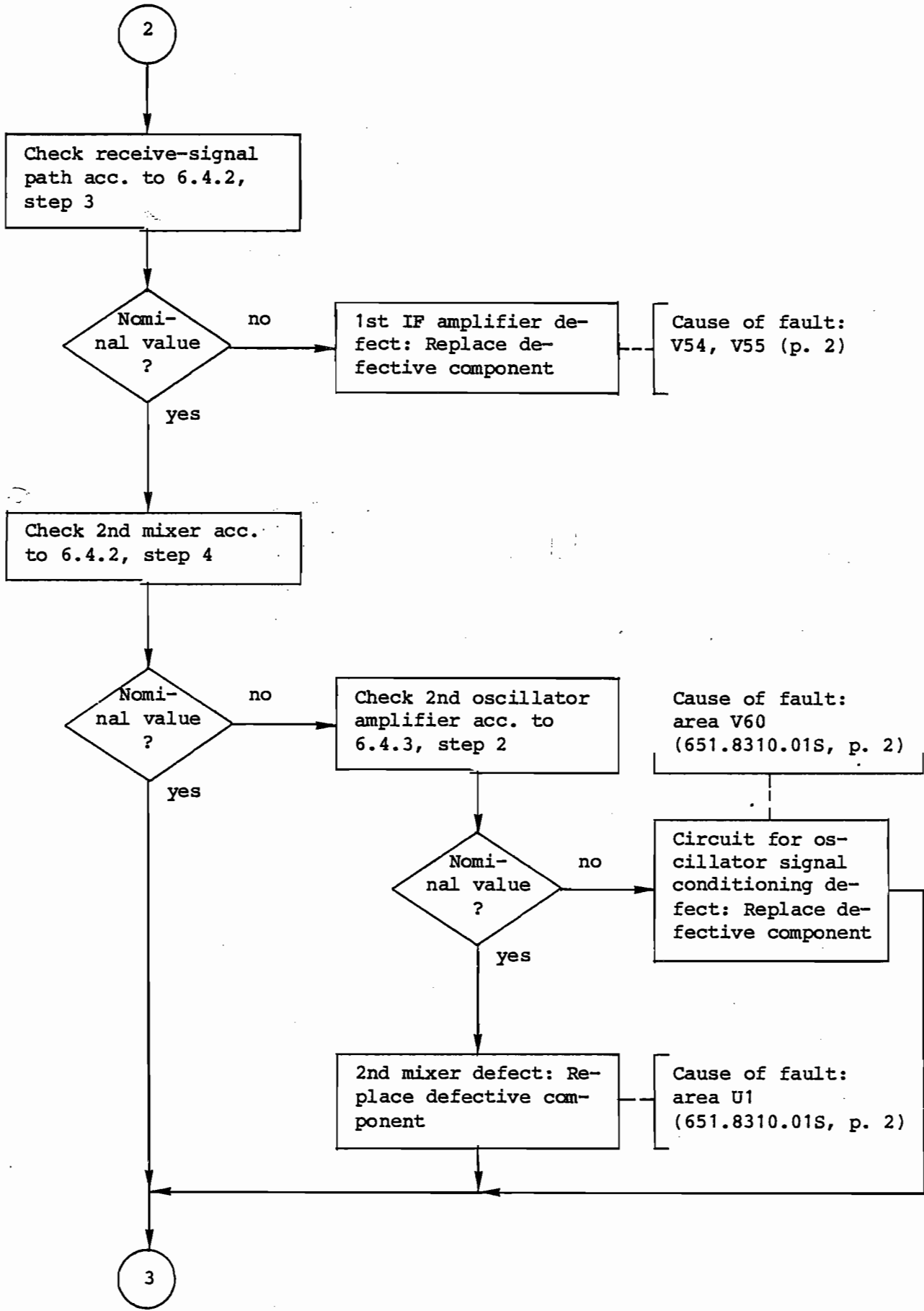
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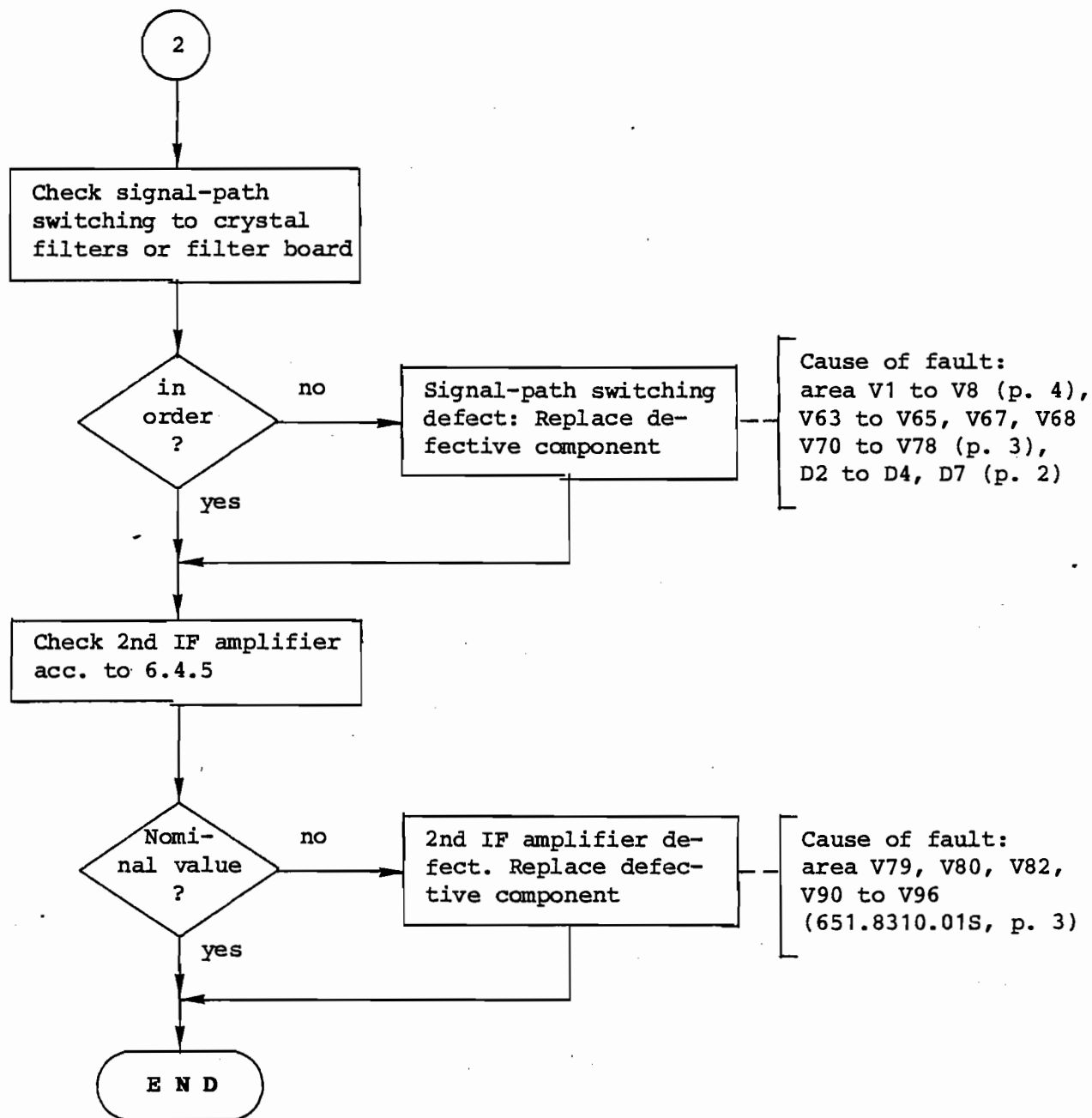
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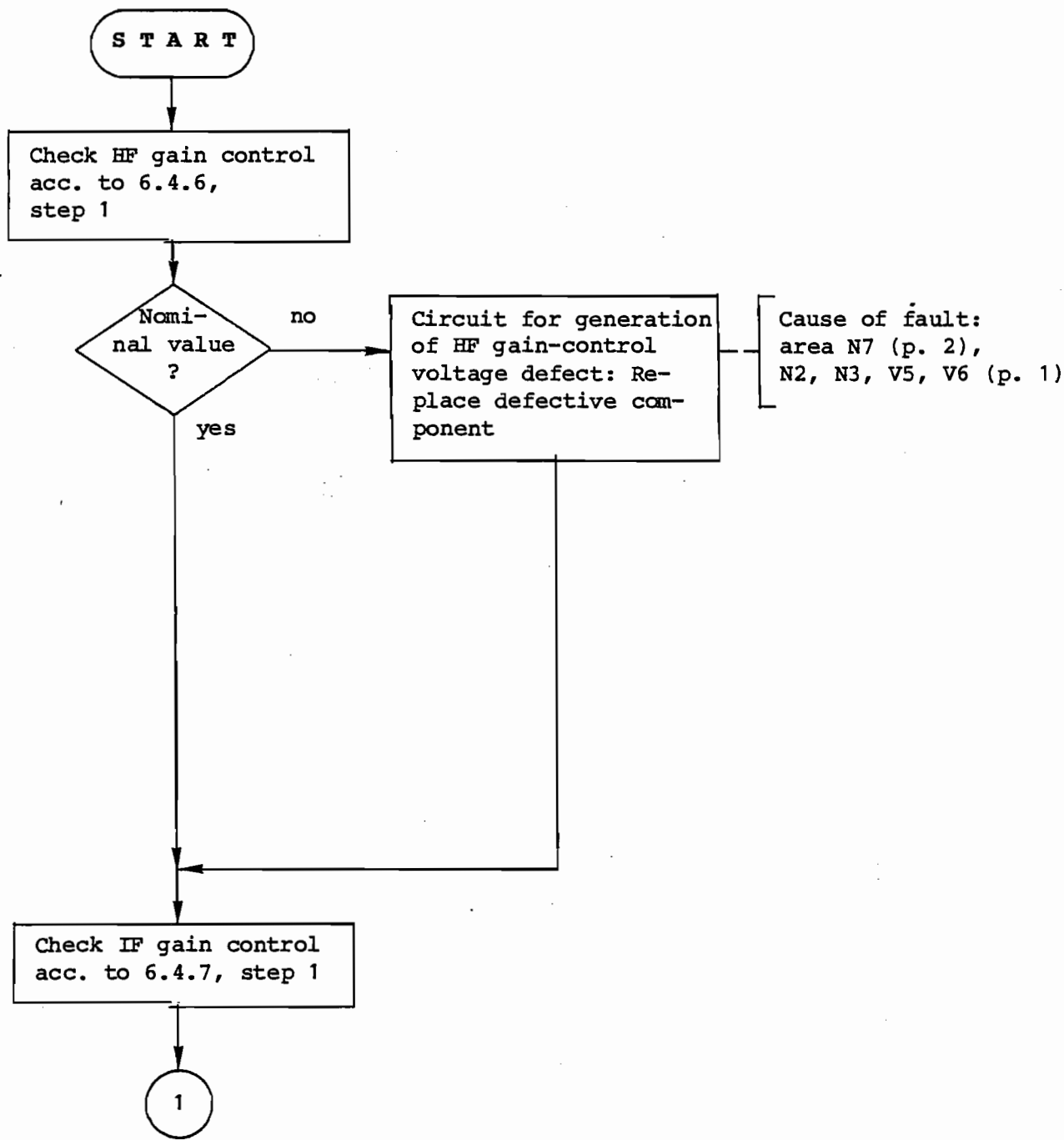
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6.3.2 Troubleshooting: HF Gain Control

The troubleshooting described here clarifies the possible causes of degraded reception through a faulty control.

Requirements for troubleshooting:

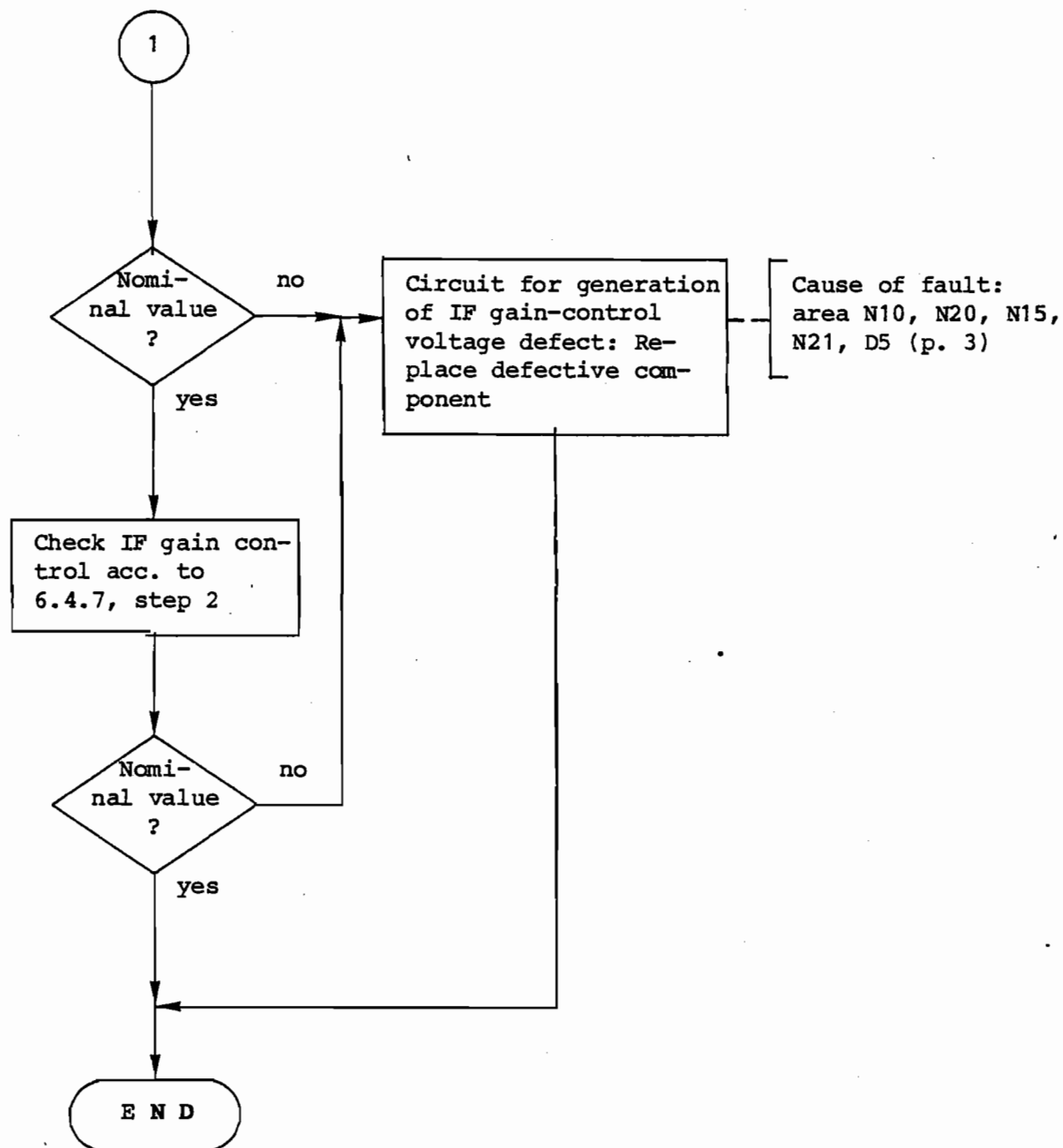
- o IF amplifier and mixer are serviceable



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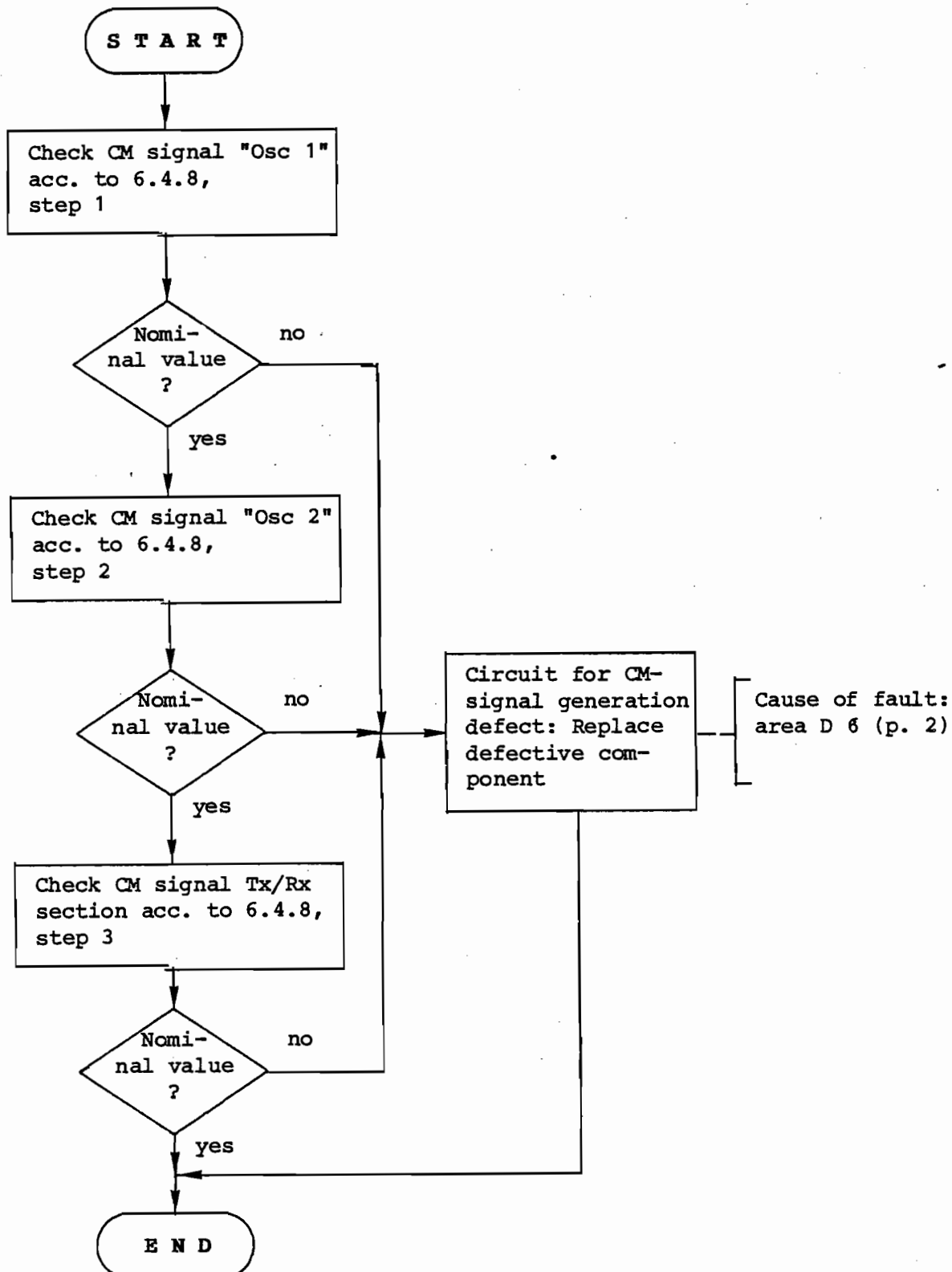


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6.3.3 Troubleshooting: Test Signals

The troubleshooting described here clarifies the possible causes of an error message on the receiver because of a faulty CM-signal generation.



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6.4 Measurements and Functional Tests

The measurements and functional tests that are described below are the more detailed procedures to the instructions given in condensed form in the troubleshooting flowcharts. Consequently one will usually undertake these measurements and functional tests by branching out of the troubleshooting flowchart at a particular point. When the measurement, etc. has been performed, return to the troubleshooting flowchart at the same point where it was left.

If a fault has been clearly identified beforehand, however, one can of course commence with one of these measurements or functional tests directly.

6.4.1 Compiled Measured Values

IF output level	170 to 260 mV
Noise figure	≤ 16 dB
Image-frequency rejection of 1st IF amplifier	≥ 10 dB
CW modulation	
Bandwidth	≥ 300 Hz
Ripple	≤ 3 dB
Selectivity at ± 375 Hz	≥ 60 dB
AM modulation	
Bandwidth	≥ 2400 Hz
Ripple	≤ 3 dB
Selectivity at ± 1.8 kHz	≥ 60 dB

6.4.2 Test of Receive-signal Path

1. Withdraw jumper X31 (p. 1).

Arrange test set-up acc. to Fig. 6.1.

Set $f = 200$ kHz on receiver.

Measure attenuation in range 10 to 400 kHz on connector X21.2/.1 (p. 1).

Nominal value: $a \leq 1.3$ dB

Set $f = 10$ MHz on receiver.

Measure attenuation in range 0.4 to 30 MHz on connector X21.2/.1 (p. 1).

Nominal value: $a = 1.3$ dB

Replace jumper X31 (p. 1).

2. Withdraw jumper X33 (p. 1).

Arrange test set-up acc. to Fig. 6.1.

Set following frequencies on receiver and feed in on connector X69 (p. 1) with a level of 100 mV:

0.01 MHz
0.1 MHz
0.4 MHz
1.5 MHz
10.0 MHz
20.0 MHz
30.0 MHz

Measure attenuation on connector X23.2/.1 (p. 1).

Nominal value: $a = 9$ to 12.5 dB

Replace jumper X33 (p. 1).

(Continuation)---

---(Continuation) Test of Receive-
signal Path

3. Withdraw jumper X35 (p. 2).

Arrange test set-up acc. to Fig.
6.1.

On receiver set frequencies
0.4 MHz, 1.5 MHz, 10 MHz, 20 MHz,
30 MHz one after the other and feed
in on connector X69 (p. 1) with a
level of 1 mV.

Measure gain on connector X25.2/.1.

Nominal value: 11 $\pm$ 1 dB

Replace jumper X35 (p. 2).

4. Withdraw jumper X36 (p. 2).

Arrange test set-up acc. to Fig.
6.1.

On receiver set frequencies
0.4 MHz, 1.5 MHz, 10 MHz, 20 MHz,
30 MHz one after the other and feed
in on connector X69 (p. 1) with a
level of 1 mV.

Measure gain on connector X26.2/.1
(p. 2).

Nominal value: 5.5 $\pm$ 1 dB

Replace jumper X36 (p. 2).

6.4.3 Test of 1st and 2nd
Oscillator Amplifier

1. On connector X672 (p. 1) feed in
oscillator signal of $f = 80.64$ MHz
and a level of 7 dBm (from synthe-
sizer).

With UDL 33 measure voltage drop
across resistors R60, R66 or R67,
and R73 (p. 1).

Nominal values: $V_{R60} = V_{R66}$
 $V_{R67} = V_{R73}$

If necessary, correct balance with
potentiometers R63 and R70 (p. 1).

With URV probe measure oscillator
voltages on testpoints X3 and X4
(p. 1).

Nominal value: 30 dBm $\pm$ 2 dB

2. On connector X673 (p. 2) feed in
oscillator signal of $f = 79.2$ MHz
and a level of 0 dBm (from
synthesizer).

Measure level on the anode of V61
(p. 2).

Nominal value: 8 dBm $\pm$ 2 dB

6.4.4 Test of Crystal Filter

1. Withdraw jumpers X32 and X33
(p. 1).

2. Arrange test set-up acc. to Fig.
6.2.

3. Sweep passband of crystal filter
with FM (ext).

Nominal values:

passband attenuation $\pm$ 3 dB

Ripple $\pm$ 1 dB

Selectivity ($\pm$ 50 kHz) $\leq$ 60 dB

Bandwidth (-1 dB) $\leq$ 8 kHz

4. Replace jumpers X32 and X33 (p. 1).

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6.4.5 Test of 2nd IF Amplifier

1. Withdraw jumper X36 (p. 2).
2. On receiver switch on MGC and bandwidth 300 Hz and turn potentiometer HF fully counter-clockwise.
3. On connector X26.3/.4 (p. 2) feed in IF signal of $f = 1.44$ MHz and a level of $10 V_{rms}$.

4. Measure IF output voltage into 1 kohm on connector X65 (p. 3).

Nominal value: 170 to 260 mV

5. Reduce level of IF signal to $1 \mu V_{rms}$ and turn potentiometer HF on receiver fully clockwise.
 6. Measure IF output voltage on connector X65 (p. 3).
- Nominal value: 170 to 260 mV
7. If necessary, attune IF output voltage to maximum with IF transformer T6 (p. 3).
 8. Replace jumper X36 (p. 2).

6.4.6 Test of HF Gain Control

1. Withdraw jumper X35 (p. 2).
2. Arrange test set-up acc. to Fig. 6.3.
3. Set $f = 10$ MHz on receiver.
4. Feed in $f = 10$ MHz on connector X69 (p. 1). Increase input level from 1 mV to between 5 and 10 mV.
5. Read off URV 4 whether control response point is reached.
6. Increase output level of signal generator to 1.5 V.

Nominal value of voltage on connector X25.2/.1 (p. 1):

≤ 65 mV

7. Replace jumper X35 (p. 2).

6.4.7 Test of IF Gain Control

1. Withdraw jumper X36 (p. 2).
 2. Arrange test set-up acc. to Fig. 6.4.
 3. On connector X26.3/.4 (p. 2) feed in IF signal of $f = 1.44$ MHz and a level of $10 mV_{rms}$.
 4. Switch on AGC receiver.
- Nominal value of output voltage on connector X65 (p. 3):
170 to 260 mV
5. Set receiver to MGC.
 6. Turn potentiometer "HF" on receiver fully counter-clockwise.
 7. Nominal value of output voltage on connector X65 (p. 3):
170 to 260 mV
 8. Replace jumper X36 (p. 2).

6.4.8 Test of Test Signals

1. Arrange test set-up acc. to Fig. 6.5.
2. On connector X672 (p. 1) feed in $f = 90.64$ MHz with a level of -10 dBm and increase level until output X6.a19 (p. 2) switches to +5 V.

(Continuation)---

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---(Continuation) Test of Test Signals

3. Using HF probe measure level on testpoints X3 and X4 (p. 1).

Nominal value: 24 dBm $\pm$ 1 dB

4. On connector X673 (p. 2) feed in $f = 79.2$ MHz with a level of -10 dBm and increase level until output X6.b20 (p. 2) switches to +5 V.

5. Using HF probe measure level on the anode of diode V61 (p. 2).

Nominal value: 4 dBm $\pm$ 1 dB

6. On connector X672 (p. 1) feed in $f = 90.64$ MHz with a level of +7 dBm and on connector X673 (p. 2) $f = 79.2$ MHz with a level of 0 dBm.

7. Check whether output X6.a20 (p. 2) has switched to +5 V.

6.5 Setting and Alignment

6.5.1 Balancing of 1st Oscillator Amplifier

1. On connector X672 (p. 1) feed in $f = 96$ MHz with a level of -10 dBm.
2. With trimmers C45 and C54 adjust levels on testpoints X3 and X4 (p. 1) to maximum.
3. On connector X672 (p. 1) increase input level to 7 dBm and measure level on testpoints X3 and X4.

Nominal values:

at	96 MHz	30 to 32.5 dBm
	80.64 MHz	> 30 dBm
	110.64 MHz	> 27.5 dBm

4. With input signal on connector (p. 1) of $f = 90.64$ MHz and level of 7 dBm measure voltage drop across resistors R60, R66 or R67 and R73 with digital multimeter.

5. With potentiometers R63 and R70 (p. 1) set balance

$$\begin{aligned} V_{R60} &= V_{R66} \text{ and} \\ V_{R63} &= V_{R73}. \end{aligned}$$

6.5.2 Alignment of IF Transformer T6

1. Withdraw jumper X36 (p. 1).
2. On connector X26.3/.4 feed in $f = 1.44$ MHz with a level of 10 mV_{rms}.
3. Press MGC key on receiver and with potentiometer "HF" on the front panel set a voltage of 100 mV on connector X65 (p. 3).
4. Align output voltage on connector X65 (p. 3) to maximum with IF transformer T6 (p. 3).
5. Replace jumper X36 (p. 1).

6.5.3 Alignment of Image Trap

1. Withdraw jumpers X33 and X35 (p. 2).
2. Arrange test set-up acc. to Fig. 6.8.
3. Set output level on SWOB 5 to approx. 2 mV and check for the following frequency response.

(Continuation)---

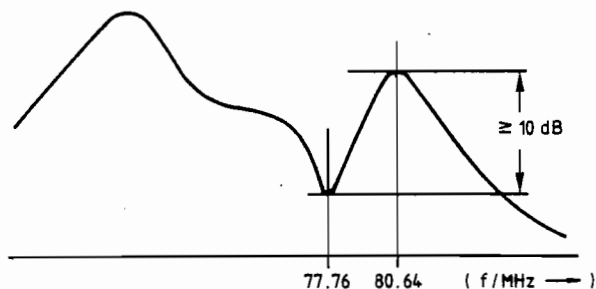
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---(Continuation) Alignment of Image Trap



Nominal value of image-frequency rejection:

≥ 10 dB

Nominal value of gain at $f = 80.64$ MHz:

24 $\pm$ 2 dB

- With coil L42 (p. 2) align frequency response to minimum at 77.76 MHz and with coil L31 (p. 2) to maximum at 80.64 MHz.

- Replace jumpers X33 and X35 (p. 2).

6.5.4 Alignment of HF Indication

- Arrange test set-up acc. to Fig. 6.7 (URV 4 is not necessary).
- Set receiver for AGC, bandwidth 300 Hz and 10.1 MHz.
- Set signal generator for 10.1 MHz with a level of 75 dB μ V.
- With potentiometer R284 (p. 3) set voltage of 7 V on N21.1.
- Increase input level to 90 dB μ V and align transition range with potentiometer R287 (p. 3) so that steady characteristic of indication appears on HF meter.

6.6 Replacement of Assemblies

CAUTION!

Detach power and battery cables before removing modules from the housing of the receiver.

Note:

With the desktop unit the panelling has to be removed before a module can be removed/replaced. Proceed as follows:

- Undo six screws (1, Fig. 6.9) and remove top cover (2) of housing.
- Undo four screws (22) and remove bottom cover (13) of housing.

6.6.1 Removal of HF/IF Unit

- Undo four screws (12 and 19, Fig. 6.9) marked red. Lift cassette, move sideways as far as it will go and push downwards to lock in place.
- Undo four screws (14 and 20) marked red on cassette (7). Detach six HF cables.
- Withdraw HF/IF unit (9) sideways from cassette.

6.6.2 Installation of HF/IF Unit

The module is installed in the reverse order to the removal described above.

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6.7 Final Test

After a repair has been carried out, the HF/IF Unit GX 085P1 must be subjected to the following final test to ensure that its technical data can still be guaranteed.

If this final test does not prove satisfactory, the troubleshooting 6.3.1 to 6.3.3 will have to be performed again. Repeat the procedure as many times as is necessary to detect and remedy all faults.

6.7.1 Test of Noise Figure

1. Arrange test set-up acc. to Fig. 6.6.
2. On receiver press MGC key, AM key and set potentiometer "HF" so that -6 dBm is indicated on URV 4.
3. Increase output level on SKTU until indication on URV 4 has risen by 2 dB.
4. Noise figure by 2-dB method:

measured value on SKTU + 2.36 dB

Nominal value of noise figure for bandwidth 2.4 kHz:

$$F \leq 16 \text{ dB}$$

6.7.2 Test of Bandwidth

1. Arrange test set-up acc. to Fig. 6.7.
2. On SMK set $f = 10 \text{ MHz}$ with a level of -100 dB.

3. On receiver select CW, press MGC key and set potentiometer "HF" so that -7 dBm is indicated on URV 4.

4. Vary frequency of generator on connector X69 (p. 1) and measure 3-dB bandwidth on connector X65 (p. 3).

5. Check ripple within nominal bandwidth.

6. Vary frequency of generator according to filter frequency and increase level until URV 4 again indicates -7 dBm.

Nominal value of bandwidth:

$$\geq 300 \text{ Hz}$$

Nominal value of ripple:

$$\leq 3 \text{ dB}$$

Nominal value of selectivity at $\pm 375 \text{ Hz}$:

$$\geq 60 \text{ dB}$$

7. Press AM key and repeat test.

Nominal value of bandwidth:

$$\geq 2400 \text{ Hz}$$

Nominal value of ripple:

$$\leq 3 \text{ dB}$$

Nominal value of selectivity at $\pm 1.8 \text{ kHz}$:

$$\geq 60 \text{ dB}$$

8. Check further bandwidths according to filters installed.

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6.7.3 Test of Amplitude Control

1. Arrange test set-up acc. to Fig. 6.7.
2. On connector X69 (p. 1) feed in $f = 10$ MHz with a level of $1 \mu\text{V}$ EMF.
3. Press MGC key and set potentiometer HF so that maximum output voltage is obtained when it is fully clockwise.
4. Press CW key.
5. Increase input voltage on connector X69 (p. 1) to 3 V EMF and measure IF output voltage (EMF) on connector X65 (p. 3) into 1 kohm.

Nominal value: 170 to 260 mV

6.7.4 Test of Gain in ISB (A3B) Reception

1. On connector X69 (p. 1) feed in $f = 10$ MHz with a level of 1 mV or 1.5 V.
2. Set receiver to 10 MHz, press ISB key and AGC key.
3. With URV 4 measure output voltage on connector X68 (p. 2) with 50-ohm termination.

Nominal values:

at 1 mV input voltage 4 to 5.5 mV
at 1.5 V input voltage ≤ 100 mV

6.7.5 Test of Test Signals

Check test signals acc. to 6.4.8.

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6.8 External Interfaces

External Interfaces		
Connector	Contact	Signal designation/level
X6 FP connector strip 64-way contact a1 	a1	MGC
	a2	AGC ref. A
	a3	AGC ref. E
	a4	AGC IF
	a5	Strobe 9
	a6	DIVERSITY
	a7	Meter HF+
	a8	Meter HF-
	a9	Not used
	a10	D0
	a11	D1
	a12	D2
	a13	D3
	a14	D4
	a15	D5
	a16	D6
	a17	D7
	a18	Strobe 6
	a19	CM osc. 1
	a20	CM rec.
	a21	AGC selection
	a22	Not used
	a23	-16 VDC
	a24	+5.3 VDC
	a25	+5.3 VDC
	a26	+7.25 VDC
	a27	+7.25 VDC
	a28	+16 VDC
	a29	+16 VDC
	a30	Ground
	a31	Ground
	a32	Ground
	b1	F1
	b2	F2
	b3	F3
	b4	F4
	b5	Strobe 9
	b6	Not used
	b7	AF output MP8
	b8	MP6
	b9	Receive inhibit
	b10	D0
	b11	D1
	b12	D2

(Continuation)---

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---(Continuation) External Interfaces

<u>External Interfaces</u>		
Connector	Contact	Signal designation/level
	b13	D3
	b14	D4
	b15	D5
	b16	D6
	b17	D7
	b18	Strobe 6
	b19	Strobe 7
	b20	CM osc. 2
	b21	HF MGC
	b22	AGC hold time
	b23	-16 VDC
	b24	+5.3 VDC
	b25	+5.3 VDC
	b26	+7.25 VDC
	b27	+7.25 VDC
	b28	+16 VDC
	b29	+16 VDC
	b30	Ground
	b31	Ground
	b32	Ground
X60, X65, X68, X69 X671 to X673 	X60	IF output
	X65	IF demodulation
	X68	ISB
	X69	HF input
	X671	Test input
	X672	Osc. 1
	X673	Osc. 2

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Part 5: Description of Function

- 5.1 -

5. Description of Function

(See Circuit Diagram 651.8310.01S, pages 1 to 4)

5.1 Receive-signal Path

The HF signal from the antenna or, depending on how the receiver is equipped, from the preselector is fed from connector X69 to relay contact K1. Here, according to the receive frequency (< 400 kHz, ≥ 400 kHz), the signal path branches. For a receive frequency of < 400 kHz the signal path is routed via relay contacts K1 (4, 1) and K3 (4, 8) to the 400-kHz lowpass filter, consisting of coils L4, L5 and capacitors C4, C6 to C8, C10, C12, and further to relay contact K2. If received signals are too large, the 20-dB attenuator formed of resistors R3, R4, R6 and R7 can be cut into this signal path by relay contact K3 (13, 11).

For a receive frequency of ≥ 400 kHz the signal path is routed via relay contact K1 (4, 7), PIN-diode control V1, V2, V4 and V7 to relay contact K2. By way of the 30-MHz lowpass filter, consisting of coils L6, L7, L9, L11 and capacitors C14 to C20, the receive signal is taken to the 1st mixer formed of transformer T1 and analog switch N4. Here, with the conditioned oscillator signal in the band from 80.64 to 110.64 MHz, which appears on pins 11 and 14 of analog switch N4, the receive signal is converted to the 1st IF of 80.64 MHz.

The circuitry with coils L19 to L21, capacitors C56 to C58 and resistors R82 and R83 forms a broadband, real termination for the 1st mixer. The 1st IF signal is fed across this to crystal filter Z1. The 80.64-MHz crystal filter Z1 has a bandwidth of 8 kHz, this being the maximum receiving bandwidth. The subsequent IF

amplifier also has a broadband termination at the input through resistor R105, coil L31 and capacitor C109.

Following crystal filter Z1 the 1st IF signal is fed to the two-stage IF amplifier with transistors V54 and V55. The first amplifier stage has a gain of approx. 20 dB and the second 9 dB.

The amplified 1st IF signal is then fed via an 80-MHz lowpass filter, formed of coils L39 to L41 and capacitors C126 to C128, to the image-frequency trap made up of coil L42 and capacitors C131, C132. By way of another 80-MHz lowpass filter with coil L60 and capacitors C260, C261, the 1st IF signal is fed to pin 1 of the 2nd mixer U1.

Here, with the oscillator signal of 79.2 MHz, conversion is made to the 2nd IF of 1.44 MHz. Via the 80-MHz lowpass filter with coil 61 and capacitors C262, C263, the 2nd IF signal is fed to the IF amplifier with transistor V62.

The amplified 2nd IF signal is then applied to an IF filter consisting of crystal filters Z2 or Z3. Crystal filters Z2 and Z3 have a bandwidth of 300 Hz and 2.4 kHz. If larger bandwidths are required, a filter board with another four crystal filters Z11 to Z14 can be connected to X612.c3 and X612.a16. The selection of the crystal filters and thus of the signal path is made by FET switches V63 to V65, V67, V68 and V70 to V72 or, on the filter board, by V1 to V8.

(Continuation)---

HF / IF UNIT

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Repair Manual

Part 5: Description of Function

- 5.2 -

---(Continuation) Received-signal Path

After filtering the 2nd IF signal is applied to a three-stage, controlled IF amplifier. The first stage is formed of transistors V80 and V82 in grounded-base circuit. The second amplifier stage consists of transistors V90 to V92. At the output of the third amplifier stage with transistors V93, V94 and V96 the 2nd IF signal is selectively coupled out with output transformer T6 and capacitor C209 to emitter follower V95. Emitter follower V95 forms an impedance transformer, which takes the 2nd IF signal with a level of approx. 200 mV to connector X65, from where it is fed to the demodulator. The IF signal is additionally matched to 50 ohms by impedance transformer V97 and output on connector X60.

With a signal on connector X6.b9 (Receive inhibit) it is possible to block the receive-signal path. This blocking occurs at various points in the receive-signal path. AND gates D1.6, D1.9, D1.10 and transistors V13 to V15 drive relays K1 to K3, which open the signal path with contacts K1 (4, 1) and K2 (4, 7) and cut in the 20-dB attenuator with K3 (4, 6) and K3 (11, 13). PIN diodes V1, V2, V4 and V7 are blocked via amplifier N2.1 and diode V19 and the 2nd IF amplifier is blocked by transistors V78 and V79. Diode V111 disables the HF indication.

5.2 Gain Control

5.2.1 HF Gain Control

For the generation of the HF gain-control voltage the 1st IF signal is coupled out after the 1st amplifier

V54, V55 and fed to amplifier N7.3. Diodes V52 and V53 limit the input signal to prevent overdriving of amplifier N7.3. Diode V51 and capacitor C102 rectify the signal amplified by 20 dB. The gain-control-voltage amplifier N3.8 amplifies the gain-control voltage that is thus produced and feeds it across resistor R46 to charging capacitor C34. The time constant for the discharging of capacitor C34 is determined by resistors R51 and R53. In HF gain control, depending on the operating mode, the control time is switched between "long" and "short". This is produced by transistor V20, which reduces the discharging time constant of capacitor C34 by cutting resistor R306 into circuit. An even shorter discharging time constant can be achieved in ISB operation by cutting in resistor R329 via connector X6.b22 (AGC hold time). Amplifier N2.7 clamps the control voltage on capacitor C34 to the minimum value of 2.5 V.

The following amplifier N3.7 works with different amplification factors determined by the voltage on pin 7. For a negative voltage on pin 7 the amplification produced by the ratio of resistor R43 to R44 is very high. If the voltage on pin 7 goes above +2.5 V, diode V18 conducts and the amplification falls to a value that corresponds to the ratio of resistor R42 to R44.

The following amplifiers N3.1 and N3.14 couple the AGC voltage to emitter followers V16, V17 and V5, V6. The emitter followers represent low-impedance voltage sources that drive PIN diodes V1, V2, V4 and V7 across resistors R26, R27 and R33, R34. Diodes V3, V11 and V12 in the drive path linearize the characteristics of the PIN diodes.

(Continuation)---

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Part 5: Description of Function

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---(Continuation) HF Gain Control

The PIN-diode control including the driving is implemented in dual form to achieve an offset of the responses. First PIN diodes V1 and V2 are effective, and at higher levels the control with PIN diodes V4 and V7 will respond. Such offset of the responses improves the intermodulation handling.

Besides the control of the HF input signal in the HF/IF unit there is also control by the PIN diode in Lowpass Filter FK 852P5 or digitally tuned Filter FK 852P2, depending on what the receiver is equipped with. For this purpose the control voltage is taken off the output of AGC amplifier N3.7 and fed via connector X6.a21 to the appropriate filter.

For receive signals < 400 kHz the PIN-diode gain control is not applicable because the receive-signal path is switched over (see 5.1). At high HF levels the 20-dB attenuator formed of resistors R3, R4, R6 and R7 is cut into this signal path by relay contact K3 (13, 11).

5.2.2 IF Gain Control

For generating the IF gain-control voltage the 2nd IF signal of 1.44 MHz is coupled out after the 2nd IF amplifier and rectified by diode V104 and capacitor C216. The control voltage generated in this way is amplified by N10.8 and fed via diode V100, resistor R273 and the analog switch to charging capacitor C221. Amplifier N10.1 with diode V108 decouples the control voltage and drives the second and third stage of the three-stage IF amplifier across resistor R296 and filter choke L54. The first stage is driven by filter choke L50.

Amplifiers N10.14 and N10.7 produce the reference voltage for the three-stage IF amplifier and determine its maximum and minimum. The reference voltage is split up by the resistive divider chain R205, R204, R225 and R235 so that there are voltage-offset response points for the control in the individual stages of the IF amplifier. This means that first the third, then the second and finally the first stage of the IF amplifier becomes effective in the control.

The minimum value of the reference voltage determined by amplifier N10.7 is applied to amplifier N20.1, which clamps the IF control voltage to the minimum value. The output of amplifier N10.14 is configured with diodes V102 and V110 in such a way that the control voltage is unable to exceed the given maximum value.

Via diode V101 capacitor C218 charges itself up to the momentary value of the control voltage. The hold time, i.e. the time in which the control voltage is held at its level if the level of the receive signal falls, is determined by resistors R261 or R262. The switchover of the hold time from "long" to "short" is made by amplifier N3.7. It cuts in resistor R262 so that charging capacitor C218 discharges faster.

If the voltage on capacitor C218 falls below a value defined by voltage divider R267, R268 and R269, amplifiers N8.13 and N8.14 cut in resistors R266 and R265. The reference voltage of amplifier N8.14 is generated by voltage divider R263 and R264 so that it is only effective for the "short" control time constant.

5.2.3 Manual Gain Control

Besides automatic gain control (AGC) there is the possibility of manual gain control (MGC) and mixed AGC + MGC. The switchover between the modes of gain control is made by analog switch N15, which receives the control signals from the processor on pins 9 and 10.

In the MGC mode the control voltage is produced by a potentiometer fed with the minimum and maximum values of the reference voltage from connectors X6.a2 and X6.a3. The wiper is connected on X6.a1 and feeds the control voltage. This is applied via amplifier N21.8, diode V105 and resistor R270 to pin 1 of analog switch N15. This switches the control voltage through to pin 3, from where it acts upon the IF amplifier across resistor R296 and filter choke L54 or L50.

In the mixed mode of control (AGC + MGC) the AGC voltage appears on pin 11 and the MGC voltage on pin 4 of analog switch N15. This switches the control voltages through to pins 3 and 13, from where the greater of the two acts upon the IF amplifier as described above.

5.3 HF Indication

The HF indication is produced by a meter on the front panel of the receiver. The HF and the IF control voltage is used to evaluate the HF input level. The HF control voltage is taken off connector X6.a21 (AGC selection) and fed to amplifier N21.14 via diode V111 and resistor R288. The IF control voltage, decoupled by

operational amplifier N20.7, or fed in on connector X6.a4 (AGC IF) in ISB operation, is taken to amplifier N21.1. The setting of the gain of the IF control voltage is made with potentiometer R284 and transferred to the HF control voltage by potentiometer R287. The initial value of the HF indication is determined by resistor R274. The boosted control voltages are combined across resistors R291 and R295 and applied to connector X6.a7, to which the HF indication is connected. The second terminal of the HF indication is on connector Xa.a8.

For a receive frequency of ≥ 400 kHz the proportion of the HF control voltage for the HF indication is blocked by diode V112. Amplifier N21.7 cuts the 20-dB attenuator into the receive-signal path for a receive frequency of ≥ 400 kHz and an input level ≥ 10 mV. Via diode V106 and resistor R282 the response point of amplifier N21.1 is at the same time shifted so that there is no alteration on the HF indication.

For a receive frequency of ≤ 400 kHz diode V113 and resistor R310 disable the 20-dB attenuator and correction of the indication. If the "Receive inhibit" signal is activated, diode V73 disables the HF indication.

5.4 Conditioning of Oscillator Signals

The 1st oscillator signal from Synthesizer GF 852P1 is applied from connector X672 with a level of 7 dBm to transistor V36 and is amplified.

HF / IF UNIT
GX 085P1

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Part 5: Description of Function

- 5.5 -

---(Continuation) Conditioning of
Oscillator Signals.

Transformer T2 divides the amplified oscillator signal into two antiphase signals which are fed to the oscillator amplifiers V32 and V34 or V38 and V39. These are wired with potentiometer R63 and R70 for balancing. For level monitoring and control diodes V30 and V31 rectify the amplified oscillator signals with feedback to amplifier N5.1. This uses PIN diode V41 to keep the oscillator signal on pins 11 and 14 of the 1st mixer N4 at a constant level.

The 2nd oscillator signal fed in on connector X673 with a level of 0 dBm is applied to transistor V60 and from there via output transformer T4 and the series resonant circuit with coil L43 and capacitor C137 to pin 8 of the 2nd mixer U1.

For generating the CM signals the 2nd oscillator signal rectified by diode V61 and the 1st oscillator signal rectified by diodes D30 and D31 are fed to comparators N6.13 and N6.1. Here the signals are compared to the nominal value produced by voltage divider R116, R128, R126. If there is a deviation from the nominal value, the CM signals will be output by comparators N6.1 and N6.13.

Input 9 of comparator N6.14 is the sum point for both CM signals. If there is a deviation of the sum signal from the given nominal value, comparator N6.14 outputs the CM signal "Receive path".

5.5 Data Input

The data D0 to D7, strobe 6 and strobe 7 are transmitted from the processor to the HF/IF unit via connector X6.a10 to X6.a18. The transferred data are activated by strobe 6 and stored in D flipflops D2 and D7 by strobe 7. Level converters D3 and D4 convert the data from 5-V logic to 15-V logic.

On the filter board the three control signals from connector X611.a1, .b1 and .b2 are decoded by D22 and converted into 15-V logic by level converter D1.1.

The different fitting of the filter board with crystal filters Z11 to Z14 is coded by the resistors R21 to R24.

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G X 0 8 5 P 1

Repair Manual
Part 5: Description of Function

N O T E S

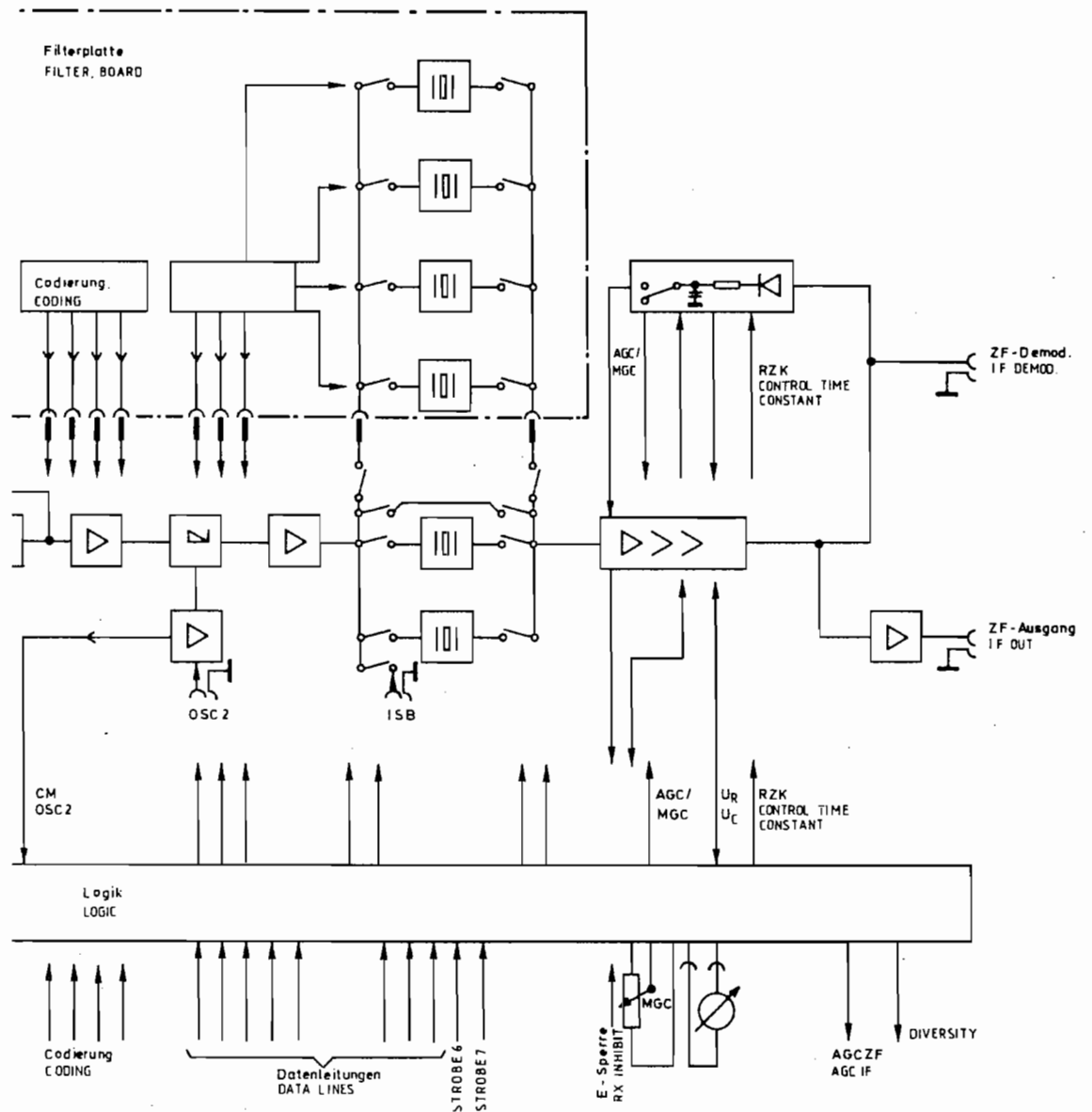


Fig. 5.1 HF/IF Unit GX 085P1, Block Diagram

HF / IF UNIT
G X 085 P 1

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- 6.23/6.24 -

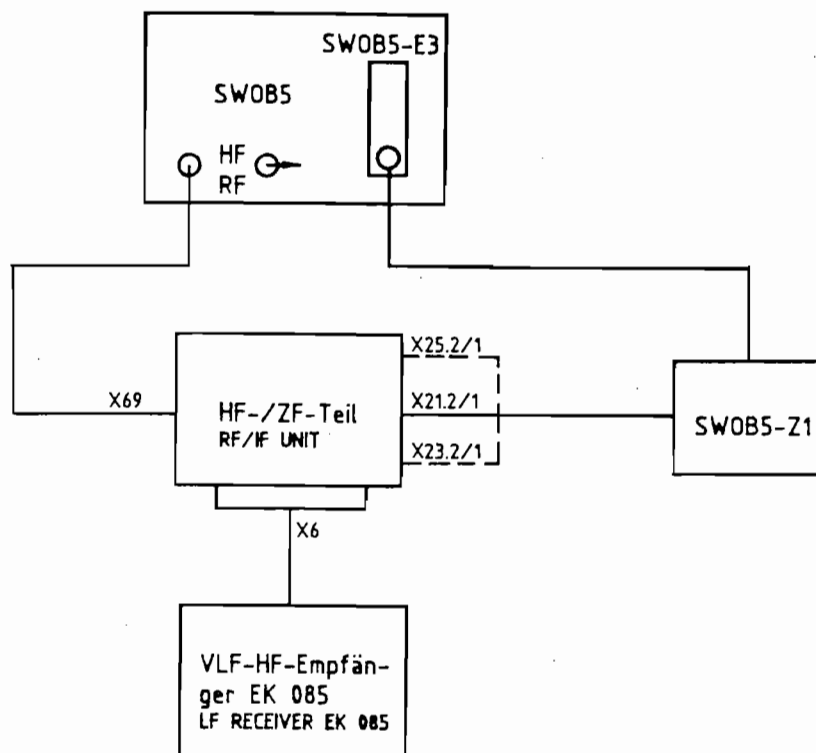


Fig. 6.1 Test Set-up for Checking Receive-signal Path

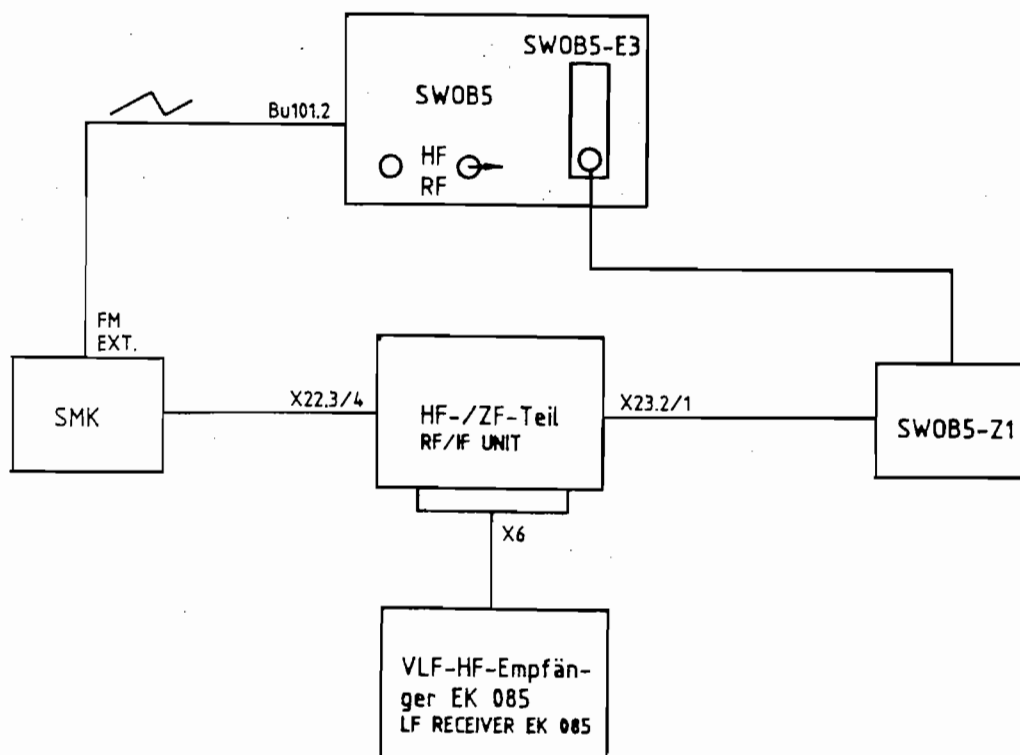


Fig. 6.2 Test Set-up for Testing Crystal Filter

HF / IF UNIT
GX 085 P 1

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- 6.25/6.26 -

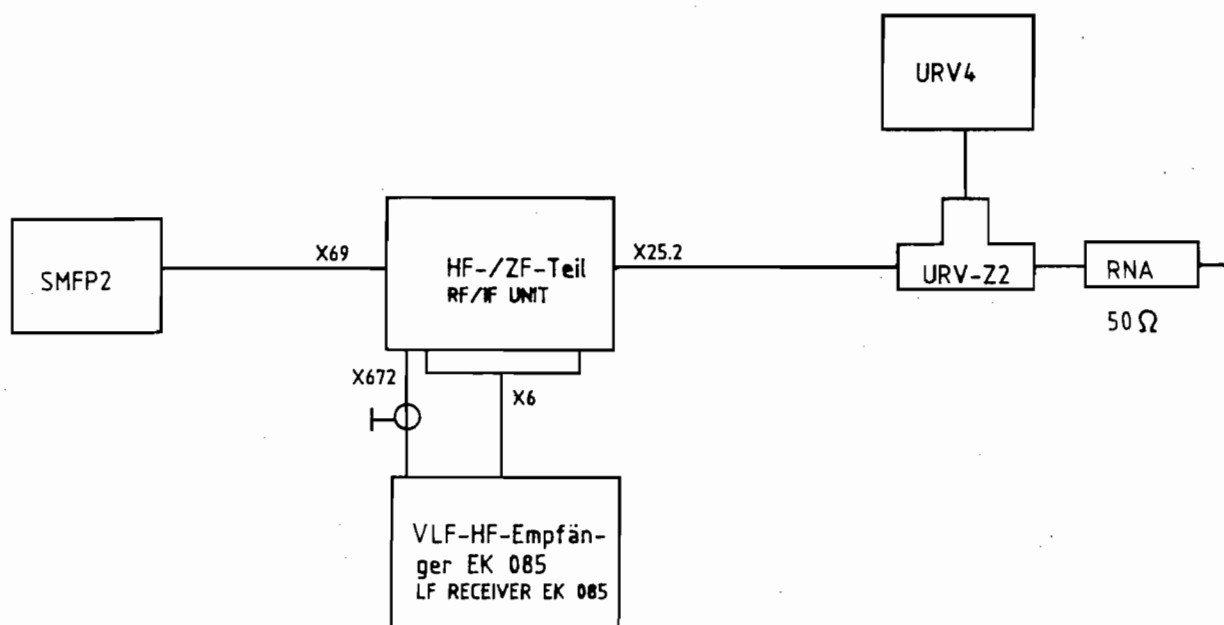


Fig. 6.3 Test Set-up for Testing HF Gain Control

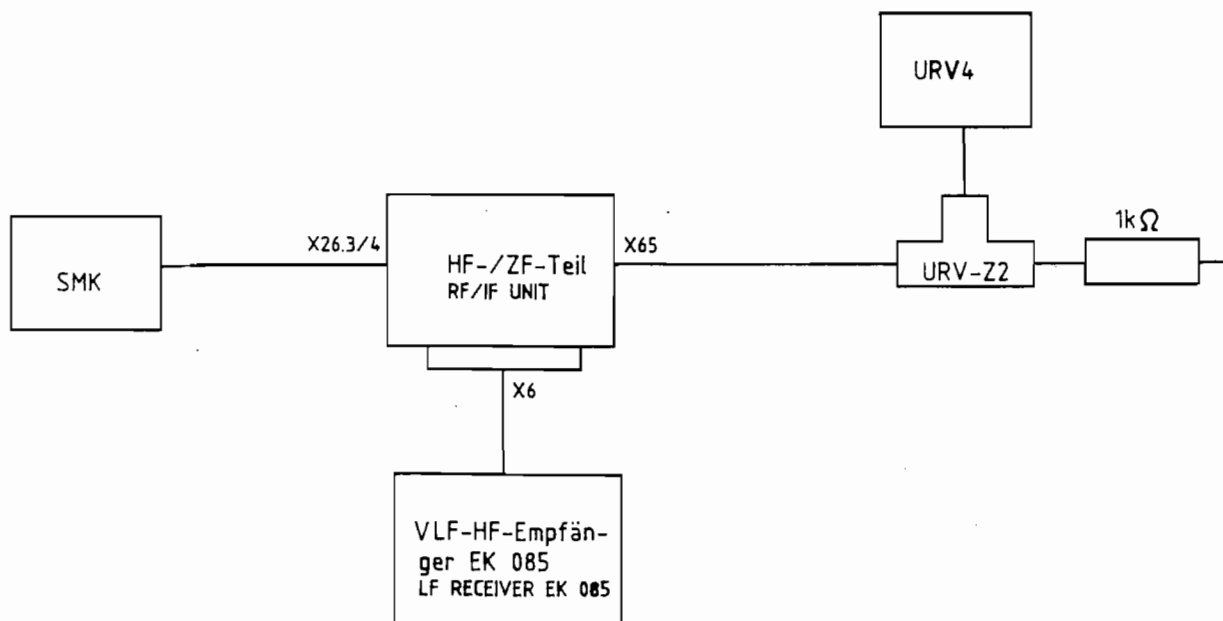


Fig. 6.4 Test set-up for Testing IF Gain Control

HF / IF UNIT
GX 085 P 1

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- 6.27/6.28 -

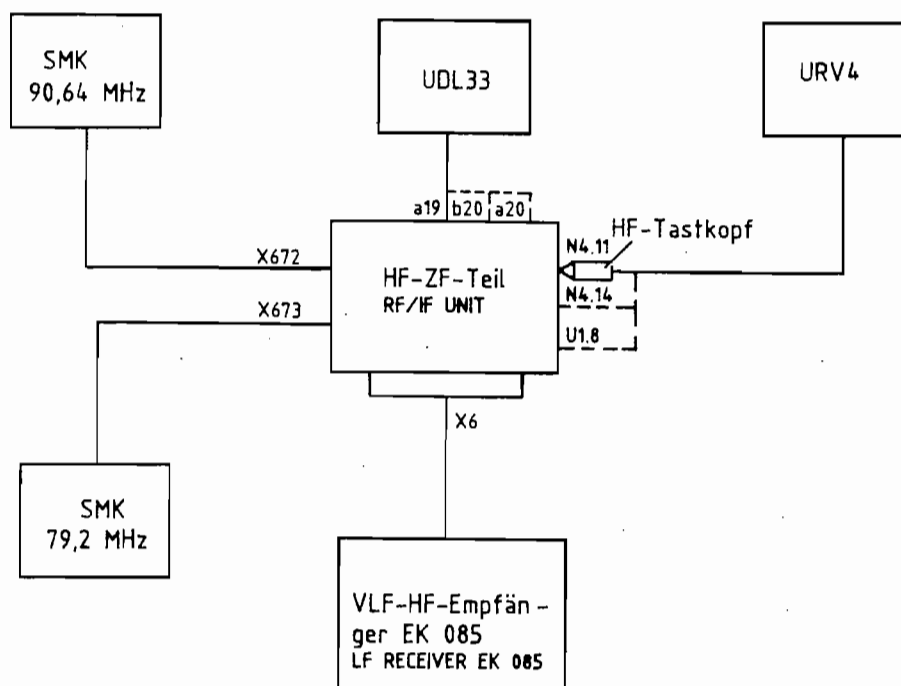


Fig. 6.5 Test Set-up for Testing CM Signals

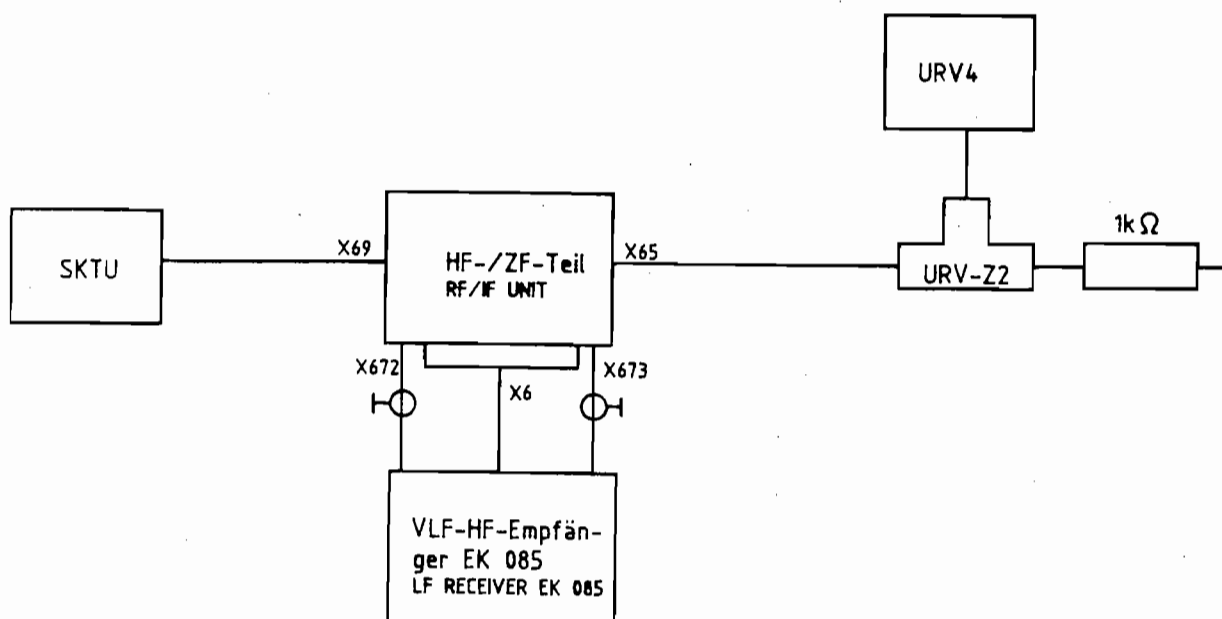


Fig. 6.6 Test Set-up for Testing Noise Figure

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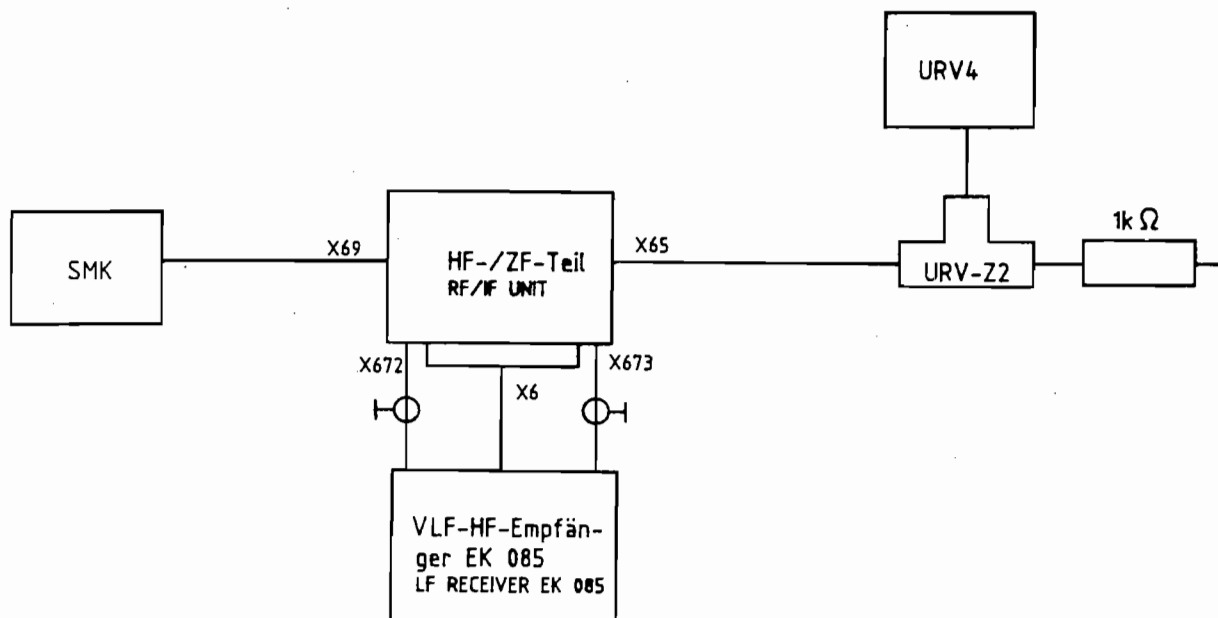


Fig. 6.7 Test Set-up for Testing Bandwidth

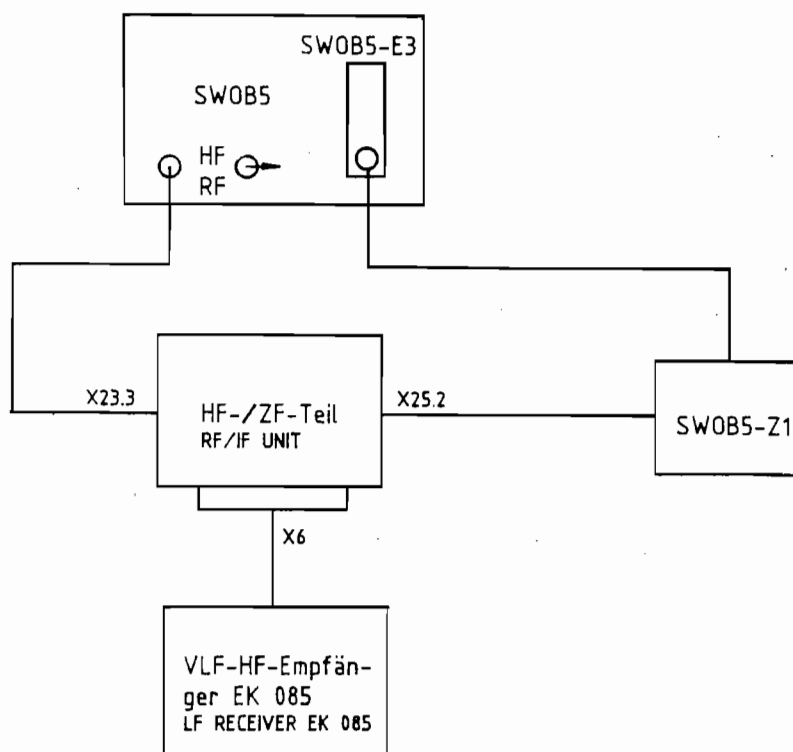
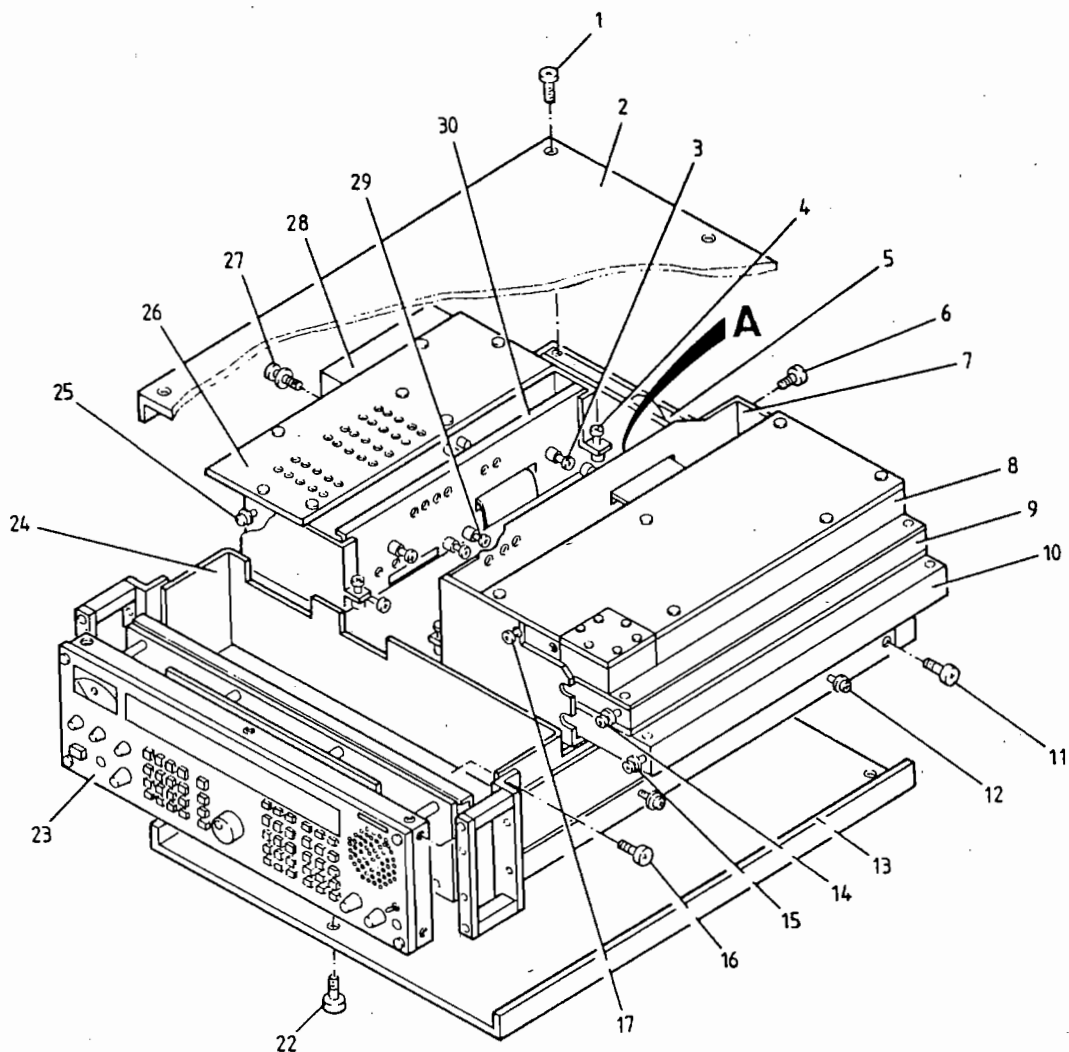


Fig. 6.8 Test Set-up for Testing Image Trap

HF/IF UNIT GX 085P1

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- 6.31/6.32 -



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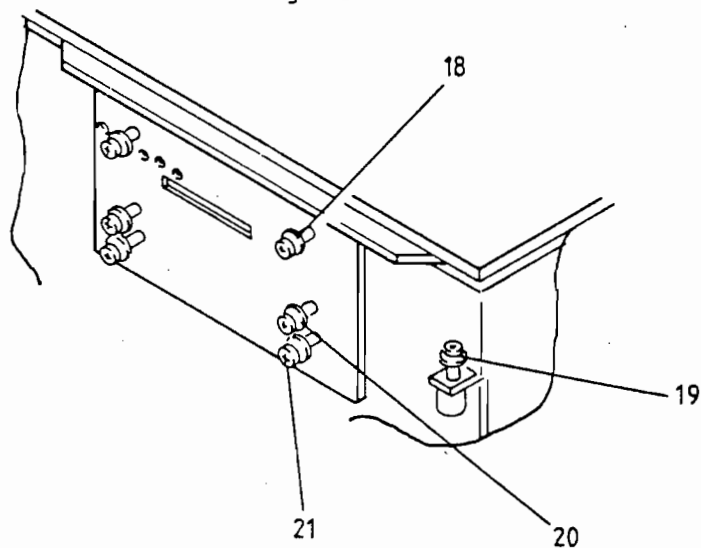
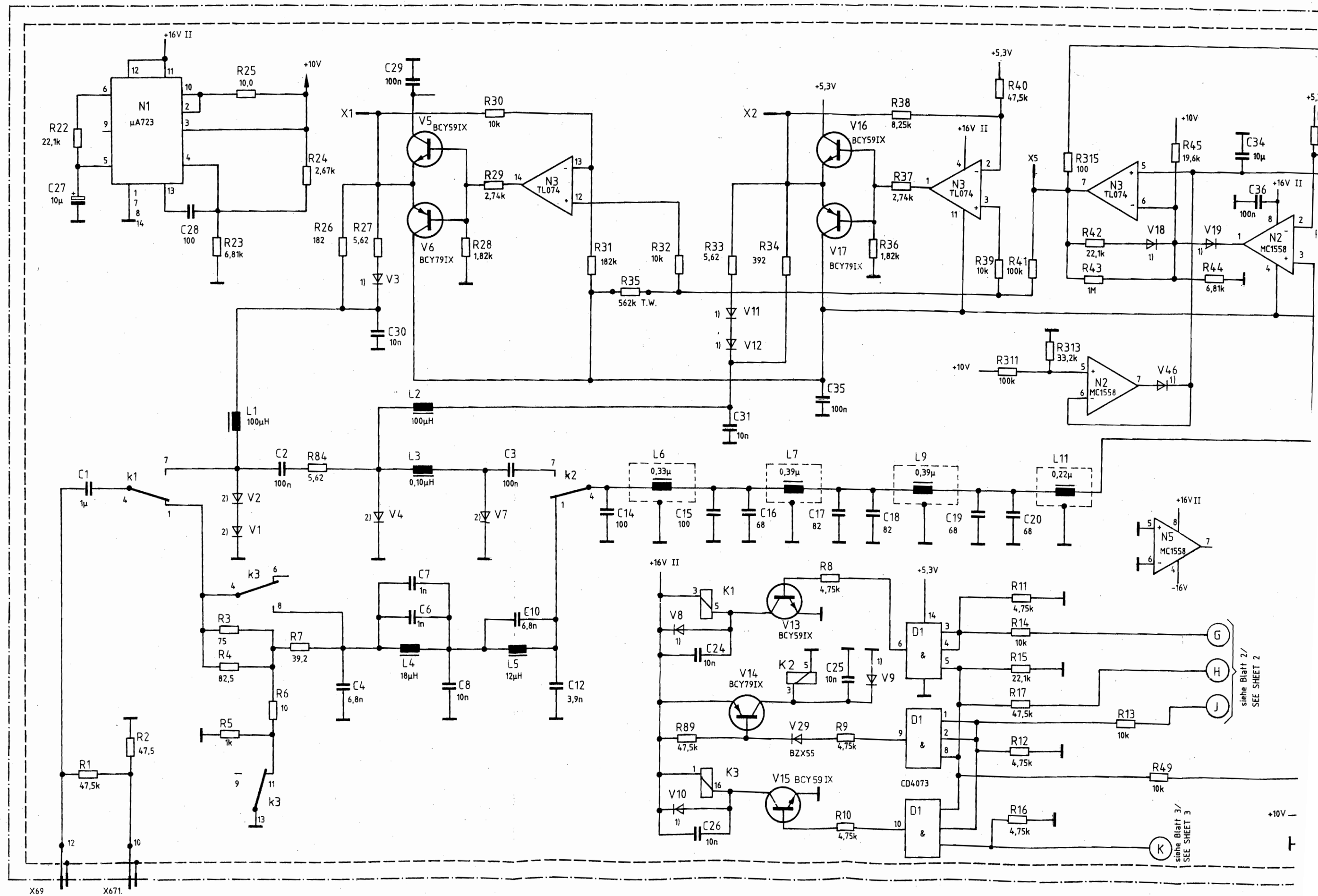


Fig. 6.9 Removal of HF/IF Unit GX 085P1



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MÜNCHEN

Schaltteillisten
Stromläufe
Bestückungspläne
Parts lists
Circuit diagrams
Components plans



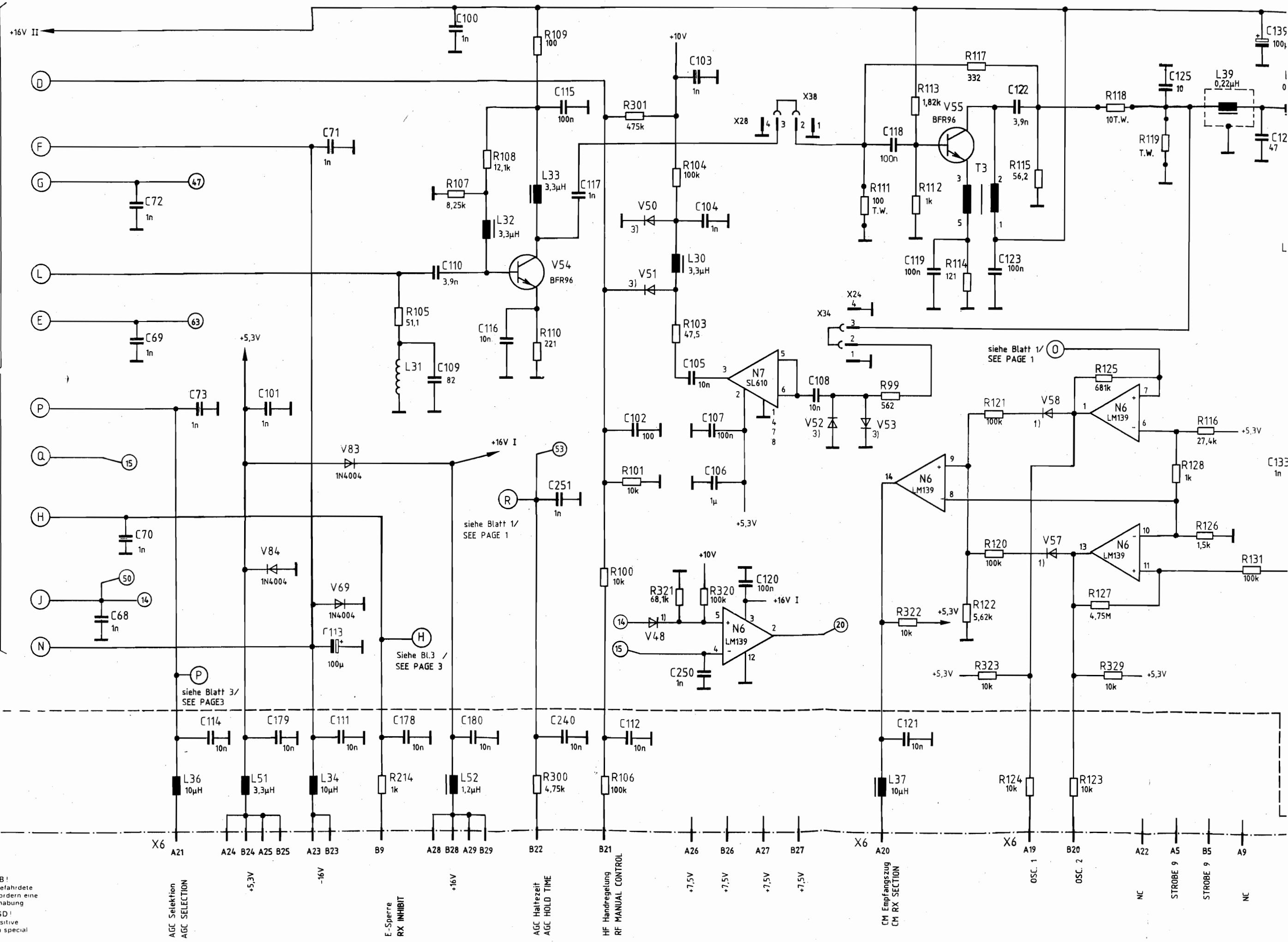
HF-Eingang
RF INPUT

Test Eingang
TEST INPUT

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Electrostatic sensitive
devices require a special
handling

siehe Blatt 2/
SEE SHEET 2

siehe Blatt 3/
SEE SHEET 3



siehe Blatt 1/ SEE PAGE 1

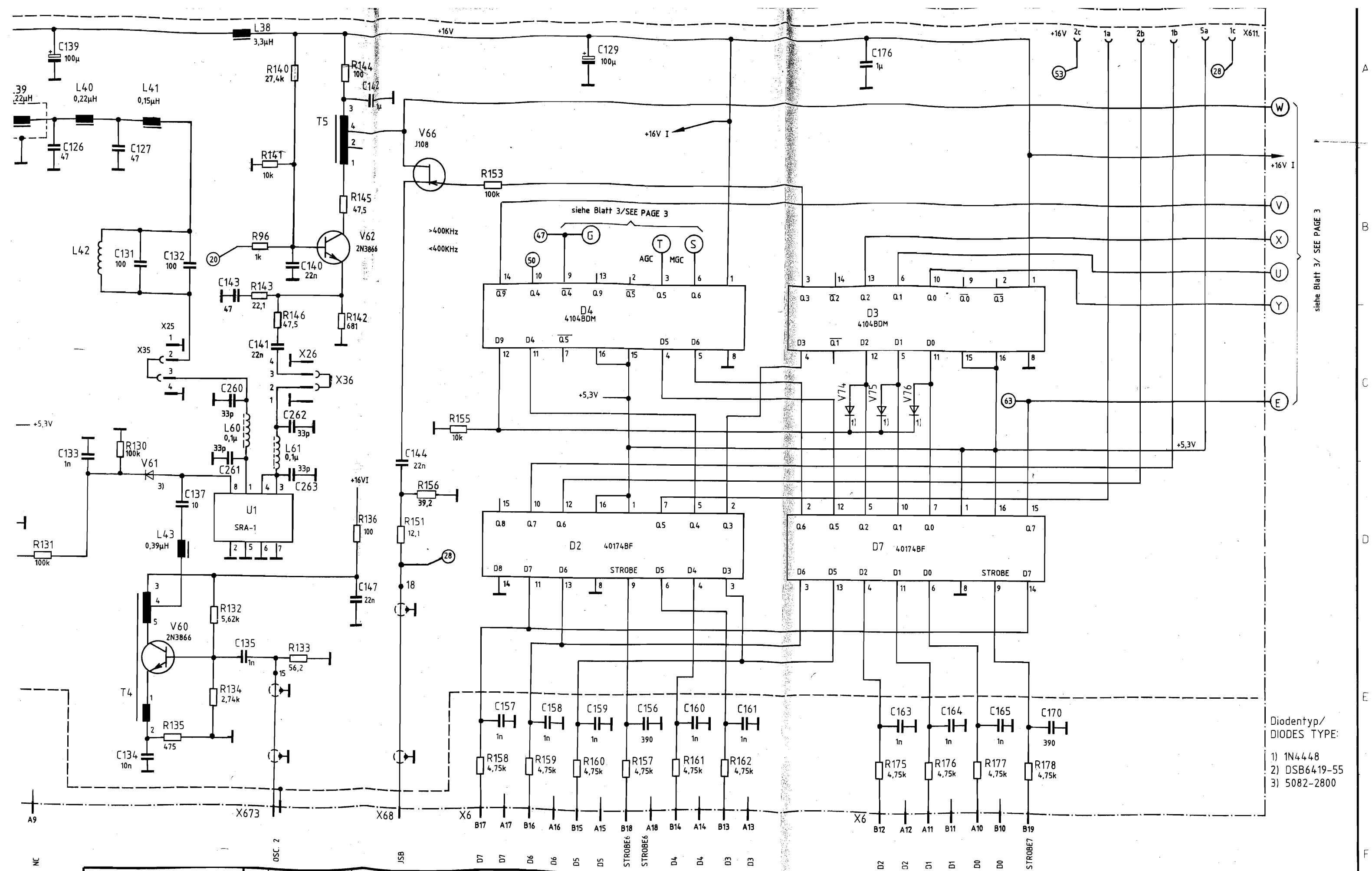
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 Electrostatic sensitive devices require a special handling



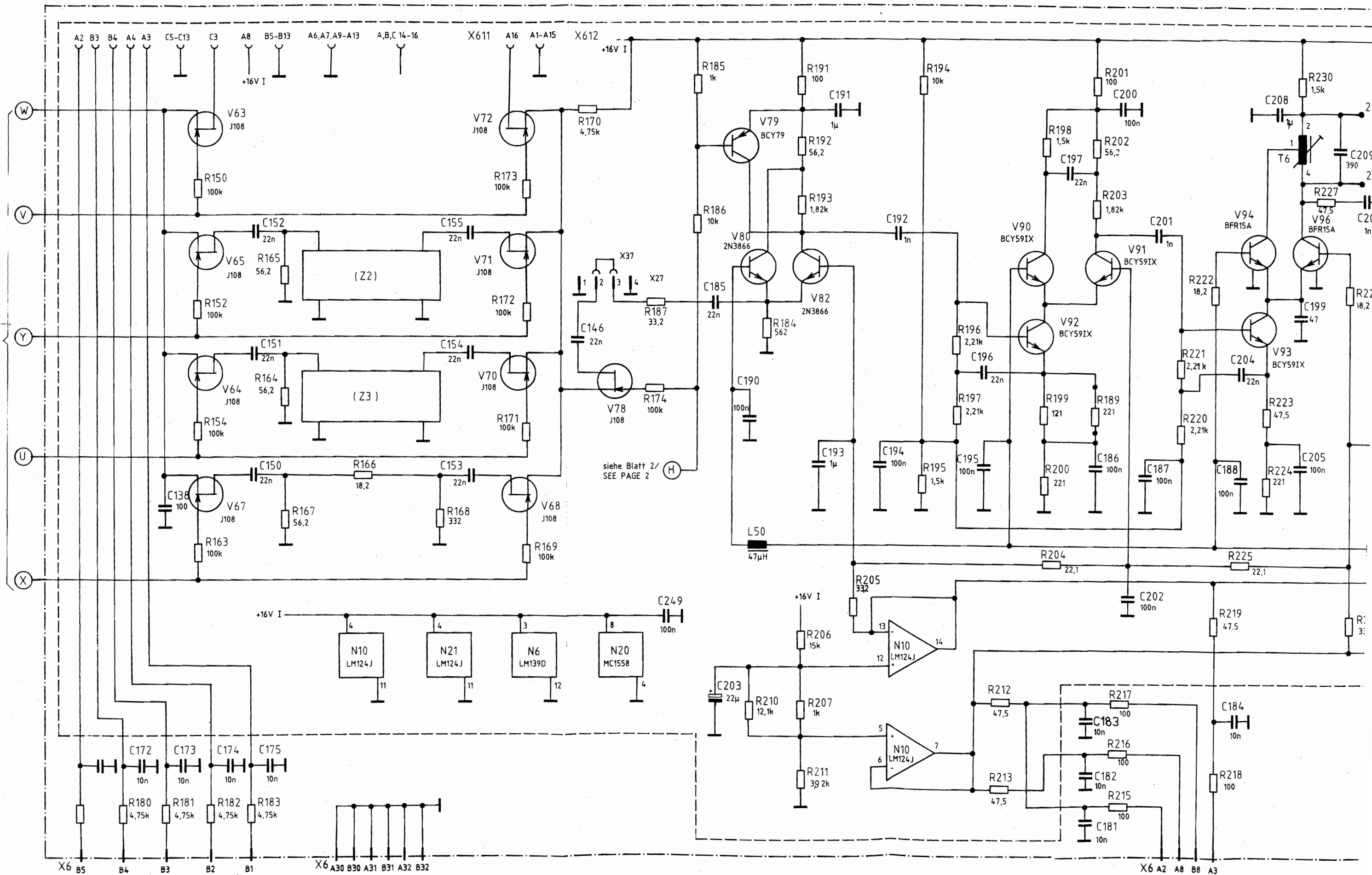
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Diodentyp/
DIODES TYPE:
1) 1N4448
2) DSB6419-55
3) 5082-2800

	A B C D E F	8.85 10.85	BM WI	6KBU	Tag 185	Name HN	Benennung GX 085 P1 HF-ZF-Teil RF/IF UNIT	zu Gerät GX085P1	Zeichn. Nr. 651.8310.01 S	reg. i. v. 651.8310V	erste Z. 651.8310.01	Blatt Nr. 2
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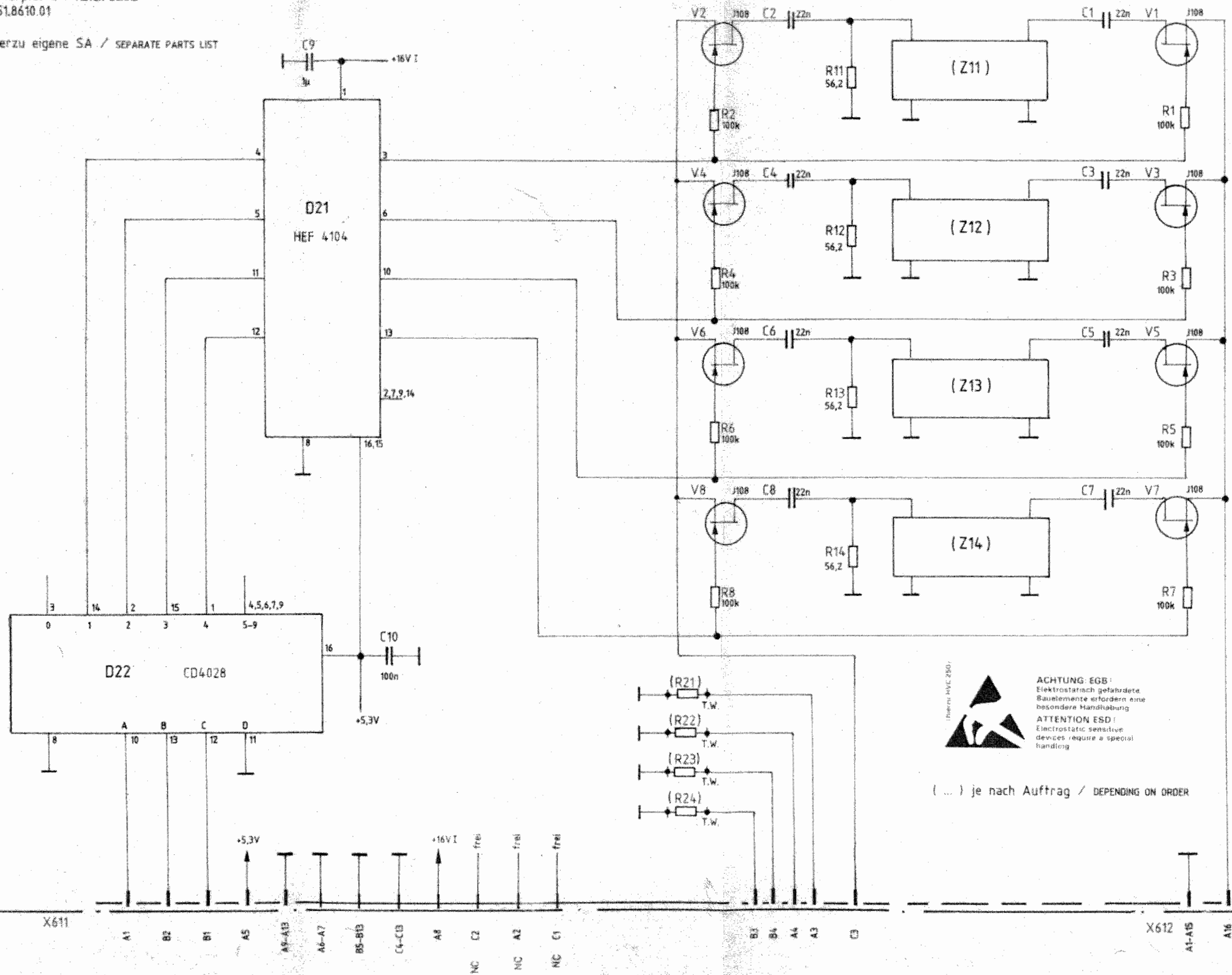
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AGC-Ref.-A
Instrument HF-
MP6
AGC-Ref.E

A6.2 Filterplatte / FILTER BOARD
651.8610.01

hierzu eigene SA / SEPARATE PARTS LIST



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	B 10.85 WI 6KBH Bearb. 8.85 Gepr.	Tag Name BM Benennung GX085P1 HF-ZF-Teil RF/IF UNIT	Zeichnung 651.8310.01 S zu Gerät GX085P1 reg. v. 651.8310V erste Z.	Blatt-Nr. 4 v. 4	07.600
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ROHDE & SCHWARZ

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 Datum
Date

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 Schaltteilliste für
Parts list for
ED HF-ZF-TEIL
RF/IF UNIT

 Sachnummer
Stock No.

651.8362.01 SA

 Blatt
Page

1

 Kennzeichen
Component No.

 Benennung/Beschreibung
Designation

 Sachnummer
Stock No.

 enthalten in
contained in

. ZUGEH. STROML. / CIRC. DIAGR.
 651.8310.01 S
 .. VARIANTENERKL. / VERSIONS
 VAR 02 = GRUNDAUSFUEHRUNG
 MOD 02 = BASIC MODEL

C1	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C2	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C3	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C4	CK 6,8NF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5682-F	CK 099.1927	
C6	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C7	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C8	CK 10NF+-1%63V7,5QUX13 KP CAPACITOR SIEMENS B33531-A5103-F	CK 340.9076	
C10	CK 6,8NF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5682-F	CK 099.1927	
C12	CK 3,9NF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5392-F	CK 340.8057	
C13	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C14	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C15	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C16	CC 68 PF+-2%63V6,5X7,5NPO CAPACITOR STETTNER EGP22,5 68PF2%NPO	CC 092.7420	
C17	CC 82 PF+-2%63V6,5X7,5NPO CAPACITOR STETTNER EGP22,5 82PF2%NPO	CC 092.7436	
C18	CC 82 PF+-2%63V6,5X7,5NPO CAPACITOR STETTNER EGP22,5 82PF2%NPO	CC 092.7436	
C19	CC 68 PF+-2%63V6,5X7,5NPO CAPACITOR STETTNER EGP22,5 68PF2%NPO	CC 092.7420	

651.8362.01 SA BL 1+



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Schaltteilliste für
Parts list for
ED HF-ZF-TEIL
RF/IF UNITSachnummer
Stock No.

651.8362.01 SA

Blatt
Page

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C20	CC 68 PF+-2%63V6, 5X7, 5NPO CAPACITOR STETTNER EGP22,5 68PF2%NPO	CC 092.7420	
C24	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX1C3K	CC 068.4060	
C25	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C26	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C27	CE 10 UF+-20%16V 7X 4X 8 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR2-10/15	CE 022.8085	
C28	CC 100PF+-10%200V5K1200VI CAPACITOR UNION CARB CK05BX101K	CC 084.5250	
C29	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C30	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C31	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C34	CE 10 UF+-20%16V 7X 4X 8 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELKOETR2-10/15	CE 022.8085	
C35	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C36	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C37	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C38	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C39	CC 56PF+-10%200V5K1200VIE CAPACITOR UNION CARB CK05BX560K	CC 084.5221	
C40	CC 56PF+-10%200V5K1200VIE CAPACITOR UNION CARB CK05BX560K	CC 084.5221	
C41	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C42	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C43	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	


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 enthalten in
contained in

C44

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

CC 068.4047

C45

 UNION CARB CK05BX102K
CT 3,5/20NP0100V 5,5RDX4
TRIMMER

455.4018

C46

ERIE 518-000A3,5-20 NPO

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

CC 068.4047

C47

 UNION CARB CK05BX102K
CC 10NF+-10%100V5K1200VIE

CC 068.4060

C48

 CERAMIC CAPACITOR
UNION CARB CK05BX103K

CC 068.4060

C49

 CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR

CC 068.4082

C50

 UNION CARB CK05BX103K
CC 470NF+-10%50VK1200VIEL

CC 068.4047

C51

 CAPACITOR
UNION CARB CK06BX474K

CC 068.4047

C52

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

CC 068.4047

C53

 UNION CARB CK05BX102K
CC 1NF+-10%200V5K1200VIEL

CC 068.4060

C54

 CAPACITOR
UNION CARB CK05BX102K

455.4018

C55

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

CC 068.4047

C56

 UNION CARB CK05BX102K
CC 10NF+-10%100V5K1200VIE

CC 092.7436

C57

 CERAMIC CAPACITOR
UNION CARB CK05BX103K

CC 092.7442

C58

 CT 3,5/20NP0100V 5,5RDX4
TRIMMER

CC 092.7320

C59

ERIE 518-000A3,5-20 NPO

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

CC 060.2445

C60

 UNION CARB CK05BX102K
CC 82 PF+-2%63V6,5X7,5NPO

CC 068.4047

C61

 CAPACITOR
STETTNER EGP22,5 82PF2%NPO

CC 068.4047

C62

 CC 100PF+-2%63V6,5X9 NPO
CAPACITOR

CC 060.2445

STETTNER EGP22,5 100PFNPO

 CC 10 PF+-2%63V4X4,5 NPO
CAPACITOR

STETTNER EGP22,5 10PF2%NPO

 CC 22NF+-10%50VK1200VIELS
CAPACITOR

UNION CARB CK05BX223K

 CC 1NF+-10%200V5K1200VIEL
CAPACITOR

 UNION CARB CK05BX102K
CC 22NF+-10%50VK1200VIELS

 CAPACITOR
UNION CARB CK05BX223K

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C63	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C64	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C65	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C66	CC 1NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y102KFA	CC 099.8438	
C67	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C68	CC 1,0NF+-20%63V5X6 K2000 CAPACITOR STETTNER EGP22,5 1000PF 20%	CC 092.7820	
BIS/TO C74			
C75	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C80	CC 10 PF+-2%63V4X4,5 NPO CAPACITOR STETTNER EGP22,5 10PF2%NPO	CC 092.7320	
C82	CC 10PF+-0,5PF50VNPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A100DFA	CC 099.8480	
C83	CC 22PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206A220JFA	CC 099.8396	
C100	CC 1,0NF+-20%63V5X6 K2000 CAPACITOR STETTNER EGP22,5 1000PF 20%	CC 092.7820	
C101	CC 1,0NF+-20%63V5X6 K2000 CAPACITOR STETTNER EGP22,5 1000PF 20%	CC 092.7820	
C102	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C103	CC 1,0NF+-20%63V5X6 K2000 CAPACITOR STETTNER EGP22,5 1000PF 20%	CC 092.7820	
C104	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C105	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C106	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C107	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	


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**Kennzeichen
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**enthalten in
contained in**
C108
**CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR**
CC 068.4060
C109
**UNION CARB CK05BX103K
CC 82 PF+-2%63V6,5X7,5NPO
CAPACITOR**
CC 092.7436
C110
**STETTNER EGPZ2,5 82PF2%NPO
CC 3,9NF+-10%100V5K1200VI
CERAMIC CAPACITOR**
CC 082.7410
C111
**UNION CARB CK05BX392K
CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR**
CC 068.4060
C112
**UNION CARB CK05BX103K
CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR**
CC 068.4060
C113
**UNION CARB CK05BX103K
CE 100UF-10+50% 25V 13X13
ELECTROLYTIC CAPACITOR**
CE 208.4007
C114
**ROEDERST ELK0EK100/25
CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR**
CC 068.4060
C115
**UNION CARB CK05BX103K
CC 100NF+-10%50V5K1200VIE
CAPACITOR**
CC 084.5350
C116
**UNION CARB CK05BX104K
CC 10NF+-10%50V X7R 1206
CERAMIC CHIP CAPACITOR**
CC 099.8521
C117
**VITRAMON VJ1206Y103KFA
CC 1NF+-10%200V5K1200VIEL
CAPACITOR**
CC 068.4047
C118
**UNION CARB CK05BX102K
CC 100NF+-10%50V5K1200VIE
CAPACITOR**
CC 084.5350
C119
**UNION CARB CK05BX104K
CC 100NF+-10%50V5K1200VIE
CAPACITOR**
CC 084.5350
C120
**UNION CARB CK05BX104K
CC 100NF+-10%50V5K1200VIE
CAPACITOR**
CC 084.5350
C121
**UNION CARB CK05BX104K
CC 10NF+-10%100V5K1200VIE
CERAMIC CAPACITOR**
CC 068.4060
C122
**UNION CARB CK05BX103K
CC 3,9NF+-10%100V5K1200VI
CERAMIC CAPACITOR**
CC 082.7410
C123
**UNION CARB CK05BX392K
CC 100NF+-10%50V5K1200VIE
CAPACITOR**
CC 084.5350
C125
**UNION CARB CK05BX104K
CC 10 PF+-2%63V4X4,5 NPO
CAPACITOR**
CC 092.7320
C126
**STETTNER EGPZ2,5 10PF2%NPO
CC 47 PF+-2%63V5,5X6,5NPO
CAPACITOR**
CC 092.7407
C127
**STETTNER EGPZ2,5 47PF2%NPO
CC 47 PF+-2%63V5,5X6,5NPO
CAPACITOR**
CC 092.7407
STETTNER EGPZ2,5 47PF2%NPO
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C129	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR ROEDERST ELKOEK100/25	CE 208.4007	
C131	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C132	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C133	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C134	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C135	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C137	CC 10 PF+-2%63V4X4,5 NPO CAPACITOR STETTNER EGP22,5 10PF2%NPO	CC 092.7320	
C138	CC 100PF+-2%63V6,5X9 NPO CAPACITOR STETTNER EGP22,5 100PFNPO	CC 092.7442	
C139	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR ROEDERST ELKOEK100/25	CE 208.4007	
C140	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C141	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C142	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C143	CC 47PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C470J2G1CA	CC 060.0736	
C144	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C146	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C147	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C150	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
BIS/TO C155 C156	CC 390PF+-10%200V K1200VI CAPACITOR UNION CARB CK05BX391K	CC 060.1103	



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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C157	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
BIS/TO			
C161			
C163	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C164	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C165	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C170	CC 390PF+-10%200V K1200VI CAPACITOR UNION CARB CK05BX391K	CC 060.1103	
C172	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C173	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C174	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C175	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
C176	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C178	CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR UNION CARB CK05BX103K	CC 068.4060	
BIS/TO			
C184			
C185	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C186	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C187	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C188	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C190	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C191	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C192	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C193	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C194	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C195	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C196	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C197	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C199	CC 47PF+- 5%100V NPO VIEL CERAMIC CAPACITOR UNIONCARB C052C470J2G1CA	CC 060.0736	
C200	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C201	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C202	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C203	CE 22 UF+-20% 6V 7X 4X 8 ELECTROLYTIC CAPACITOR ERO-TANTAL TA-ELK0,ETR2-22/6	CE 022.8033	
C204	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB CK05BX223K	CC 060.2445	
C205	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C206	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C207	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	
C208	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB CK06BX105K	CC 084.5538	
C209	CC 390PF+- 5%100V NPO VIE CERAMIC CAPACITOR UNIONCARB C052C391J2G1CA	CC 060.0842	
C210	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C211	CC 1NF+-10%200V5K1200VIEL CAPACITOR UNION CARB CK05BX102K	CC 068.4047	



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C212	CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350	
C213	UNION CARB CK05BX104K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350	
C214	UNION CARB CK05BX104K CC 1NF+-10%200V5K1200VIEL CAPACITOR	CC 068.4047	
C215	UNION CARB CK05BX102K CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C216	UNION CARB CK05BX103K CC 1NF+-10%200V5K1200VIEL CAPACITOR	CC 068.4047	
C217	UNION CARB CK05BX102K CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C218	UNION CARB CK05BX103K CE 4,7UF+-20%20V 7X 4X 8 ELECTROLYTIC CAPACITOR	CE 022.8110	
C220	ERO-TANTAL TA-ELKOETR2-4,7/20 CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C221	UNION CARB CK05BX103K CE 100UF+-20%20V12X12X11 ELECTROLYTIC CAPACITOR	CE 022.8140	
C222	ERO-TANTAL TA-ELKOETR5-100/20 CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C223	UNION CARB CK05BX103K CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C224	UNION CARB CK05BX103K CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C240	UNION CARB CK05BX103K CC 10NF+-10%100V5K1200VIE CERAMIC CAPACITOR	CC 068.4060	
C249	UNION CARB CK05BX103K CC 100NF+-10%50V5K1200VIE CAPACITOR	CC 084.5350	
C250	UNION CARB CK05BX104K CC 1,0NF+-20%63V5X6 K2000 CAPACITOR	CC 092.7820	
C251	STETTNER EGPZ2,5 1000PF 20% CC 1,0NF+-20%63V5X6 K2000 CAPACITOR	CC 092.7820	
C260	STETTNER EGPZ2,5 1000PF 20% CC 33PF+-5%50V NPO 1206 CERAMIC CHIP CAPACITOR	CC 099.8780	
BIS/TO C263	VITRAMON VJ1206A330JFA		
D1	BL CD4073BE 3X3IN. ANDG AND GATE RCA CD4073BE	BL 280.9847	

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D2	BL CD40174BF 6XD- FLIPFL FLIPFLOP RCA CD40174BF	BL 092.9474	
D3	BL HEF4104BD 4XCONV. 3S LEVEL CONVERTER VALVO HEF4104BD	645.7668	
D4	BL HEF4104BD 4XCONV. 3S LEVEL CONVERTER VALVO HEF4104BD	645.7668	
D7	BL CD40174BF 6XD- FLIPFL FLIPFLOP RCA CD40174BF	BL 092.9474	
K1	SN 12V 1XU AU-CO MONOSTAB RELAY SDS RS-12V	SN 063.7083	
K2	SN 12V 1XU AU-CO MONOSTAB RELAY SDS RS-12V	SN 063.7083	
K3	SN GEPOLT 2XU 12V RELAY SDS DS2E-DC12V	645.6810	
L1	LD 100 UH10%8,000HMO,084A CHOKE DELEVAN DROSSEL1025-68	LD 067.3101	
L2	LD 100 UH10%8,000HMO,084A CHOKE DELEVAN DROSSEL1025-68	LD 067.3101	
L3	LD 0,10UH10%0,08CHM1,400A CHOKE DELEVAN DROSSEL1025-94	LD 067.2740	
L4	LD 18UH+-2% 0,36A1,95 OHM MINI CHOKE JAHRE 74.11-18ROG	LD 283.1001	
L5	LD 12UH BEI 0,62A1,1 OHM CHOKE JAHRE 7411-12R+2%	LD 066.9806	
L6	LD 0,33UH+-2% 2A 0,0650HM CHOKE JAHRE 74.11-R330G	LD 567.4019	
L7	LD 0,39UH+-2% 1,8A0,070HM HF-COIL JAHRE 74.11-R390G	645.6826	
L9	LD 0,39UH+-2% 1,8A0,070HM HF-COIL JAHRE 74.11-R390G	645.6826	
L11	LD 0,22UH+-2% 2A0,035 OHM CHOKE JAHRE 74.11-R220G	523.7770	
L14	LD 3,30UH10%0,850HMO,285A CHOKE DELEVAN DROSSEL1025-32	LD 067.2928	
L15	LD 3,30UH10%0,850HMO,285A CHOKE DELEVAN DROSSEL1025-32	LD 067.2928	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
L16	LD 0,47UH10%,350HMO,660A CHOKE	LD 067.2828	
L17	DELEVAN DROSSEL1025-12 LD 0,47UH10%,350HMO,660A CHOKE	LD 067.2828	
L18	DELEVAN DROSSEL1025-12 LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L19	DELEVAN DROSSEL1025-32 LD SPULE COIL	651.8691	
L20	LD SPULE COIL	651.8704	
L21	LD 0,39UH10%,300HMO,710A CHOKE	LD 067.2811	
L22	DELEVAN DROSSEL1025-10 LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L24	DELEVAN DROSSEL1025-32 LD 0,10 UH 10% 935 MIA CHOKE	LD 092.3030	
L30	DELEVAN DROSSEL0819-00 LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L31	DELEVAN DROSSEL1025-32 LD SPULE COIL	651.8710	
L32	LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L33	DELEVAN DROSSEL1025-32 LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L34	DELEVAN DROSSEL1025-32 LD 10,0UH10%,3,300HMO,144A CHOKE	LD 026.4184	
L36	DELEVAN DROSSEL1025-44 LD 10,0UH10%,3,300HMO,144A CHOKE	LD 026.4184	
L37	DELEVAN DROSSEL1025-44 LD 10,0UH10%,3,300HMO,144A CHOKE	LD 026.4184	
L38	DELEVAN DROSSEL1025-44 LD 3,30UH10%,850HMO,285A CHOKE	LD 067.2928	
L39	DELEVAN DROSSEL1025-32 LD 0,22UH+-2% 2A0,035 OHM CHOKE	523.7770	
L40	JAHRE 74.11-R220G LD 0,22UH10%,140HM1,045A CHOKE	LD 067.2786	
L41	DELEVAN DROSSEL1025-04 LD 0,15UH10%,100HM1,230A CHOKE	LD 067.2763	
L42	DELEVAN DROSSEL1025-00 LD SPULE COIL	651.8727	
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L43	LD 0,39UH10X0,300HMO,710A CHOKE DELEVAN DROSSEL1025-10	LD 067.2811	
L50	LD 47,0UH10X4,500HMO,110A CHOKE DELEVAN DROSSEL1025-60	LD 067.3060	
L51	LD 3,30UH10X0,850HMO,285A CHOKE DELEVAN DROSSEL1025-32	LD 067.2928	
L52	LD 1,20UH10X0,180HMO,620A CHOKE DELEVAN DROSSEL1025-22	LD 067.2870	
L53	LD 220 UH10X21,00HMO,052A CHOKE DELEVAN DROSSEL1025-76	LD 067.3147	
L54	LD 47,0UH10X4,500HMO,110A CHOKE DELEVAN DROSSEL1025-60	LD 067.3060	
L56	LF ROHRK.RD3,5X1,2X3 GETR TUBLAR CORE VOGT ROHRKERN 0269257	LF 026.9257	
L60	LD 0,10 UH 10% 935 MIA CHOKE DELEVAN DROSSEL0819-00	LD 092.3030	
L61	LD 0,10 UH 10% 935 MIA CHOKE DELEVAN DROSSEL0819-00	LD 092.3030	
L82	LD 0,10UH10X0,080HM1,400A CHOKE DELEVAN DROSSEL1025-94	LD 067.2740	
N1	BO UA723DM ADJOA1 VREGL VOLTAGE REGULATOR THOMSON MA723MDG	BO 283.9425	
N2	BO MC1558JG 2X OPAMP OPERATIONAL AMPLIFIER NSC LM1558J	BO 275.0816	
N3	BO TL074IN 4XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL074IN	BO 568.7528	
N4	BJ SD5000N 4X ANALOGSCH BJ SD5000N 4XANALOGSWITCH SILICONIX SD5000N	BJ 342.2340	
N5	BO MC1558JG 2X OPAMP OPERATIONAL AMPLIFIER NSC LM1558J	BO 275.0816	
N6	BO LM139J 4X COMPAR COMPARATOR NSC LM139J	BO 455.2873	
N7	BO SL610CCM8 IF AMPL IF AMPLIFIER PLESSEY SL610CCM8	610.4110	
N8	BO LM139J 4X COMPAR COMPARATOR NSC LM139J	BO 455.2873	

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N10
**BO LM124J 4XL.P.OPAMP
OPERATIONAL AMPLIFIER
NSC LM124J**
BO 300.6353
N15
**BL CD4052BE 2X4CH.MUX
MULTIPLEXER/DEMUTIPLEXER
MOTOROLA MC14052BCP**
BL 243.1200
N20
**BO MC1558JG 2X OPAMP
OPERATIONAL AMPLIFIER
NSC LM1558J**
BO 275.0816
N21
**BO LM124J 4XL.P.OPAMP
OPERATIONAL AMPLIFIER
NSC LM124J**
BO 300.6353
R1
**RL 0,35W 47,5KOHM+-1%TK50
RESISTOR**
RL 083.1800
R2
**DRALORIC SMA/207/47,5K-F-C
RL 0,35W 47,5 OHM+-1%TK50
RESISTOR**
RL 082.9507
R3
**DRALORIC SMA0207/47,5OHM-F-D
RL 0,35W 75,0 OHM+-1%TK50
RESISTOR**
RL 082.9665
R4
**DRALORIC SMA0207/75OHM-F-D
RL 0,35W 82,5 OHM+-1%TK50
RESISTOR**
RL 082.9707
R5
**DRALORIC SMA0207/82,5OHM-F-D
RL 0,35W 1KOHM+-1%TK50
RESISTOR**
RL 082.2160
R6
**DRALORIC SMA0207/1K-F-C
RL 0,35W 10,0 OHM+-1%TK50
RESISTOR**
RL 082.8852
R7
**DRALORIC SMA0207/100OHM-F-D
RL 0,35W 39,2 OHM+-1%TK50
RESISTOR**
RL 082.9420
R8
**DRALORIC SMA0207/39,2OHM-F-D
RL 0,35W 4,75KOHM+-1%TK50
RESISTOR**
RL 083.1097
DRALORIC SMA0207/4,75K-F-D
BIS/TO
R12
R13
**RL 0,35W 10,0KOHM+-1%TK50
RESISTOR**
RL 083.1297
DRALORIC SMA0207/10K-F-D
R14
**RL 0,35W 10,0KOHM+-1%TK50
RESISTOR**
RL 083.1297
DRALORIC SMA0207/10K-F-D
R15
**RL 0,35W 22,1KOHM+-1%TK50
RESISTOR**
RL 083.1545
DRALORIC SMA/207/22,1K-F-C
R16
**RL 0,35W 4,75KOHM+-1%TK50
RESISTOR**
RL 083.1097
DRALORIC SMA0207/4,75K-F-D
R17
**RL 0,35W 47,5KOHM+-1%TK50
RESISTOR**
RL 083.1800
DRALORIC SMA/207/47,5K-F-C
R18
**RL 0,35W 10,0KOHM+-1%TK50
RESISTOR**
RL 083.1297
DRALORIC SMA0207/10K-F-D
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R19	RL 0,35W 121KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/121K-F-C	RL 083.2070	
R20	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270	
R21	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/5620HM-F-D	RL 083.0461	
R22	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545	
R23	RL 0,35W 6,81KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/6,81K-F-C	RL 082.2560	
R24	RL 0,35W 2,67KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,67K-F-D	RL 083.0910	
R25	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R26	RL 0,35W 182 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/1820HM-F-D	RL 083.0010	
R27	RL 0,35W 5,62 OHM+-1% TK50 METALFILMRESISTOR RESISTA MK2 5,62 OHM 1% TK50	RL 099.8044	
R28	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C	RL 082.2277	
R29	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926	
R30	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R31	RL 0,35W 182 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/182K-F-C	RL 083.2193	
R32	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R33	RL 0,35W 5,62 OHM+-1% TK50 METALFILMRESISTOR RESISTA MK2 5,62 OHM 1% TK50	RL 099.8044	
R34	RL 0,35W 392 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/392K-F-C	RL 082.2183	
R35	RL 0,35W 562 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/562K-F-C	RL 083.2664	
R36	TRIMMWERT / SELECTED RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C	RL 082.2277	


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R37	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926	
R38	RL 0,35W 8,25KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/8,25K-F-D	RL 083.1239	
R39	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R40	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800	
R41	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R42	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545	
R43	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R44	RL 0,35W 6,81KOHM+-0,1%T25 RESISTOR DRALORIC SMA0207/6,81K-B-E	RL 084.2745	
R45	RL 0,35W 19,6KOHM+-0,1%T25 RESISTOR DRALORIC SMA0207/19,6K-B-E	RL 084.3629	
R46	RL 0,35W 825 OHM+-1%TK50 RESISTOR DRALORIC SMA 0207/825OHM-F-C	RL 082.2502	
R47	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R48	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R49	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R50	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/27,4K-F-C	RL 082.2583	
R51	RL 0,35W 1MOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1M-F-D	RL 082.7862	
R52	RL 0,35W 4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250	
R53	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R54	RL 0,35W 3,92KOHM+-1%TK50 RESISTOR	RL 083.1039	
R55	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R56	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R57	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R58	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R59	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477	
R60	RL 0,35W22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R61	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/3320HM-F-D	RL 083.0255	
R62	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190	
R63	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103	RS 247.7903	
R64	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190	
R65	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/3320HM-F-D	RL 083.0255	
R66	RL 0,35W22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R67	RL 0,35W22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R68	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/3320HM-F-D	RL 083.0255	
R69	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190	
R70	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-103	RS 247.7903	
R71	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190	
R72	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/3320HM-F-D	RL 083.0255	
R73	RL 0,35W22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R74	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-C	RL 082.2190	

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R75
RL 0,21W 1,00KOHM+-1%TK50
RESISTOR
RL 092.1444
RESISTA MK1 1K00 1% TK50
R76
RL 0,35W 1KOHM+-1%TK50
RESISTOR
RL 082.2160
DRALORIC SMA0207/1K-F-C
R77
RL 0,35W 100 OHM+-1%TK50
DEPOS.-CARBON RESISTOR
RL 082.6543
DRALORIC SMA0207/100/HM-F-D
R78
RL 0,35W 10,0 OHM+-1%TK50
RESISTOR
RL 082.8852
DRALORIC SMA0207/100HM-F-D
R79
RL 0,35W 56,2 OHM+-1%TK50
RESISTOR
RL 082.9571
DRALORIC SMA0207/56,20HM-F-D
R80
RL 0,35W 2,21KOHM+-1%TK50
RESISTOR
RL 082.2477
DRALORIC SMA 0207/2,21K-F-C
R81
RL 0,35W 100KOHM+-1%TK50
RESISTOR
RL 082.1764
DRALORIC SMA0207/100K-F-C
R82
RL 0,35W 51,1 OHM+-1%TK50
RESISTOR
RL 082.9536
DRALORIC SMA0207/51,10HM-F-D
R83
RL 0,35W 51,1 OHM+-1%TK50
RESISTOR
RL 082.9536
DRALORIC SMA0207/51,10HM-F-D
R84
RL 0,35W 5,62 OHM+-1% TK50
METALFILMRESISTOR
RL 099.8044
RESISTA MK2 5,62 OHM 1% TK50
R86
RL 0,35W 47,5 OHM+-1%TK50
RESISTOR
RL 082.9507
DRALORIC SMA0207/47,50HM-F-D
R87
RL 0,35W 10,0 OHM+-1%TK50
RESISTOR
RL 082.8852
DRALORIC SMA0207/100HM-F-D
R89
RL 0,35W 47,5KOHM+-1%TK50
RESISTOR
RL 083.1800
DRALORIC SMA/207/47,5K-F-C
R96
RL 0,35W 1KOHM+-1%TK50
RESISTOR
RL 082.2160
DRALORIC SMA0207/1K-F-C
R97
RL 0,35W 10,0KOHM+-1%TK50
RESISTOR
RL 083.1297
DRALORIC SMA0207/10K-F-D
R99
RL 0,35W 274 OHM+-1%TK50
RESISTOR
RL 083.0178
DRALORIC SMA0207/2740HM-F-D
R100
RL 0,35W 10,0KOHM+-1%TK50
RESISTOR
RL 083.1297
DRALORIC SMA0207/10K-F-D
R101
RL 0,35W 10,0KOHM+-1%TK50
RESISTOR
RL 083.1297
DRALORIC SMA0207/10K-F-D
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R103	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R104	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R105	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D	RL 082.9536	
R106	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R107	RL 0,35W 8,25KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/8,25K-F-D	RL 083.1239	
R108	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R109	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R110	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D	RL 083.0084	
R111	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R112	TRIMMWERT / SELECTED RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R113	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C	RL 082.2277	
R114	RL 0,1W 2210HM+-1%TK50 RESISTOR DALE MF1/10 221 OHM1%TK50	067.4372	
R115	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R116	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/27,4K-F-C	RL 082.2583	
R117	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/332OHM-F-D	RL 083.0255	
R118	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R119	TRIMMWERT / SELECTED		
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	



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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R122	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-D	RL 082.2190	
R123	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R124	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R125	RL 0,35W 681 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/381K-F-C	RL 083.2735	
R126	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R127	RL 0,35W 4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250	
R128	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D	RL 083.0461	
R130	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R131	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R132	RL 0,35W 5,62KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,62K-F-D	RL 082.2190	
R133	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R134	RL 0,35W 2,74KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,74K-F-D	RL 083.0926	
R135	RL 0,35W 475 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/475OHM-F-D	RL 083.0390	
R136	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R140	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/27,4K-F-C	RL 082.2583	
R141	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R142	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D	RL 083.0490	
R143	RL 0,35W 22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R144	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R145	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R146	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R150	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R151	RL 0,35W 12,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1OHM-F-D	RL 082.8930	
R152	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R153	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R154	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R155	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R156	RL 0,35W 39,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/39,2OHM-F-D	RL 082.9420	
R157	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
BIS/TO R162 R163	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R164	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R165	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R166	RL 0,35W 18,20 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/18,2OHM-F-D	RL 082.9107	
R167	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R168	RL 0,35W 332 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/332OHM-F-D	RL 083.0255	
R169	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R170	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R171	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
BIS/TO R174 R175	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
BIS/TO R178 R180	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
BIS/TO R183 R184	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D	RL 083.0461	
R185	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R186	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R187	RL 0,35W 33,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/33,2OHM-F-D	RL 082.9359	
R189	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D	RL 083.0084	
R191	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R192	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R193	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C	RL 082.2277	
R194	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R195	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R196	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477	
R197	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477	
R198	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R199	RL 0,35W 121 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/121OHM-F-D	RL 082.9859	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R200	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D	RL 083.0084	
R201	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R202	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571	
R203	RL 0,35W 1,82KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,82K-F-C	RL 082.2277	
R204	RL 0,35W 22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10HM-F-D	RL 082.9188	
R205	RL 0,35W 33,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/33,2OHM-F-D	RL 082.9359	
R206	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400	
R207	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R210	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R211	RL 0,35W 3,92KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 083.1039	
R212	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R213	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R214	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R215	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
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R218			
R219	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R220	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477	
R221	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477	
R222	RL 0,35W 18,20 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/18,20HM-F-D	RL 082.9107	


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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R223	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R224	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D	RL 083.0084	
R225	RL 0,35W 22,10 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/22,10OHM-F-D	RL 082.9188	
R226	RL 0,35W 18,20 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/18,20OHM-F-D	RL 082.9107	
R227	RL 0,35W 47,5 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5OHM-F-D	RL 082.9507	
R230	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R231	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-D	RL 082.2231	
R232	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R233	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R234	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-D	RL 082.2160	
R235	RL 0,35W 33,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/33,2OHM-F-D	RL 082.9359	
R236	RL 0,35W 274 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/274OHM-F-D	RL 083.0178	
R237	RL 0,35W 51,1 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/51,1OHM-F-D	RL 082.9536	
R238	RL 0,35W 221 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/221OHM-F-D	RL 083.0084	
R239	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R240	RL 0,35W 33,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/33,2K-F-D	RL 083.1674	
R241	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/47,5K-F-D	RL 083.1800	
R243	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-D	RL 082.2231	
R251	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	
R252	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764		
R253	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800		
R254	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764		
R255	RL 0,35W 47,5KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/47,5K-F-C	RL 083.1800		
R256	RL 0,35W 475 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/475K-F-C	RL 083.2593		
R260	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477		
R261	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270		
R262	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545		
R263	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764		
R264	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764		
R265	RL 0,35W 2,21KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/2,21K-F-C	RL 082.2477		
R266	RL 0,35W 22,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/22,1K-F-C	RL 083.1545		
R267	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400		
R268	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D	RL 083.0990		
R269	RL 0,35W 27,4KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/27,4K-F-C	RL 082.2583		
R270	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2OHM-F-D	RL 082.9571		
R271	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297		
R273	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/681OHM-F-D	RL 083.0490		
R274	RL 0,35W 681 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/381K-F-C	RL 083.2735		
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R275	TRIMMWERT/SELECTED RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R276	TRIMMWERT / SELECTED RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R280	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R281	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R282	RL 0,35W 221 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/221K-F-C	RL 083.2270	
R283	RL 0,35W 56,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,2K-F-C	RL 082.2231	
R284	RS 0,5W50KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-503	RS 247.7910	
R285	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R286	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400	
R287	RS 0,5W50KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386F-1-502	RS 247.7890	
R288	RL 0,35W 12,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/12,1K-F-D	RL 083.1351	
R290	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R291	RL 0,35W 6,81KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/6,81K-F-C	RL 082.2560	
R292	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R294	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
R295	RL 0,35W 3,32KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,32K-F-D	RL 083.0990	
R296	RL 0,35W 10,0 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/100HM-F-D	RL 082.8852	
R297	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R298	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R299	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R300	RL 0,35W 4,75KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,75K-F-D	RL 083.1097	
R301	RL 0,35W 392 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/392K-F-C	RL 083.2512	
R305	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R306	RL 0,35W 562 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/562K-F-C	RL 083.2664	
R310	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R311	RL 0,35W 100KOHM+-0,1%TK25 RESISTOR DRALORIC SMA0207/100K-B-E	RL 084.4983	
R313	RL 0,35W 33,2KOHM+-0,1%TK25 RESISTOR DRALORIC SMA/207/33,2K-B-E	RL 084.4060	
R314	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R315	RL 0,35W 100 OHM+-1%TK50 DEPOS.-CARBON RESISTOR DRALORIC SMA0207/100/HM-F-D	RL 082.6543	
R320	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R321	RL 0,35W 68,1KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/68,1K-F-C	RL 082.2602	
R322	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R323	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R325	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R329	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
T1	LU TRANSFORMATOR TRANSFORMER	651.8756	
T2	LU TRANSFORMATOR TRANSFORMER	651.8762	

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Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
T3	LU TRANSFORMATOR TRANSFORMER		651.8779		
T4	LU TRANSFORMATOR TRANSFORMER		651.8785		
T5	LU TRANSFORMATOR TRANSFORMER		651.8791		
T6	LU TRANSFORMATOR TRANSFORMER		651.8804		
U1	8M SRA1 MIXER 0.5GHZ MIXER MINI-CCTS SRA1		BM 207.3465		
V1	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55		645.7345		
V2	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55		645.7345		
V3	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448		AD 012.0700		
V4	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55		645.7345		
V5	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX		AK 010.5163		
V6	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX		AK 010.3777		
V7	AE DSB6419-55 100V PINDI PIN DIODE ALPHA IND DSB 6419-55		645.7345		
V8	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448		AD 012.0700		
BIS/TO					
V12					
V13	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX		AK 010.5163		
V14	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX		AK 010.3777		
V15	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX		AK 010.5163		
V16	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX		AK 010.5163		
V17	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX		AK 010.3777		
V18	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448		AD 012.0700		
				651.8362.01 SA BL27+	

 ROHDE & SCHWARZ		AZ Datum Date	Schalteilliste für Parts list for ED HF-ZF-TEIL RF/IF UNIT	Sachnummer Stock No.	Blatt Page
12		0286		651.8362.01 _{SA}	28
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in
V19	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V20	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V21	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800			AE 012.9066	
V29	AE BZX55/B12 0,5W Z-DI ZENER DIODE VALVO BZX55/B12			AE 218.8940	
V30	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800			AE 012.9066	
V31	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800			AE 012.9066	
V32	AK 2N5160 PNP 40V 400MA TRANSISTOR MOTOROLA 2N5160			AK 010.3060	
V33	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V34	AK 2N3866 NPN 30V 400MA TRANSISTOR RCA 2N3866			AK 010.0926	
V35	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V36	AK 2N3866 NPN 30V 400MA TRANSISTOR RCA 2N3866			AK 010.0926	
V37	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V38	AK 2N5160 PNP 40V 400MA TRANSISTOR MOTOROLA 2N5160			AK 010.3060	
V39	AK 2N3866 NPN 30V 400MA TRANSISTOR RCA 2N3866			AK 010.0926	
V40	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V41	AE 5082-3188 35V PINDI PIN DIODE HEWLETT-P. 5082-3188			AE 086.9118	
V46	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V47	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V48	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
651.8362.01 SA BL28+					


ROHDE & SCHWARZ

AZ

 Datum
Date

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 ED HF-ZF-TEIL
RF/IF UNIT

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 Kennzeichen
Component No.

 Benennung/Beschreibung
Designation

 Sachnummer
Stock No.

 enthalten in
contained in

V50

 AE 5082-2800 SCHOTTKYDI
DIODE
HEWLETT-P. 5082-2800

AE 012.9066

BIS/TO

V53

V54

 AK BFR96 NPN 15V 5GHZ
TRANSISTOR
VALVO BFR96

AK 093.2738

V55

 AK BFR96 NPN 15V 5GHZ
TRANSISTOR
VALVO BFR96

AK 093.2738

V57

 AD 1N4448 75V 0,15A UDI
DIODE

AD 012.0700

V58

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

AD 012.0700

V60

 AK 2N3866 NPN 30V 400MA
TRANSISTOR
RCA 2N3866

AK 010.0926

V61

 AE 5082-2800 SCHOTTKYDI
DIODE
HEWLETT-P. 5082-2800

AE 012.9066

V62

 AK 2N3866 NPN 30V 400MA
TRANSISTOR
RCA 2N3866

AK 010.0926

V63

 AM J108 NKAN 25V FET
FET
SILICONIX J108

AM 332.2660

BIS/TO

V68

V69

 AG 1N4007 GL1000V 1A0
RECTIFIER
AEG-TELEF 1N4007

AG 013.0310

V70

 AM J108 NKAN 25V FET
FET
SILICONIX J108

AM 332.2660

V71

 AM J108 NKAN 25V FET
FET
SILICONIX J108

AM 332.2660

V72

 AM J108 NKAN 25V FET
FET
SILICONIX J108

AM 332.2660

V73

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

AD 012.0700

V74

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

AD 012.0700

V75

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

AD 012.0700

V76

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

AD 012.0700

651.8362.01 SA BL29+

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 ROHDE & SCHWARZ		AZ Datum Date	Schaltteilliste für Parts list for ED HF-ZF-TEIL RF/IF UNIT	Sachnummer Stock No.	Blatt Page
		12	0286	651.8362.01 SA	30
Kennzeichen Component No.	Benennung/Beschreibung Designation			Sachnummer Stock No.	enthalten in contained in
V78	AM J108 NKAN 25V FET FET SILICONIX J108			AM 332.2660	
V79	AK BCY79IX PNP 45V 200MA TRANSISTOR SIEMENS BCY79IX			AK 010.3777	
V80	AK 2N3866 NPN 30V 400MA TRANSISTOR RCA 2N3866			AK 010.0926	
V82	AK 2N3866 NPN 30V 400MA TRANSISTOR RCA 2N3866			AK 010.0926	
V83	AG 1N4007 GL1000V 1A0 RECTIFIER AEG-TELEF 1N4007			AG 013.0310	
V84	AG 1N4007 GL1000V 1A0 RECTIFIER AEG-TELEF 1N4007			AG 013.0310	
V90	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V91	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V92	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V93	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V94	AK BFR15A NPN 12V >4GHZ TRANSISTOR SIEMENS BFR15A			AK 451.4320	
V95	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V96	AK BFR15A NPN 12V >4GHZ TRANSISTOR SIEMENS BFR15A			AK 451.4320	
V97	AK BCY59IX NPN 45V 200MA TRANSISTOR SIEMENS BCY59IX			AK 010.5163	
V98	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V100	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V101	AD 1N4448 75V 0,15A UDI DIODE VALVO 1N4448			AD 012.0700	
V102	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800			AE 012.9066	
V103	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800			AE 012.9066	
651.8362.01 SA 8L30+					


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AZ
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Date**
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Parts list for**
**ED HF-ZF-TEIL
RF/IF UNIT**
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
V104	AE 5082-2800 SCHOTTKYDI DIODE	AE 012.9066	
V105	HEWLETT-P. 5082-2800 AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	
V106	VALVO 1N4448 AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	
V107	VALVO 1N4448 AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	
BIS/TO	VALVO 1N4448		
V113			
V114	AE BZX55/B4V7 0,5W Z-DI ZENER DIODE	AE 080.4014	
V116	INTERMETAL ZPD4,7+-2,5% AD 1N4448 75V 0,15A UDI DIODE	AD 012.0700	
	VALVO 1N4448		
W1	DX KABEL I	651.8733	
W2	DX KABEL II	651.8740	
X1	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 1-POLIG		
X2	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 1-POLIG		
X3	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 1-POLIG		
X4	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 1-POLIG		
X5	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 1-POLIG		
X6	FP STECKERL.INDIR.64POLIG 64-PIN INSERT	FP 084.6470	
	PANDUIT 100-064-033/999		
X21	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 4-POLIG		
X23	FP INDIREKT.STECKERL.36P. PIN CONNECTOR	FP 242.3600	
	BERG 75160-102-36 4-POLIG		

651.8362.01 SA BL31+

 ROHDE & SCHWARZ		AZ Datum Date	Schaltteilliste für Parts list for ED HF-ZF-TEIL RF/IF UNIT	Sachnummer Stock No.	Blatt Page
12		0286		651.8362.01 SA	32
Kennzeichen Component No.	Benennung/Beschreibung Designation		Sachnummer Stock No.	enthalten in contained in	
X24	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 4-POLIG		FP 242.3600		
X25	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 4-POLIG		FP 242.3600		
X26	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 4-POLIG		FP 242.3600		
X27	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 4-POLIG		FP 242.3600		
X28	FP INDIREKT.STECKERL.36P. PIN CONNECTOR BERG 75160-102-36 4-POLIG		FP 242.3600		
X31	FP KURZSCHLUSSBUCHSE SHORTING PLUG PK 452-70302		FP 491.7042		
X33	FP KURZSCHLUSSBUCHSE SHORTING PLUG PK 452-70302		FP 491.7042		
BIS/TO					
X38					
X60	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X65	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X68	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X69	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X611	FP BUCHSENLEISTE 48POL. CONNECTOR PANDUIT 100-348-439/999/994		FP 565.9588		
X612	FP BUCHSENLEISTE 16P.KURZ 16-SOCKET INSERT PANDUIT 100-316-431/999/994		FP 565.1441		
X671	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X672	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
X673	FJ EINBAUSTECKER SYST.SMB FIXED CONNECTOR ROSENBERG 59S601-200D2		FJ 063.5116		
				651.8362.01 SA BL32+	

**ROHDE & SCHWARZ**

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Datum
Date

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Schaltteilliste für
Parts list forED HF-ZF-TEIL
RF/IF UNITSachnummer
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Kennzeichen
Component No.Benennung/Beschreibung
DesignationSachnummer
Stock No.enthalten in
contained in

Z1

EP 80,64MHZ-BANDP., B: 8K
80,64MHZ-BANDPASS, BW8KHZ
CATHODE ON R&S-ZCHNG.EP089.3991

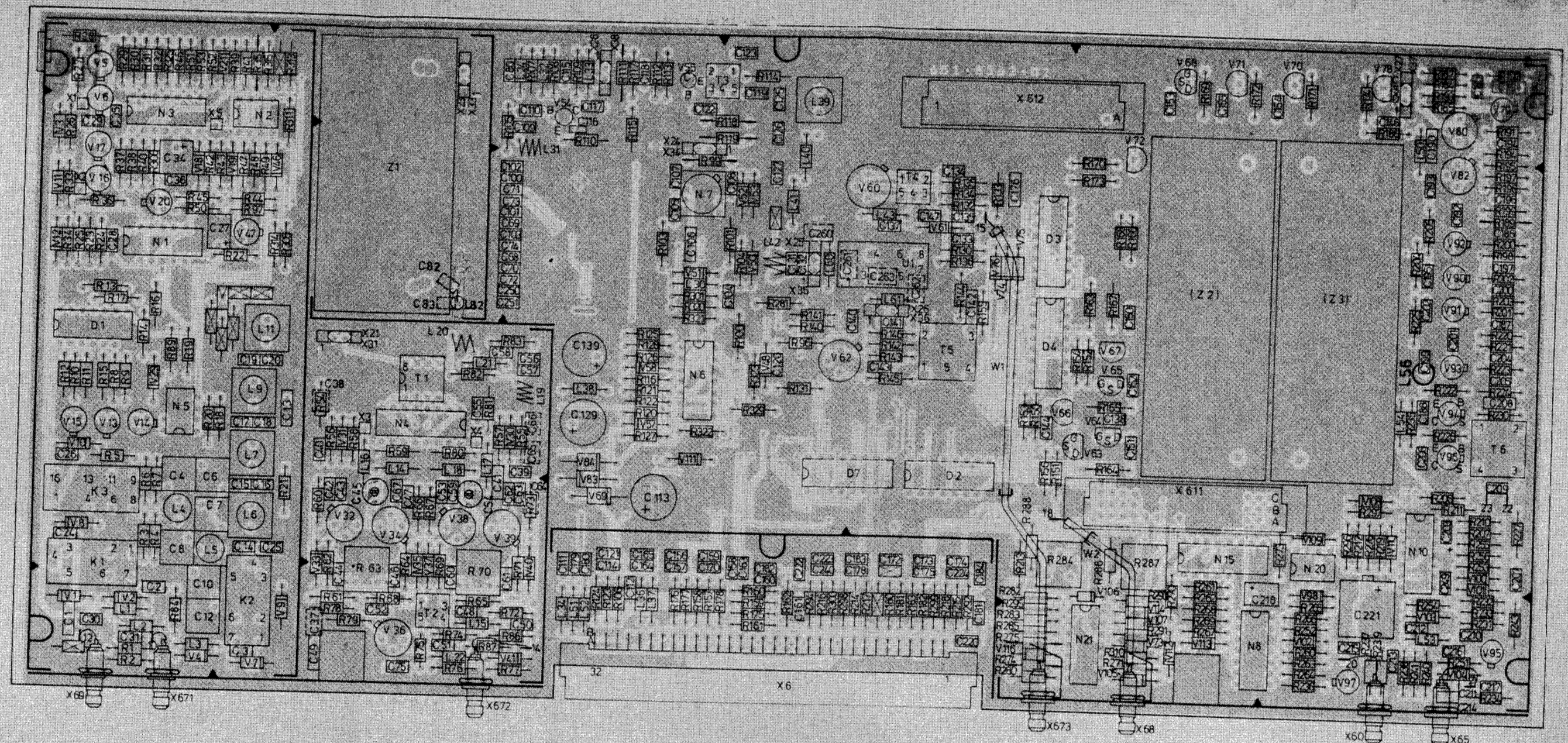
089.3991

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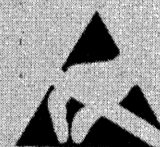
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Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



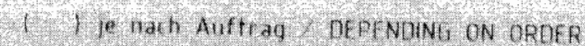
je nach Auftrag / DEPENDING ON ORDER

B	08 85	WI	Modulname	Modulnr.	1
I	10 85	WI	Modulname	Modulnr.	1
D	35406	11 85	WI	Modulname	1
I	35406	18 85	WI	Modulname	1
6KBH			Modulname	Modulnr.	1
08 85			Modulname	Modulnr.	1
WI			Modulname	Modulnr.	1
ROHDE & SCHWARZ			Modulname	Modulnr.	1
GX 085 P1			Modulname	Modulnr.	1
HF-ZF-Teil			Modulname	Modulnr.	1
REIF UNIT			Modulname	Modulnr.	1
651.8362 01			Modulname	Modulnr.	1
651.8310 V			Modulname	Modulnr.	1
651.8310 01			Modulname	Modulnr.	1



ATTENTION: FOR
Electronic equipment
Base electronic equipment
Attention: FOR
Electronic equipment
Base electronic equipment
Attention: FOR

SEE PARTS LIST



B	08 85	WI	Meldestufe	Markiert	1 1
C	10 85	WI	Indikatorgröße	Highspeed Workshift	
D	35406	11 85	WI		
E	35406	186	WI		
	6KBH	08 85	WI	HF-ZF-Teil	Z
	REPAIR UNIT				
				651.8362.01	3
	RONDE & SCHWARZ				3



ACHTUNG LEB:
Elektronische Leuchtstoffe
Benutzen Sie elektronische
bestimmte Handhabung.

ATTENTION LEB:
Electronique, veuillez
utiliser le matériel
approprié.



ROHDE & SCHWARZ

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Datum
DateSchaltteilliste für
Parts list forED FILTERPLATTE
FILTER BOARDSachnummer
Stock No.Blatt
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02 0785

651.8610.01 SA

1

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
.	ZUGEH.STROML./CIRC.DIAGR.		
..	651.8310.01 S VARIANTENERKL. / VERSIONS VAR 02 = GRUNDAUSFUEHRUNG MOD 02 = BASIC MODEL		
C1	CC 22NF+-10%50VK1200VIELS CAPACITOR UNION CARB M39014/01-1421	CC 060.2445	
BIS/TO C8			
C9	CC 1UF+-10%50V7K1200VIEL CAPACITOR UNION CARB M39014/02-1403	CC 084.5538	
C10	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB M39014/01-1433	CC 084.5350	
D21	BL HEF4104BD 4XCONV. 3S LEVEL CONVERTER VALVO HEF4104BD	645.7668	
D22	BL SCL4028BC BCD/DEC.DEC BCD/DECADE DECODER MOTOROLA MC14028BAL	BL 290.1178	
R1	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
BIS/TO R8			
R11	RL 0,35W 56,2 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/56,20HM-F-D	RL 082.9571	
BIS/TO R14			
V1	AM J108 NKAN 25V FET FET SILICONIX J108	AM 332.2660	
BIS/TO V8			
X611	FP STECKERLEISTE 48POL. CONNECTOR PANDUIT 100-348-131/999/994	FP 565.9571	
X612	FP STECKERLEISTE 16P KURZ PANDUIT 100-316-131/999/994	FP 565.1435	

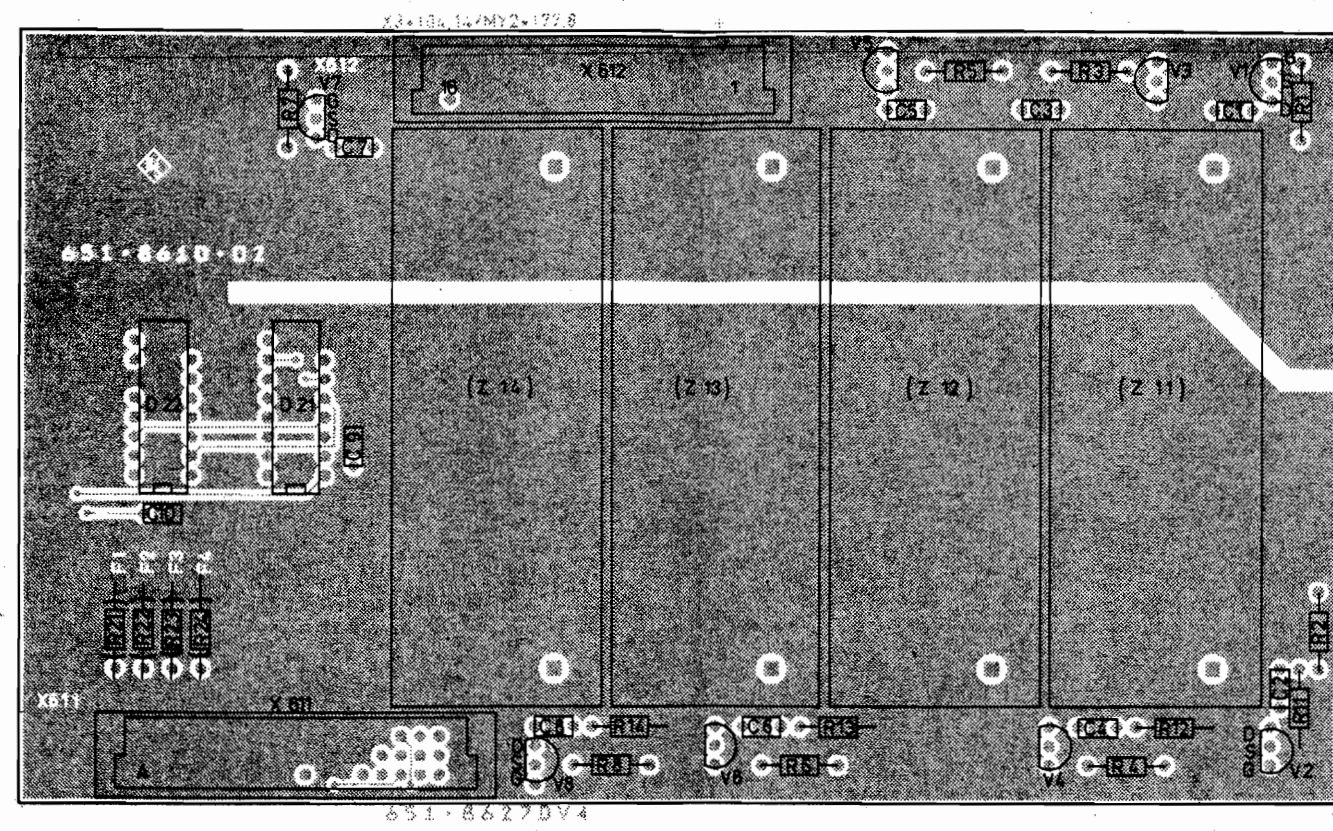
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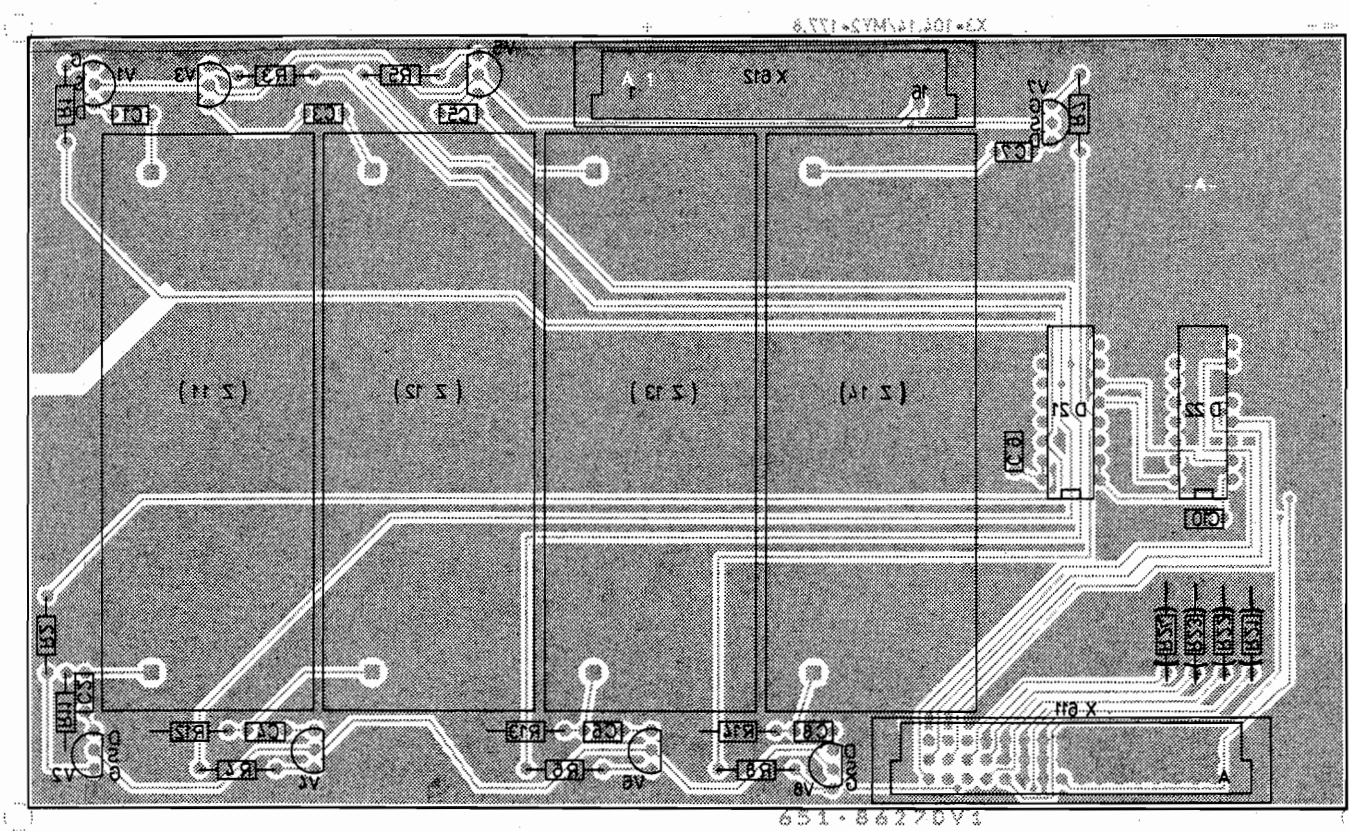


ACHTUNG: EGB!
Elektrostatisch gefährdete
Bauelemente erfordern eine
besondere Handhabung.
ATTENTION ESD!
Electrostatic sensitive
devices require a special
handling.

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



Ansicht und Leitungsführung Lötseite
View of tracks on solder side



(...) je nach Auftrag / DEPENDING ON ORDER

Variantenerklärung siehe SA
EXPLANATION OF MODELS
SEE PARTS LIST

A	7.85	WI	Maße ohne Toleranzangabe	Maßstab 1 : 1	
B	10.85	WI		Halbzeug, Werkstoff	
			6KBU Tag Name	Benennung	
			Bearb 7.84 HN	Filterplatte	Z
			Gepr	FILTER BOARD	
			Norm		
			ROHDE & SCHWARZ	Zeichn.-Nr	Blatt-Nr
				651.8610.01	2
And Zust	Anderungs-Mitteilung	Tag	Name		v 2 Bl.