

## Selective Level Meter

**SPM-15**

for the frequency range 50 Hz to 10 MHz, send section available



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**Part I: Level Meter**

**SPM-15**

## 6 PRELIMINARY REMARKS

### 6.1 INTRODUCTION TO SERVICING

Maintenance and repair are the two main tasks involved in servicing a measuring instrument. All the necessary information is provided in the Instrument Manual, with its Operating Instructions, Service Instructions and Appendix.

The Operating Instructions provide all the necessary basic information on the instrument. Section 5 describes a brief function test and the non-electrical maintenance work.

The Service Instructions provide all the specific information required for repair work. Section 8 "Verifying important technical data" is required for both maintenance and repairs.

The information provided has been selected in such a way that an experienced technician can carry out all standard repairs. Work which is usually only necessary during the manufacture of an instrument has not been included.

The Appendix contains all the general block diagrams, circuit diagrams, electrical parts lists and component layout diagrams of the circuit boards. In addition, it provides the necessary information for reading the circuit diagrams and ordering spare parts. Also included is a list of the terms used in the Appendix in German/English/French.

#### 6.1.1 MEASURING EQUIPMENT

The measuring equipment listed here as necessary for testing represents a recommendation only. Equivalent instruments from other manufacturers may also be used.

Instrument	Requirements	Recommended type	Manufacturer	Refer to Section for use
Level meter	50 Hz...25 MHz synthesizer output 40 to 65 MHz	SPM-19	W&G	7.5, 7.6, 7.8
Display unit	for level meter; 2 curve stores	SG-4	W&G	7.5, 7.6, 7.8
Level generator	70 Hz to 25 MHz ext. frequency and level variable	PS-19	W&G	7.5, 7.6, 7.8
Level generator with tracking generator	50 Hz to 10 MHz	SPM-15 with PSE or SPM-19/PSS-19	W&G	8.2, 8.5, 8.7, 8.8
Milliwatt power meter	50 Hz to 10 MHz accuracy $\pm 1$ mB	EPM-1 with TK-10	W&G	7.5, 7.6, 7.8, 8.2, 8.6
Bal. test probe	124 $\Omega$ , 150 $\Omega$ , 600 $\Omega$	TKS-10, TKS-124, TKS-150, TKS-600	W&G	7.5, 7.6, 7.8, 8.2, 8.6

Instrument	Requirements	Recommended type	Manufacturer	Refer to Section for use
Attenuation set	75 $\Omega$ , DC...100 MHz 1...100 dB, 1 dB increments	D2053	Siemens	7.5, 7.8, 8.2, 8.6
Return loss meas. attachment	75 $\Omega$ , 10 kHz... 10 MHz	RFZ-5	W&G	7.8, 8.5, 8.8
Return loss meas. attachment	124/150/600 $\Omega$ 10 kHz...100 kHz	RFZ-12	W&G	7.8, 8.5, 8.8
Signal balance ratio meas. att.	124/600 $\Omega$ 10 kHz...5 MHz	SDZ-12	W&G	7.8, 8.5, 8.8
Frequency counter	50 Hz...100 MHz, $\Delta f \leq 1 \times 10^{-7}$ resolution 1 Hz	PM 6673/03	Philips	7.5, 7.8, 8.2
Active test probe	2 kHz...100 MHz	TK-11	W&G	7.5, 7.6, 7.8
Signature analyzer	HP-compatible	HP 5004/5005	HP	7.4
Logic analyzer	Advisable, not essential	-	-	7.4, 7.5
Noise level generator	6 kHz...12 kHz	RG-25	W&G	8.7
Limiting filter	12 kHz...8160 kHz	RSB 12/8160	W&G	8.7
Bandstop filter	$f = 3886$ kHz, $B_{rms} \geq 20$ kHz	RSS 3886	W&G	8.7
Low-pass filter	$300 \text{ Hz} \leq f_g \leq 1 \text{ MHz}$	-	-	8.6
X-Y plotter	-	-	-	7
Oscilloscope	$\geq 100$ MHz	-	-	7
Power supply	8...20 V/4 A	-	-	7.8.2
Variable-ratio transformer	100 V...250 V	-	-	7.8.2
Special measuring equipment:				
MONEX with adapter	} refer to Section 9.5	MONEX	W&G	7
		PG 19-955	W&G	7
Current measurement adapter	-	PG 1-955	W&G	7
T branch	BNC	-	-	7, 8.2
T branch	3-pole (CF)	S 833	W&G	7, 8.4

## 7 NOTES ON TROUBLESHOOTING AND REPAIRS

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### 7.1 SAFETY MEASURES

#### 7.1.1 ELECTRICAL SAFETY

##### Protection class

This instrument is classified in protection class I to VDE 0411 and IEC Publ. 348. The power cord supplied contains a non-fused earthed conductor. The mains plug may only be plugged into earthed sockets unless the mains sockets are transformer isolated. The non-fused earthed conductor must not be interrupted either inside or outside the instrument.

##### Opening the instrument

Live parts may be exposed when covers are opened or parts removed with the aid of a tool. Connecting points may also be live.

The instrument must be disconnected from all power sources before being opened.

If it is essential to perform calibration, maintenance or repair work on the instrument when it is both open and connected to the power supply, such work must only be carried out by a trained technician who is aware of the potential danger.

Capacitors inside the instrument may still be charged, even if the instrument itself has been disconnected from all power sources; the circuit diagrams must be consulted.

##### Fuses

Only the specified fuses may be used.

##### Repairs, replacing parts

Repairs must be performed correctly. Particular care must be taken to ensure that the design features of the instrument are not altered in a manner reducing its safety. On no account must the creepage and air paths or the insulation distances be reduced.

Only use original parts as replacements. Other spare parts may only be used if they do not impair the safety characteristics of the instrument.

Refer to Section 7.1.4 for notes on ordering spare parts.

##### Testing after repair and maintenance work

###### Testing the non-fused earthed conductor

Visually check for correct connection and good condition of the conductor and measure the resistance between the plug connection of the non-fused earthed conductor and the housing. The resistance should be  $< 0,5 \Omega$ . Move the connecting lead during this measurement. Fluctuations in the resistance are indicative of damage to the conductor.

###### Testing the insulation resistance

Measure the insulation resistance between the mains connections and the non-fused earthed conductor at a voltage of 500 V DC. Set the line switch on the instrument to "ON" for this purpose. The insulation resistance should be  $> 2 M\Omega$ .

### 7.1.2 CIRCUITRY PROTECTION

#### Be careful when handling MOS components!

A number of MOS (metal-oxide semiconductor) components are used in this instrument. They can easily be damaged or destroyed by static charges, ripple voltages from unearthed devices or other interference voltages. Damage to the gate insulation does not always result in immediate failure of a component; in many cases, this only occurs after a certain period of operation. Damage due to static charges can be avoided by noting the following rules:

- Whenever possible, MOS components should remain in the supplier's wrapping until required. All connections must be conductively linked until used (black, electrically conductive foam).
- The electrically conductive part of the packaging must make contact with a reference potential in the form of a conductive worktop or the chassis of the instrument to be repaired before unpacking the MOS components or the circuit boards fitted with such components.
- Before touching the MOS components, touch the conductor acting as reference potential with one hand.
- All tools and instruments, the part to be repaired and the user should have the same potential as the conductor acting as the reference potential (e.g. a conductive worktop or, alternatively, the chassis of the instrument to be repaired). For this reason, first make contact between the reference potential and the tools with which the MOS components are to be handled. Tools must not have insulated handles.
- If work is being carried out on a circuit board or other instrument parts separately from the rest of the instrument and not on a conductive worktop, connect the earth of the circuit board, etc. to the reference potential.

Damage due to ripple voltages during soldering work can be avoided by establishing a permanent connection between the soldering iron and the chassis of the instrument being repaired.

MOS components include the letters MOS, CMOS or MOSFET in the component designations of the electrical parts list.

### 7.1.3 SOLDERING INSTRUCTIONS

It is recommendable to use thin solder with little flux. Note the following points:

- Soldering time for all components  $\leq 5$  s
- Soldering temperatures  $\leq 260^{\circ}\text{C}$
- Ensure that flux is not spilled onto contact-making surfaces when soldering switch contacts or other electromechanical components.

Note on desoldering components with multiple connections:

The best method by far is to remove the solder of each individual connection by suction using special-purpose desoldering equipment. Move the connection gently back and forth while desoldering, to check that each individual connection is free. Do not use force.

Through-platings are sensitive to tensile stresses during soldering.

In the case of dual-in-line components, the circuit board can be spared a great deal of damage by cutting through the connections on the component side and desoldering them individually.

#### Soldering on thin-film circuits

Soldering on thin-film circuits requires exact temperature control, a very short soldering time and special-purpose tools. Using the normal procedure, the risk of destroying the circuitry is so great that we recommend replacement of the complete thin-film circuit.

#### 7.1.4 INSTRUMENT DATA

The following data are required for enquiries and orders for spare parts relating to the instrument to be repaired:

Type designation, Series index and instrument number, model designation and any options installed.

e.g. SPM-15, Series B-0999, BN 955/01 with PSE

The item No. listed in the electrical parts list in the Appendix must also be stated when ordering spare parts.

e.g. 1 Trans. BCY59D item No. 0001-0016.518

Fig. 7.1-1 shows where the instrument data are to be found.

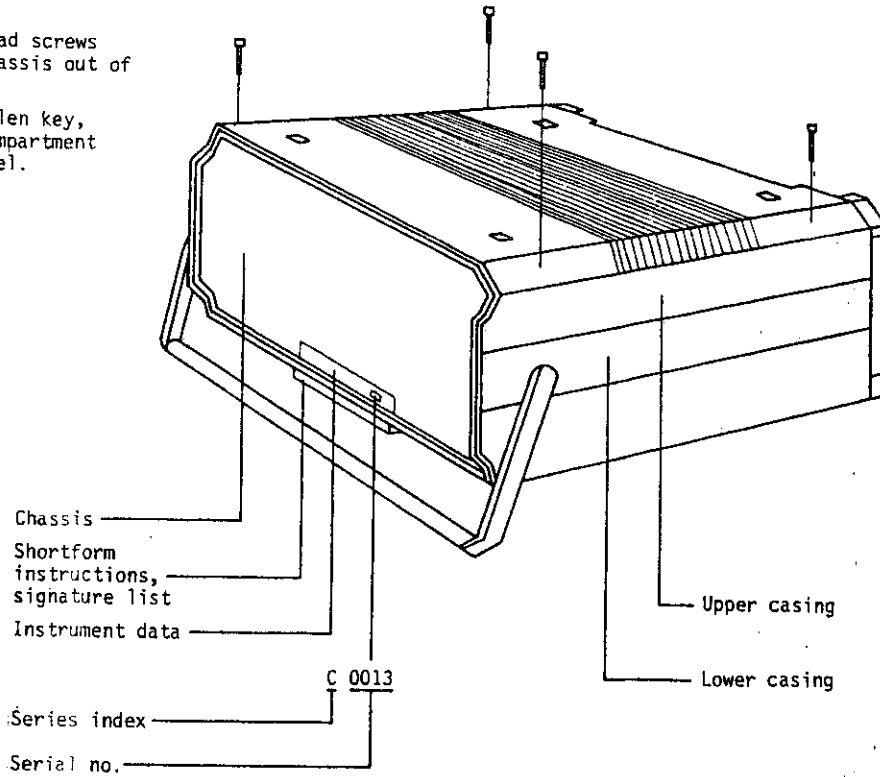
The software package is identified via the BV number of the signature list (refer to Fig. 7.4-1). On instruments with a drawer for the shortform Operating Instructions, the signature list is also put into this drawer. If there is no drawer, the signature list is fitted inside the instrument. An adhesive label on the rear cover plate identifies the signature list. The signature list must be supplemented or replaced when subsequently fitting additional options or using new software.



Dismantling

Undo 4 allen-head screws and lift the chassis out of the casing.

Use the 3 mm allen key, found in the compartment on the back panel.



Back panel

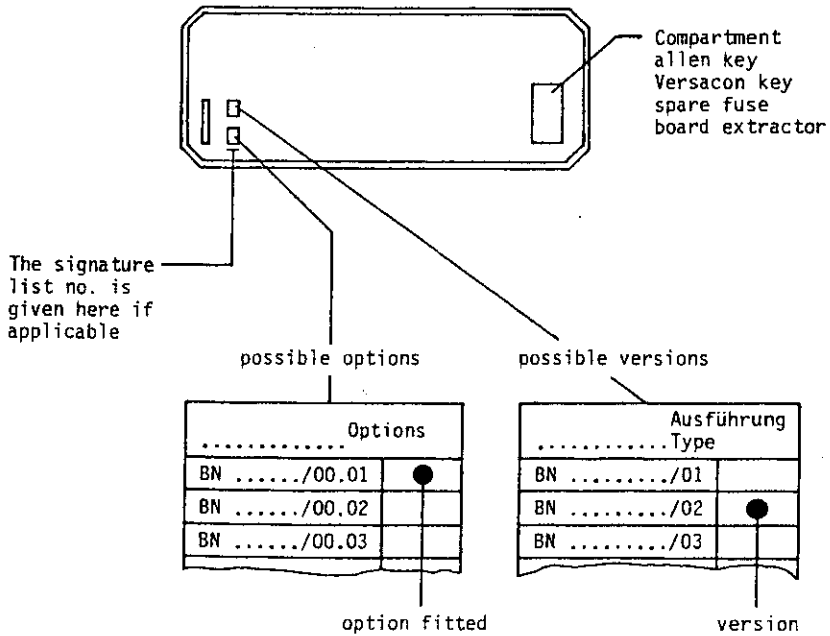


Fig. 7.1-1 Dismantling the instrument; instrument data

### 7.1.5 DISMANTLING THE INSTRUMENT

#### Removing the instrument

After undoing the four hexagon socket screws at the top and removing the top part of the housing, the instrument can be lifted up and out of the housing.

#### Removing the control knobs

Refer to Fig. 7.1-2.

#### Casings and frames

Refer to Fig. 7.1-3.

All knobs are mounted by a clamping chuck. To obtain access for removal of the knob, use a knife blade to pry off the plastic cap covering the central fastening screw or nut. Use 7 mm open end wrench.

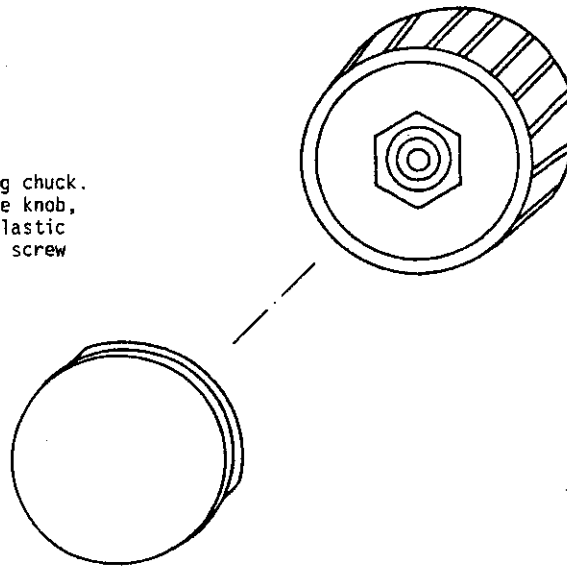
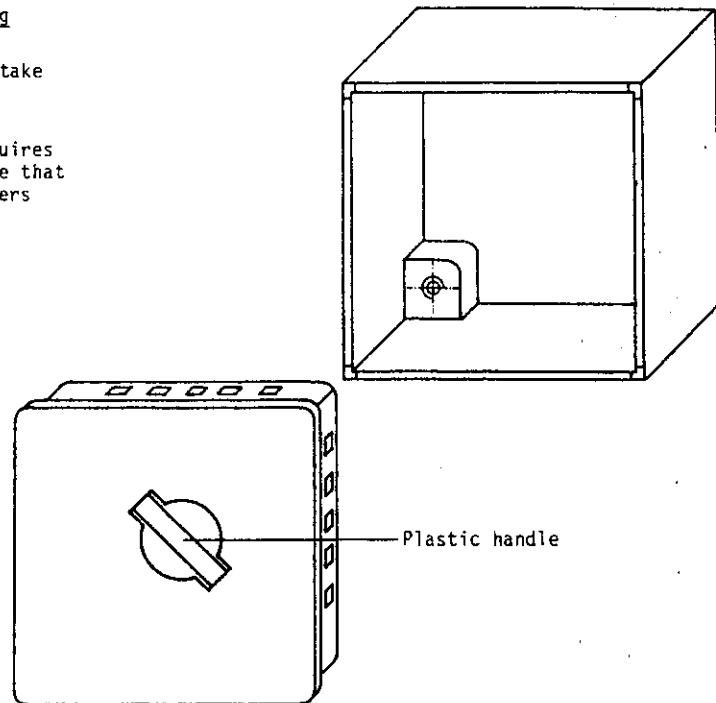


Fig. 7.1-2 Removing control knobs

Removal of cover from screening boxes and frames

The plastic handle is used to take the covers off from the frames and boxes.

Caution: replacing a cover requires attention to make sure that the thin contact fingers are not damaged.



Disassembly of circuits from screening boxes and frames

The stand-off screws or spacers to which the printed circuit board is attached, and all chassis-ground screws should be removed. Then the printed circuit board is removed by the card puller. When replacing the circuit the contact pins must be protected by assuring the p.c.b. is exactly parallel to all pins before the p.c.b. is pressed home.

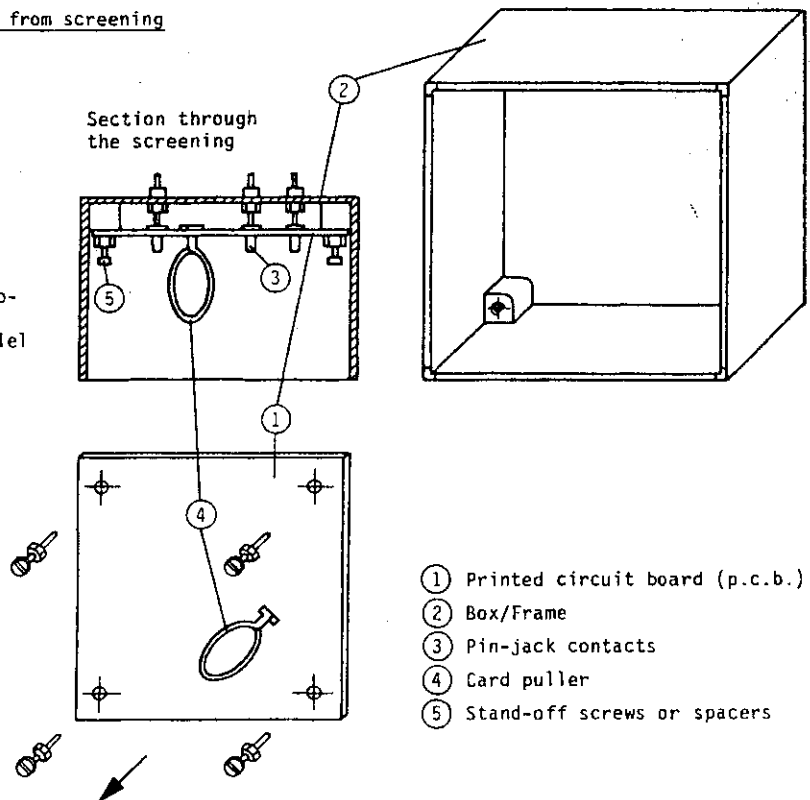


Fig. 7.1-3 Casings and frames

7.2 LOCATION OF ASSEMBLIES, ALIGNMENT ELEMENTS, TEST POINTS

A list of assemblies can be found in Section 7.8, Fig. 7.8-2.

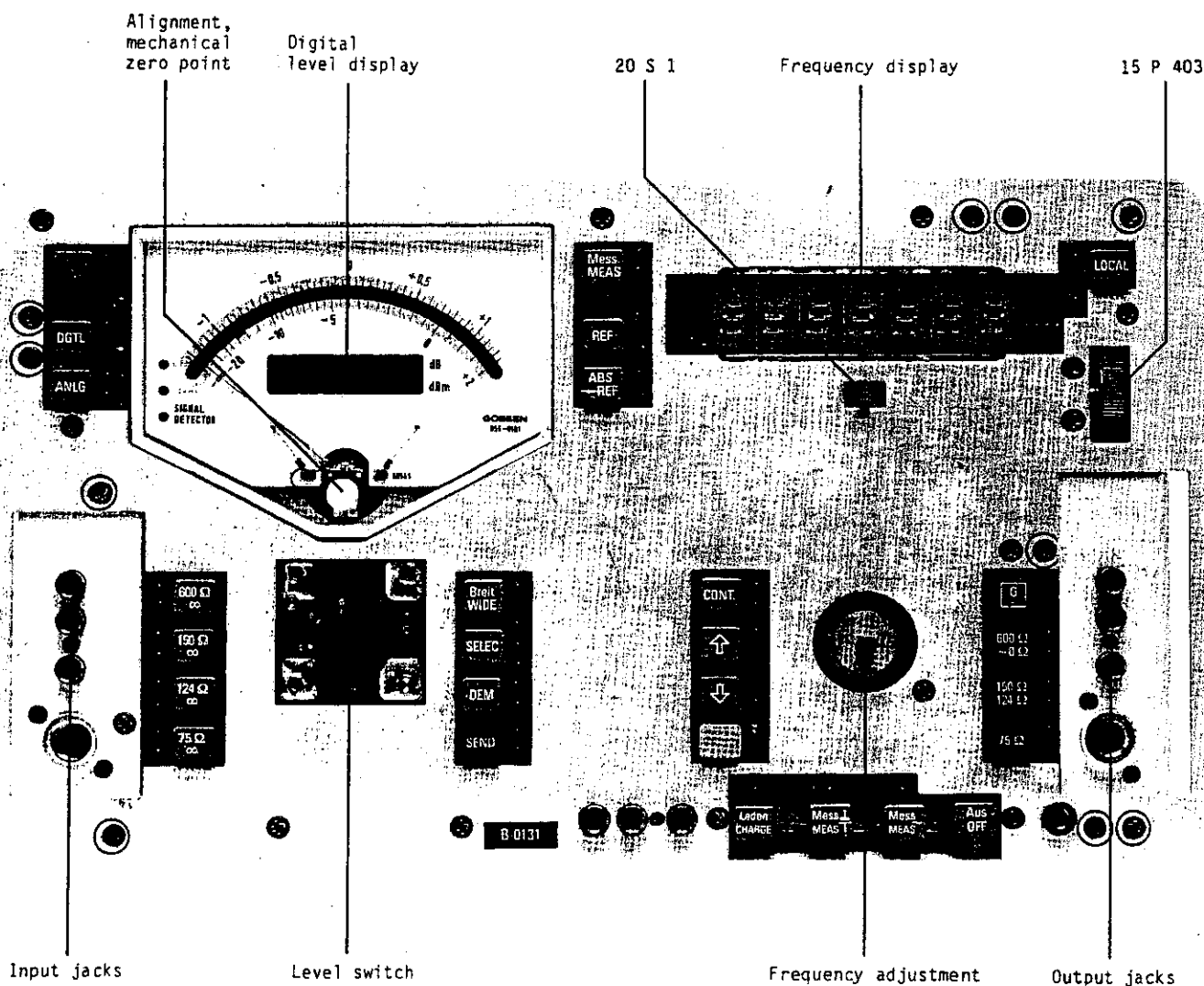


Fig. 7.2-1 SPM-15, front view

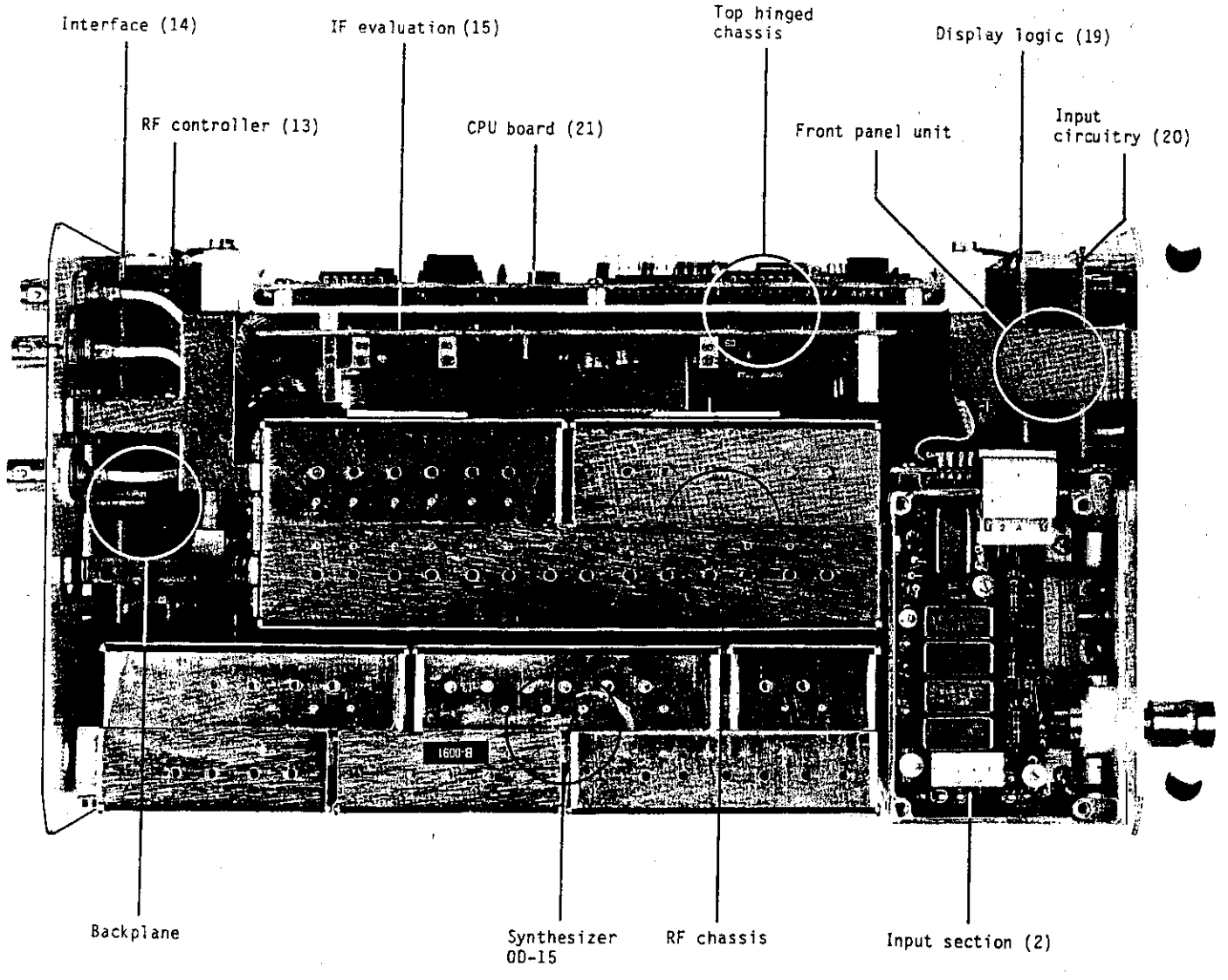


Fig. 7.2-2 SPM-15, side view from left

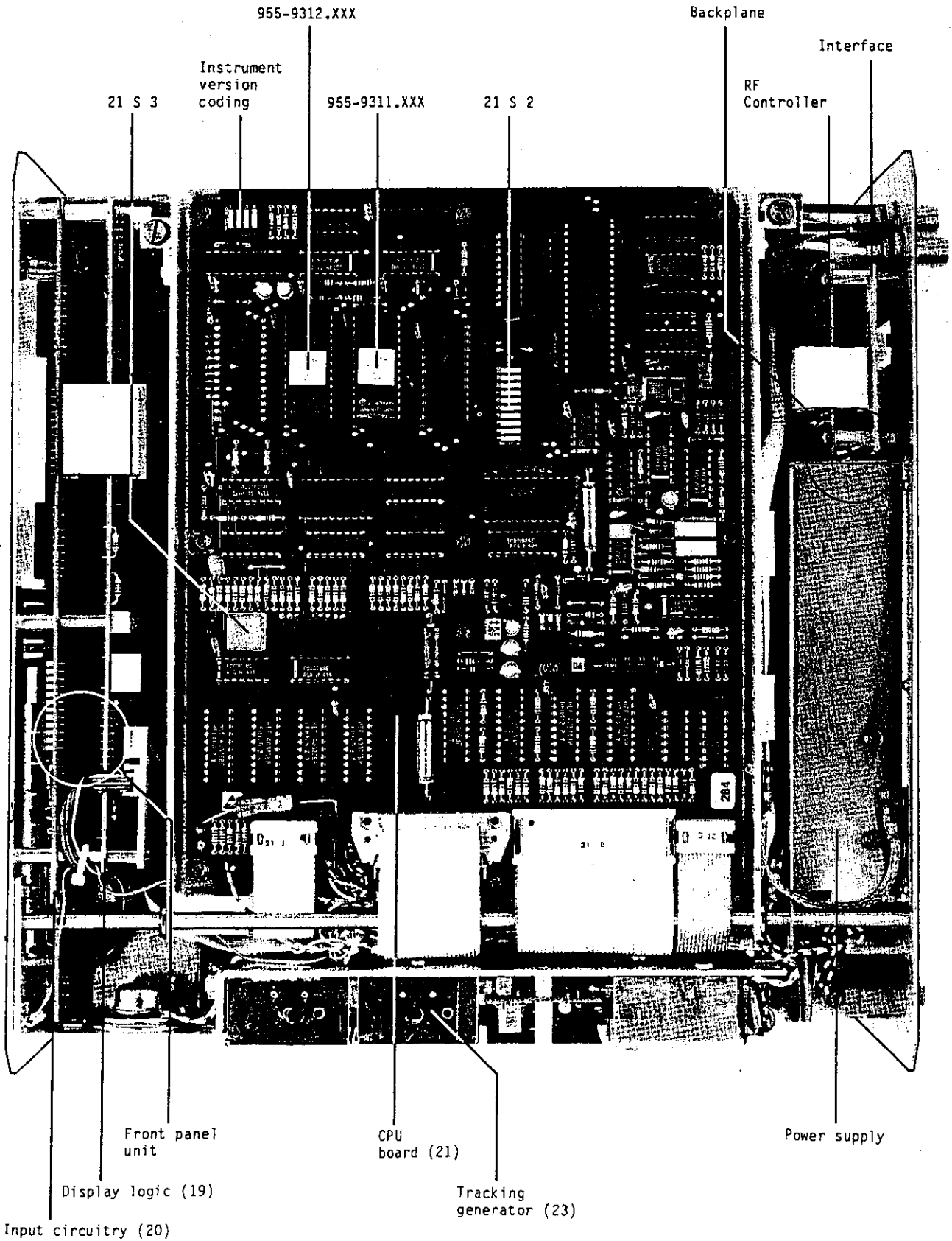


Fig. 7.2-3 SPM-15, top hinged frame from above

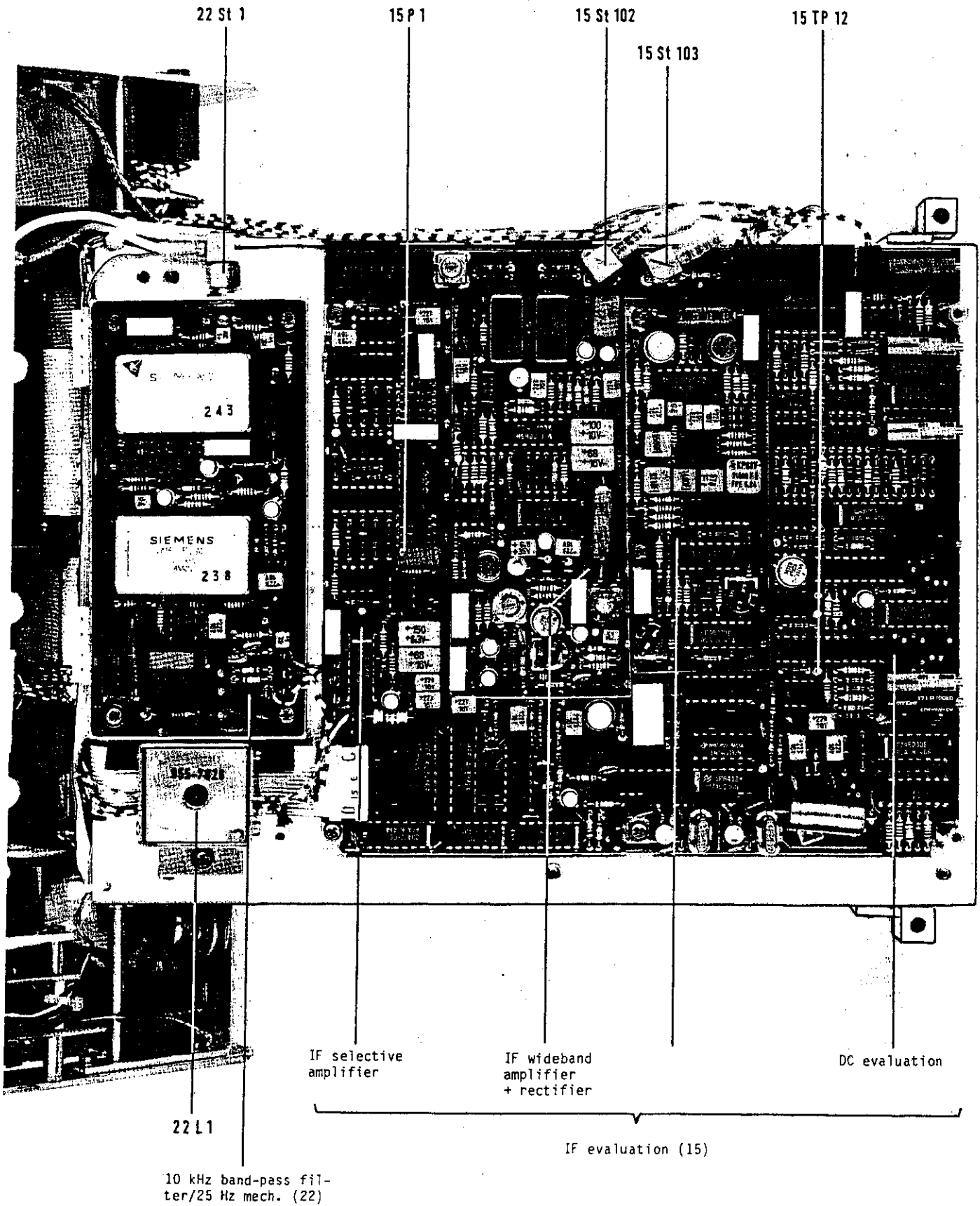


Fig. 7.2-4 SPM-15, top hinged frame from below

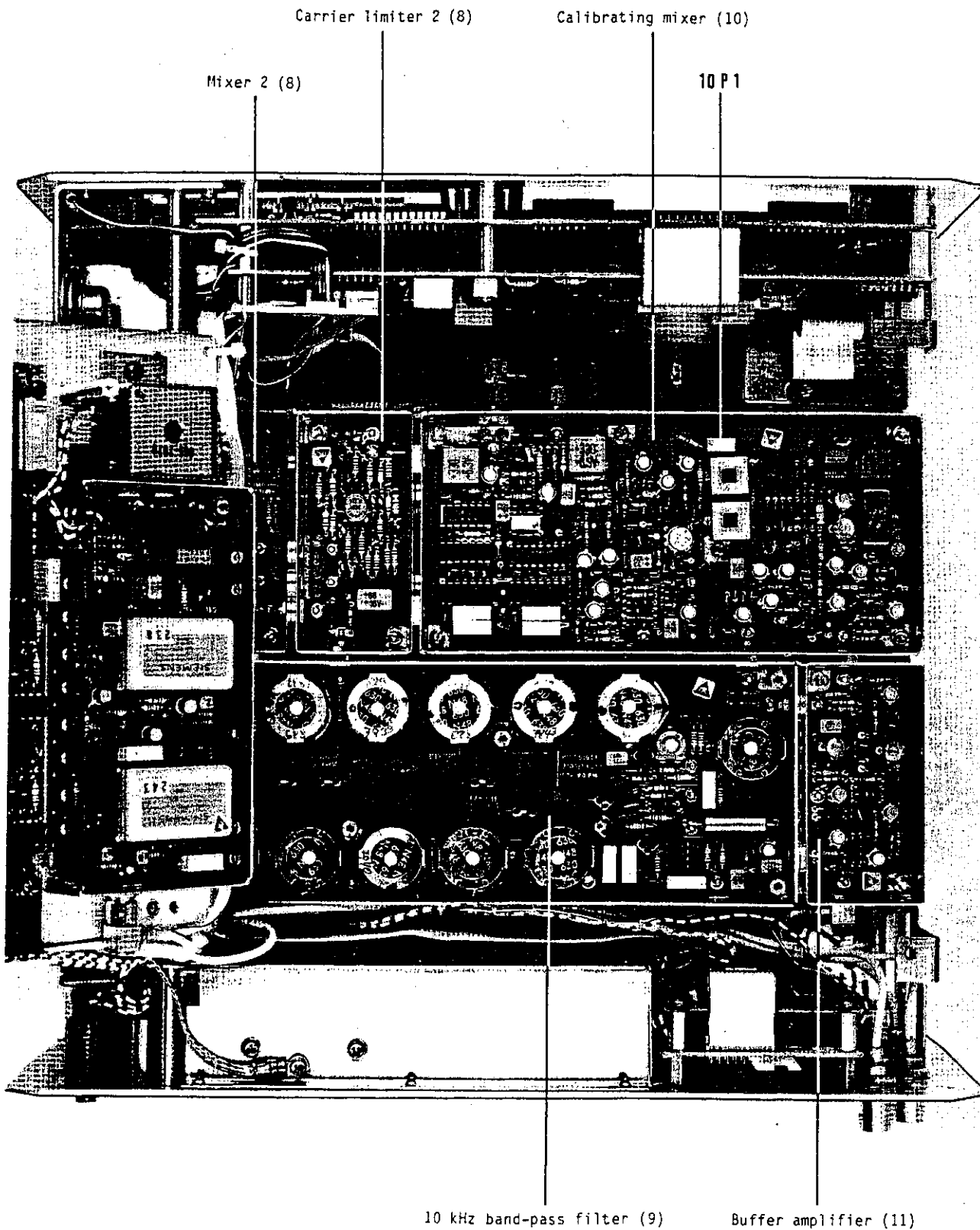


Fig. 7.2-5 SPM-15, RF chassis from above



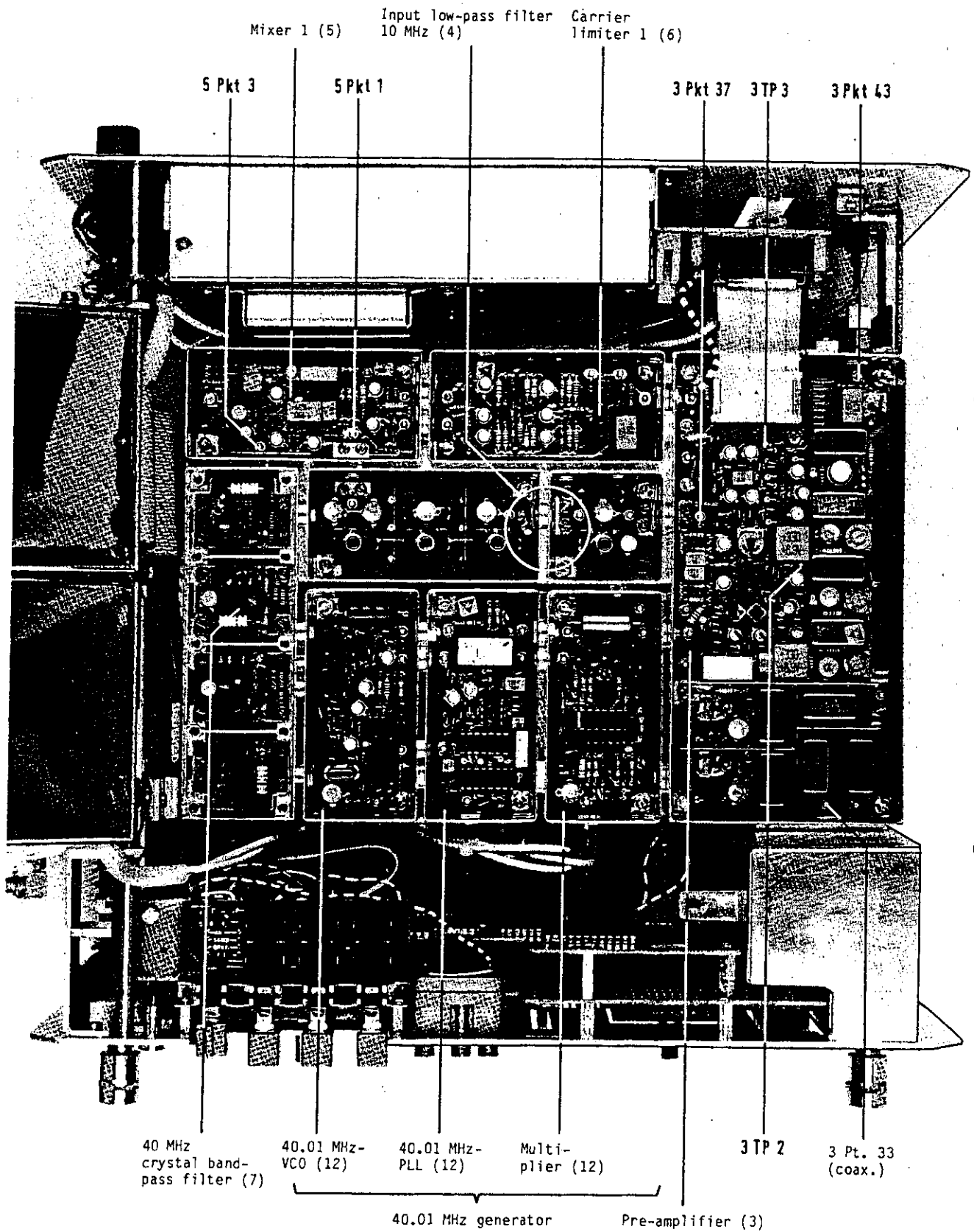


Fig. 7.2-6 SPM-15, RF chassis from below

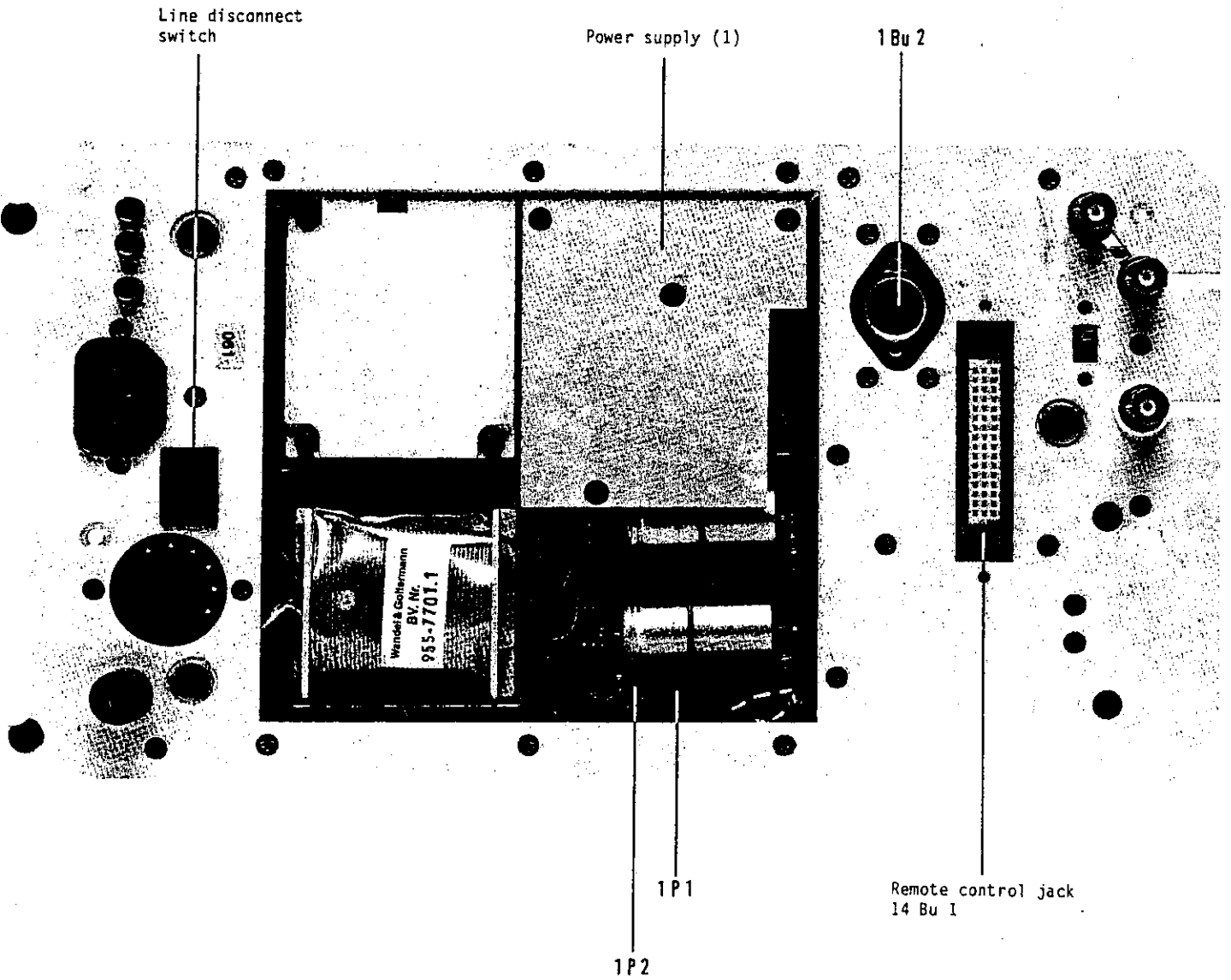


Fig. 7.2-7 SPM-15, rear instrument wall open

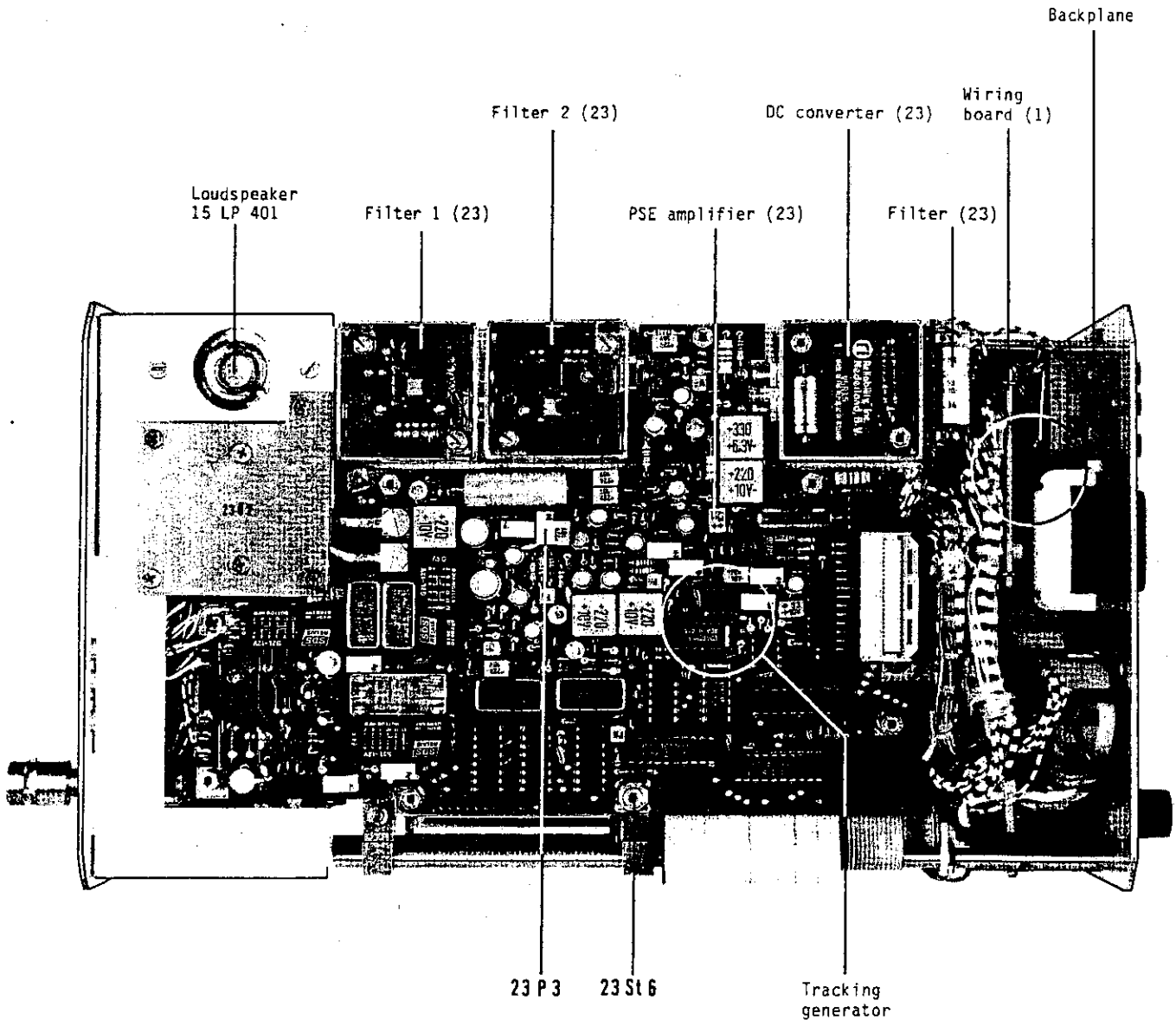


Fig. 7.2-8 SPM-15, side view from right (Series A ... D)

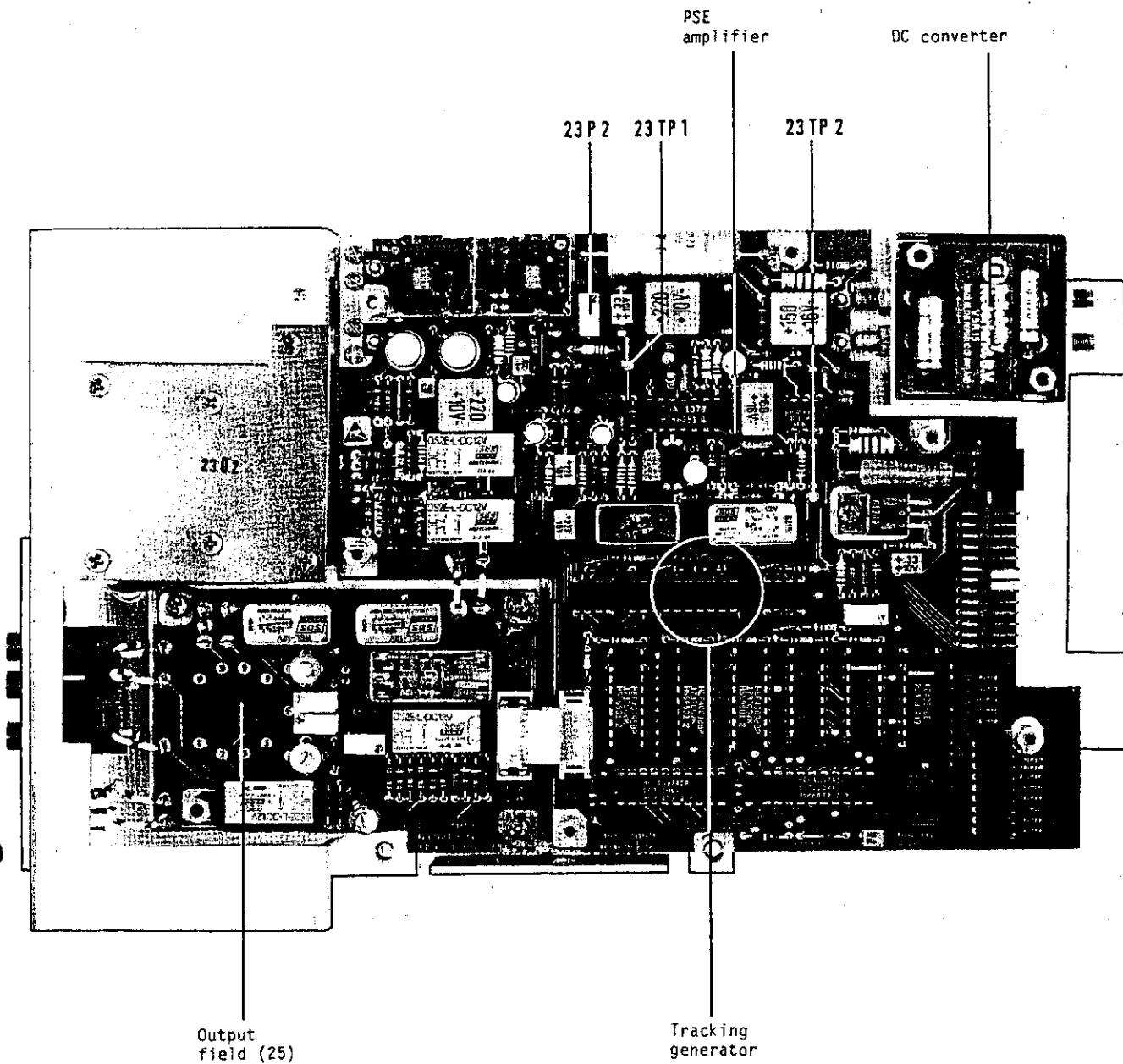


Fig. 7.2-9 SPM-15, side view from right (Series E ...)

### 7.3 NOTES ON TROUBLESHOOTING

#### 7.3.1 FAULT LOCALIZATION CONCEPT

The information compiled in the following Sections is intended to facilitate the rapid localization of causes of faults.

To this end, Section 7.3.3 describes simple check measurements designed to allow localization of the cause of a fault to a function block within the SPM-15.

Further fault localization in the Power supply, Control section, Measuring section and Tracking generator modules is described in the subsequent Sections. There is a separate Service Instructions section for the Synthesizer module (OD-15).

#### Monitor (MONEX) functions

These functions are often used for checks and alignments. They are described in more detail in Section 9.5.

#### 7.3.2 RESET

Following a repair or when attaching the BAZ-15, it may happen that the last instrument set-up stored in RAM is lost. The microcomputer cannot detect this when powered up. The instrument is now in an undefined state, and this may inhibit the operator keys. In such cases, it is best to perform a reset as described below:

- Remove the upper housing shell
- Press reset key 21S3 at the front of the CPU controller board.

The reset establishes a defined starting state of the instrument, this causing the standard settings described in Section 3.5.1 of the Operating Instructions to be selected.

#### Software reset:

In most cases, a reset can also be performed via the operator keyboard, as follows:

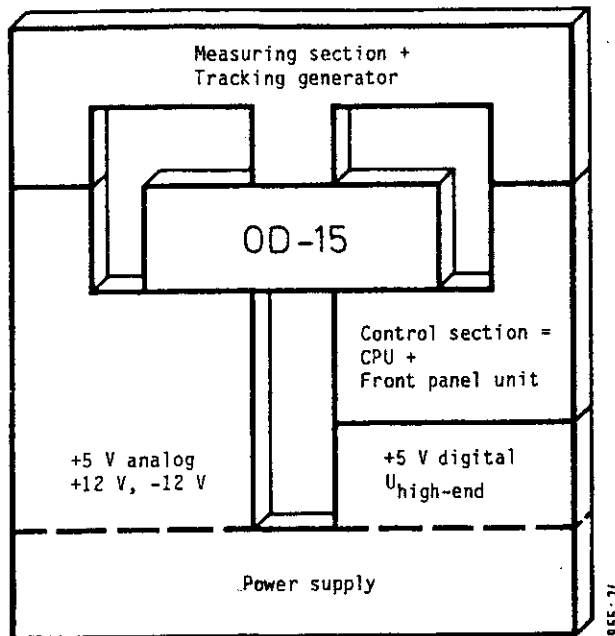
1. Switch off the instrument
2. Press the AUTO-CAL key
3. Hold the CAL key down and switch on the instrument
4. Release the key when the standard (default) values appear

#### 7.3.3 LOCALIZATION OF FAULTS IN MODULES

Fig. 7.3-1 shows the modules of the SPM-15 and their interdependences.

Fault localization is carried out from the bottom upwards.

## SPM-15



Troubleshooting described in:

Sections 7.5 and 7.6

Separate service manual for OD-15, BN 2011

Section 7.4

Section 7.7

Fig. 7.3-1 Function blocks of the SPM-15

### 7.3.3.1 Power supply

The output voltages of the power supply are 5 V (split into "5 V analog" and "5 V digital"), +12 V, -12 V and the high-end voltage  $U_{\text{high-end}}$ .

All voltages can be measured on the CPU board (21).

+5 V  $\pm$  20 mV at 21 Pt. 4 and 7

+12 V  $\pm$  50 mV at 21 Pt. 1

-12 V  $\pm$  50 mV at 21 Pt. 2

$U_{\text{high-end}}$  = 25 V ... 35 V (for line operation) at 21 Pt. 6 = 21 TP 13

If a voltage is out of tolerance, first check the power supply in accordance with Section 7.7.

If the power supply is functioning correctly, all circuits connected to the voltage in question must be successively eliminated as the possible cause of the fault.

Using Fig. 7.3-2 (wiring of the supply voltages; refer to the end of the Service Instructions for the SPM-15), it is easy to find the points at which assemblies can be specifically disconnected from the power supply.

### 7.3.3.2 Control section (CPU and front panel unit)

First disconnect the instrument without IEC bus and BAZ-15 from the line voltage and then switch on again.

The frequency display then allows localization of the fault according to the following Table:

0-000 or 0-300 and higher		0-200, 0-1xx or 0-400	Arbitrary, meaningless display
Basic instrument setting: f = 100 kHz 20 dB scale, -0.00 75 $\Omega$ , ABS, 3.1 kHz CRSE, LOCAL, PSE OFF	Basic setting, but individual bars of the digits or LEDs faulty	CPU faulty	CPU or front panel unit faulty
	Continue with 7.4.3 (Front panel unit)	Continue with 7.4.1 (CPU)	Continue with Section 7.4 (Control section)
Check a few keys, level switch and frequency setting		If faulty, first check all bus connectors	
If functioning correctly	If faulty		
Control section OK	Continue with 7.4.3 (Front panel unit)		

### 7.3.3.3 OD-15 (synthesizer)

The OD-15 of the SPM-15 has two outputs:

- 10 MHz standard frequency at [33] = 51 Bu 3
- Carrier frequency 40 ... 50 MHz at [34] = 11 Bu 1

The frequency accuracy and compliance with the level tolerances can easily be checked:

- [33]: 10 MHz  $\pm 10$  Hz; 0 dBm/75  $\Omega$   $\pm 2$  dB  
 [34]: 40 MHz  $\pm 40$  Hz; when tuned to 0 Hz  
 49.999999 MHz  $\pm 50$  Hz; when tuned to 9999.999 kHz  
 40 ... 50 MHz ; -6 dBm/75  $\Omega$   $\pm 2$  dB  
 $\cong$  (75  $\Omega$  terminating impedance) 200 mV peak  $\pm 30$  mV

This output is fed from the buffer amplifier (11).

If the data lines between the CPU and the OD-15 are faulty, certain frequencies are in fact not set, although they appear correctly on the frequency display. For complete functional testing, the numbers 0, 1, 2, 4, 8 must be checked for each frequency digit.

If the OD-15 is faulty: refer to the separate Service Instructions section for the OD-15.

7.3.3.4 Measuring section and tracking generator

Section 7.5.1 provides general information on troubleshooting in the measuring section.

Section 7.6.1 provides general information on troubleshooting in the tracking generator.

7.3.3.5 Summary of fault and message numbers

## Control section:

0---- Self-test running  
 0-000 Self-test OK  
 0-10X RAM fault  
 0-200 ROM fault  
 0-400 I/O fault  
 0-300 Battery/line voltage missing or too low, refer to Operating Instructions, Section 3.5

## Analog section:

1-201 Fault in measuring path for ANLG measurement  
 1-202 Fault in measuring path for DGTL measurement  
 2-107 Measuring range unsuitable for (ABS-REF)  
 2-222 Frequency unsuitable for demodulator operation

## Remote control:

4-XXX } Programming error in computer operation  
 5-XXX } Refer to Operating Instructions, Section 6.4.6

7.4 TROUBLESHOOTING IN THE CONTROL SECTION7.4.1 TROUBLESHOOTING ON THE CPU

The SPM-15 automatically performs a self-test on the control section after power-up.

Activation: - Switch off instrument  
 - Switch on instrument

A continuous self-test can also be carried out.

Activation: - Switch off instrument  
 - Set 21 S 1.1 to OFF  
 Set 21 S 1.2 - S 1.4 to ON  
 - Switch on instrument

Display while test running: 0---  
 Test OK : 0-0.00

If no fault is detected, the test is repeated continuously if the continuous test has been selected. The display alternates between 0--- und 0-000.

Fault numbers: EPROM fault : 0-2.00  
 RAM fault : 0-1.0X  
 I/O fault : 0-4.00

Refer to Section 7.4.1.1 if any of these fault numbers appear in the frequency display. Otherwise, perform troubleshooting in accordance with Section 7.4.1.2.



7.4.1.1 Troubleshooting on the CPU with more accurate definition of the fault

0-200 in frequency display?		
Yes	No	
EPROM signature as per 7.4.1.5	0-1XX in freq. display?	
	Yes	No
	RAM stimulus as per 7.4.1.6	Free-running I/O address as per 7.4.1.7
	I/O stimulus as per 7.4.1.8	

7.4.1.2 Troubleshooting on the CPU without more accurate definition of the fault

Switch off instrument	
Disconnect plugs 21 St a, 21 St b, 21 St c and 21 St e from CPU	
Switch on instrument	
Measure voltage at 21 IC 21, Pin 40 (microprocessor)	
5 V $\pm$ 100 mV voltage OK?	
Yes	No
	Check voltage monitor with the aid of circuit diagram 21
	Reconnect plug 21 St a to CPU
	Recommence troubleshooting on CPU at 7.4.1
Read Section 7.4.1.3 Signature analysis	

Operate processor in free-running mode as per Section 7.4.1.4	
Frame signature OK?	
Yes	No
Check switch position of 21 S 2	
Check CLOCK, START, STOP and GROUND connections of signature analyzer	
Check the following signals on the microprocessor with the oscilloscope Clock Pt. 37 TRAP Pt. 6           LOW HOLD Pt. 39           LOW RESET IN Pt. 36       HIGH	
Check signatures of address lines A0 ... A15	
Signatures OK?	
Yes	No
Check address driver and latches (21 IC 18 ... 21 IC 20, 21 IC 23 ... 21 IC 25), e.g. short to +5 V or chassis, mutual short	
Reconnect plug 21 St a to CPU	
Recommence troubleshooting on CPU at 7.4.1	
Carry out RAM stimulus as per 7.4.1.6	
Signatures OK?	
Yes	No
Check RAM activation	
RAM activation OK?	
Yes	No
Replace RAM	
Reconnect plug 21 St a to CPU	
Recommence troubleshooting on CPU at 7.4.1	
Check I/O section	

Carry out free I/O address run as per 7.4.1.7	
Signatures OK?	
Yes	No
Check I/O address activation (21 IC 9, 21 IC 3 ... 21 IC 5, 21 IC 1)	
Carry out program-controlled I/O stimulus as per 7.4.1.8	
Signatures OK?	
Yes	No
Check I/O data section (21 IC 10, 21 IC 2, 21 IC 4/1, 21 IC 3/1)	
CPU check complete, continue with 7.3	

#### 7.4.1.3 Signature analysis with the hp 5004A or 5005A

The signature analyzer (e.g. hp 5004A) is an instrument allowing unambiguous and simple checking of digital signal strings of any desired length. In order to obtain constant signatures (four digits, quasi-hexadecimal notation), there must be defined and repeatable bit patterns on the lines or points to be tested in relation to a time window = START/STOP frame. The microprocessor does not produce these bit patterns automatically, but must be forced to do so. For instance, switch 21 S 2 is used to connect the data lines D0 ... D7 on the CPU to +5 V, line D7 also being connected to the READ signal via a Schottky diode. The free-running instruction is, therefore, 7FH = MOV A, A, this causing the microprocessor to run through the entire address range from 0000H to FFFFH. Each address line yields an unambiguous signature when this is done.

The most significant address bit A15 can, for example, be used as the time window. A signal fulfilling the time condition is used as the CLOCK signal, e.g. the signal RD for the "8085".

The temporal assignment of the signals CLOCK, DATA, START and STOP must always be correct, since unstable signatures may otherwise occur.

Two important signatures deserve a brief explanation:

- The signature of the 0 V line is always 0000, irrespective of the START/STOP frame.
- The signature of the +5 V line is the so-called "FRAME SIGNATURE". The signature of the CLOCK pulses read in within the START/STOP frame is displayed here.

The frame signature can be used to check whether the START/STOP frame is connected correctly and whether the edges for the START/STOP frame are correct.

In addition, it may also be assumed that the microprocessor is working.

If the signature 0000 occurs, the line is shorted to chassis.

If the frame signature occurs, this indicates a short to the supply voltage.

7.4.1.4 Free processor run

Set 21 S 2.1 ... 21 S 2.9 to OFF

Set 21 S 2.10 to ON

Synchronization connections: START STOP CLOCK Chassis  
 21 TP 8 21 TP 8 21 TP 2 21 TP 10

Synchronization setting: 

Frame/H - Signature - Test point HS: 755U

Signatures recorded:	Test point	Signature
	A0	H335
	A1	C113
	A2	7050
	A3	0772
	A4	C4C3
	A5	AA08
	A6	7211
	A7	A3C1
	A8	7707
	A9	577A
	A10	HH86
	A11	89F1
	A12	AC99
	A13	PCF3
	A14	1180
	A15	0000

Synchronization connections: START STOP CLOCK Chassis  
 21 TP 8 21 TP 8 21 TP 2 21 TP 10

Synchronization setting: 

Frame/H - Signature - Test point HS: 755U

Signatures recorded:	Test point	Signature
	A0	H335
	A1	C113
	A2	7050
	A3	0772
	A4	C4C3
	A5	AA08
	A6	7211
	A7	A3C1
	A8	7707
	A9	577A
	A10	HH86
	A11	89F1
	A12	AC99
	A13	PCF3
	A14	1180
	A15	755U

7.4.1.5 EPROM signature

Switch on instrument

Set 21 S 2.1 ... 21 S 2.9 to OFF

Set 21 S 2.10 to ON

Synchronization connections:	START	STOP	CLOCK	Chassis
EPROM 0	21 TP 4	21 TP 4	21 TP 2	21 TP 10
EPROM 1	21 TP 6	21 TP 6	21 TP 2	21 TP 10
EPROM 2	21 TP 7	21 TP 7	21 TP 2	21 TP 10

Synchronization setting: 

Frame/H - Signature - Test point HS: Only Series A P254

From Series B 1180

Signatures recorded: refer to associated signature lists.

The signature list of the corresponding software is attached inside the drawer for the shortform Operating Instructions on the SPM-15.

Example:

Bv. Nummer	D0	D1	D2	D3	D4	D5	D6	D7
955-9313.032	4H3A	6153	4982	2H6A	279U	7127	542P	0110
955-9312.130	6206	H7H2	9640	FP5C	U5P6	23A7	7U7F	3C95
955-9311.131	C4H1	UACD	8985	A2CC	F21A	U3CC	F427	5350
Signaturliste	Sach-Nr.	955-0093.174			Dat.: 12.09.86			

└───┘  
Software series designation

Fig. 7.4-1 Example of a signature list

7.4.1.6 RAM stimulus

Switch off instrument

Set 21 S 2.1 ... 21 S 2.9 to ON

Set 21 S 2.10 to OFF

Set 21 S 1.1 to ON

Set 21 S 1.2 to OFF


Set 21 S 1.3 to ON

Set 21 S 1.4 to ON

Switch on instrument

Display while test running: --1.00

Synchronization connections:	START	STOP	CLOCK	Chassis
	21 TP 3	21 TP 3	21 TP 9	21 TP 10

Synchronization setting: 

Frame/H - Signature - Test point HS: AHA4

Signatures recorded:	Test point	Signature
	D0	P6C6
	D1	CH7A
	D2	2UU2
	D3	743P
	D4	10HP
	D5	4C12
	D6	H99A
	D7	8256

7.4.1.7 Free I/O address run

Free-running I/O address operation is carried out with forced I/O operation.

Set 21 S 4 to T position (return to M position at end of test)

Set 21 S 2.1 ... 21 S 2.9 to OFF

Set 21 S 2.10 to ON

Synchronization connections:    START        STOP        CLOCK        Chassis  
    21 TP 8    21 TP 8    21 TP 2    21 TP 10

Synchronization setting:                        

Frame/H - Signature - Test point HS: 755U

Signatures recorded:	Test point	Signature
	A0	H335
	A1	C113
	A2	7050
	A3	0772
	A4	C4C3
	Negated A0	A66A
	Negated A1	F44F
	Negated A2	050U
	Negated A3	722H
	Negated A4	F1PF
	Negated A5	HU57
	Negated A6	074P
	Negated A7	H6PP

7.4.1.8 Program-controlled I/O stimulus

Switch off instrument

Set 21 S 2.1 ... 21 S 2.9 to ON

Set 21 S 2.10 to OFF

Set 21 S 1.1 to OFF

Set 21 S 1.2 to OFF

Set 21 S 1.3 to ON

Set 21 S 1.4 to ON

Switch on instrument

Display while test running: --4.00

Synchronization connections:    START        STOP        CLOCK        Chassis  
    21 TP 5    21 TP 5    21 TP 1    21 TP 10

Synchronization setting:                        

Frame/H - Signature - Test point HS: OUP7

Signatures recorded:	Test point	Signature
	D0	055H
	D1	098P
	D2	0113
	D3	0HFO
	D4	0669
	D5	0ACA
	D6	0227
	D7	0PU4

7.4.1.9 Program-controlled synthesizer stimulus

Switch off instrument

Set 21 S 2.1 ... 21 S 2.9 to ON  
 Set 21 S 2.10 to OFF  
 Set 21 S 1.1 to ON  
 Set 21 S 1.2 to ON  
 Set 21 S 1.3 to OFF  
 Connect 21 IC 38.7 to 21 IC 40.3  
 Set 21 S 1.4 to ON

Switch on instrument

Display while test running: --5.00

Synchronization connections:	START	STOP	CLOCK	Chassis
	21 IC 38.7	21 IC 38.4	21 IC 4.12	21 TP 10

Synchronization setting:               

Frame/H - Signature - Test point HS: 000U

Signatures recorded:	Test point	Signature
	21 St b Pt. 1	000A
	21 St b Pt. 2	0009
	21 St b Pt. 3	000A
	21 St b Pt. 4	0005
	21 St b Pt. 5	0006
	21 St b Pt. 6	000F
	21 St b Pt. 7	0005
	21 St b Pt. 8	000A
	21 St b Pt. 9	0003
	21 St b Pt. 10	0006
	21 St b Pt. 11	000A
	21 St b Pt. 12	0005
	21 St b Pt. 13	0009
	21 St b Pt. 28	000H
	21 St b Pt. 29	0001
	21 St b Pt. 30	000P
	21 St b Pt. 31	0002
	21 St b Pt. 32	000C
	21 St b Pt. 33	0002
	21 St b Pt. 34	000H
	21 St b Pt. 35	0004
	21 St b Pt. 36	0007
	21 St b Pt. 37	0004
	21 St b Pt. 38	000C
	21 St b Pt. 39	0008
	21 St c Pt. 4	000F
	21 St c Pt. 5	0008
	21 St c Pt. 6	000P
	21 St c Pt. 13	0007
	IC 50.12	0003
	IC 50.15	0005
	IC 50.16	0001

## 7.4.1.10 Switch settings of 21 S 1 and 21 S 2

Operating mode S 1	S 1.4	S 1.3	S 1.2	S 1.1	MODEL / OPTION
<b>Test:</b>					
CPU test	ON	ON	ON	OFF	-
RAM test	ON	ON	OFF	ON	-
I/O test	ON	ON	OFF	OFF	-
Synthesizer test	ON	OFF	ON	ON	-
IEC bus test	ON	OFF	ON	OFF	-
<b>(Operating):</b>					
<u>European with PSE</u>	ON	ON	ON	ON	/00.02
WECO with PSE, 135 Ω, dBrnC	ON	OFF	OFF	ON	/02
WECO w/out PSE, 135 Ω, dBrnC	ON	OFF	OFF	OFF	-
European with PSE, dBrnC	OFF	ON	ON	ON	/00.02 + /00.23
European with PSE, 135 Ω	OFF	ON	ON	OFF	/00.02 + /00.21
European with PSE, 135 Ω, dBrnC	OFF	ON	OFF	ON	/00.02 /00.21 /00.23
European w/out PSE, dBrnC	OFF	OFF	ON	ON	/00.23
European w/out PSE, 135 Ω	OFF	OFF	ON	OFF	/00.21
European w/out PSE, 135 Ω, dBrnC	OFF	OFF	OFF	ON	/00.21 + /00.23
<u>European w/out PSE</u>	OFF	OFF	OFF	OFF	-

Free-running switch S2	Operating:	S 2.1 ... S 2.9 ON
		S 2.10 OFF
	Free-running:	S 2.1 ... S 2.9 OFF
		S 2.10 ON

## 7.4.2 RF CONTROLLER

Check the operation of the address lines 84H and 85H with the aid of the MONEX and the program in Section 9.5.6.	
OK?	
Yes	No
Check 84H and 85H addressing (13 IC 1, 13 IC 4)	
Check the data latches with the aid of the program in Section 9.5.6 (13 IC 5, 7)	
OK?	
Yes	No
Check data latches	
Check drivers 13 IC 2, 13 IC 3 and 13 IC 6	



### 7.4.3 TESTING THE FRONT PANEL FUNCTIONS

The interrupt logic, level switch logic, frequency adjustment, LED activation and display logic are checked by operating the front panel and observing the resultant reactions.

If the fault on the front panel is already more closely defined, proceed immediately with the subsequent Sections. The symptoms of faults in the LED display must be observed during the self-test, as soon as the instrument is powered up.

Localized fault	Section
LED display faulty	7.4.3.1
A segment is missing in all 7-segment displays	7.4.3.1 from Front panel data flow and segment drivers
No LEDs illuminated in one column (e.g. REF, PSE, 25 Hz, 124 $\Omega$ )	7.4.3.1 from Front panel data flow and segment drivers
1 digit is not displayed	7.4.3.1 Front panel address flow
LEDs of one row (e.g. 75 $\Omega$ /75, 124 $\Omega$ /124, 150 $\Omega$ /150, 600 $\Omega$ /600)	7.4.3.1 Front panel data flow
Keyboard cannot be operated	7.4.3.2, 7.4.3.3
Interrupt cannot be reset	7.4.3.3
Level switch fails to react	7.4.3.4
Frequency cannot be changed	7.4.3.5


#### Coarse localization of the front panel fault


Leave the instrument switched on and pull out the plug	
Plug in the instrument	
100000 must appear in the frequency display -0.00 must appear in the level display Only the following LEDs may light up 75 $\Omega$ , 20 dB, ABS, 3.1 kHz, Coarse, LOCAL, PSE Off	
Is the status as described above?	
Yes	No
Check LED activation; refer to Section 7.4.3.1	
Press "Selec" key	
Key reaction (1.74 kHz reacts)?	
Yes	No
Examine interrupt logic; refer to Section 7.4.3.2	
Examine keyboard logic; refer to Section 7.4.3.3	


Turn level switch to right	
Does level display change to -10.00?	
Yes	No
Examine level switch logic; refer to Section 7.4.3.4	
Turn level switch to left	
Does level display change to 0.00?	
Yes	No
Examine level switch logic; refer to Section 7.4.3.4	
Turn frequency switch to right	
Is frequency display incremented?	
Yes	No
Examine frequency adjustment; refer to Section 7.4.3.5	
Turn frequency switch to left	
Is frequency display decremented?	
Yes	No
Examine frequency adjustment; refer to Section 7.4.3.5	

Connection points for signature analysis

Frame signature: 7U39H

Start: 20IC15, Pin 11 

Stop: 20IC15, Pin 15 

Clock: 19 IC 37, Pin 3 

### 7.4.3.1 Check LED activation

LED activation can best be checked with the aid of the "MONEX", since it allows the gates to be set and reset individually.

#### Basic clock and data bus latches

Measure clock at 19 IC 37, Pt. 3	
Is the set value of 1.6 kHz $\pm$ 10% reached?	
Yes	No
Possibly faults in 19 IC 37, supply voltage missing	
Measure clock at 19 IC 36	
Is the clock at Pin 6 = 800 Hz, Pin 11 = 400 Hz, Pin 14 = 200 Hz, Pin 2 = 100 Hz $\pm$ 10%?	
Yes	No
Possibly faults in 19 IC 36, 19 IC 27/2, 19 IC 25	
Connect 19 IC 25, Pt. 6 to +5 V Use the program in Section 9.5.6 to check the operation of the data lines of address 44H = 19 IC 12	
Can all data lines be switched from L to H and/or from H to L?	
Yes	No
Possibly faults in: Addressing 19 IC 2, 19 IC 8, 19 IC 11/1, IC 3/1, data lines 19 IC 1, 19 IC 2, buffer 19 IC 12, internal bus 19 IC 18, 19 IC 21, 19 IC 23, 19 IC 20, 19 IC 26	
Check address 45H = 19 IC 13	
Can all data lines be switched from L to H?	
Yes	No
Possibly faults in: Addressing 19 IC 2, 19 IC 8, 19 IC 11/2, data lines 19 IC 13	
Check address 46H = 19 IC 9	
Can all data lines be switched from L to H?	
Yes	No
Possibly faults in: Data lines 19 IC 9, addressing 19 IC 2, 19 IC 8, 19 IC 11/3	

RAM controller

Checking the RAM controller necessitates the use of a

Signature analyzer  
Logic analyzer or multi-channel oscilloscope

Signatures are always recorded and/or signal profiles observed at defined points; depending on their behaviour, further conclusions can then be drawn as to the nature of the fault.

The signatures recorded apply for the basic setting following initialization after pressing the reset key. The signatures in brackets only apply for software version A, 955-9311.005/955-9312.004.

Address flow, display logic

If unfamiliar with the signature analyzer: read Section 7.4.1.3	
Test point	Related signature
19 IC 36 Pin 6	2AP8
19 IC 36 Pin 11	19A7
19 IC 36 Pin 14	078C
19 IC 36 Pin 2	007U
Signatures OK?	
Yes	No
Fault in 19 IC 37, 19 IC 36	
19 IC 18 Pin 1	0000
19 IC 18 Pin 2	007U
19 IC 18 Pin 3	078C
19 IC 18 Pin 4	19A7
19 IC 18 Pin 5	2AP8
19 IC 17 Pin 2	007U
19 IC 17 Pin 6	078C
19 IC 17 Pin 9	19A7
19 IC 17 Pin 13	2AP8
Signatures OK?	
Yes	No
Line interruptions	
19 IC 17 Pin 3	7U46
19 IC 17 Pin 4	78C2
19 IC 17 Pin 10	669P
19 IC 17 Pin 11	2AP8
19 IC 19 Pin 1	2052
Signatures OK?	
Yes	No
Fault in 19 IC 17, 19 IC 19/1	

Check signal profile of RAM controller

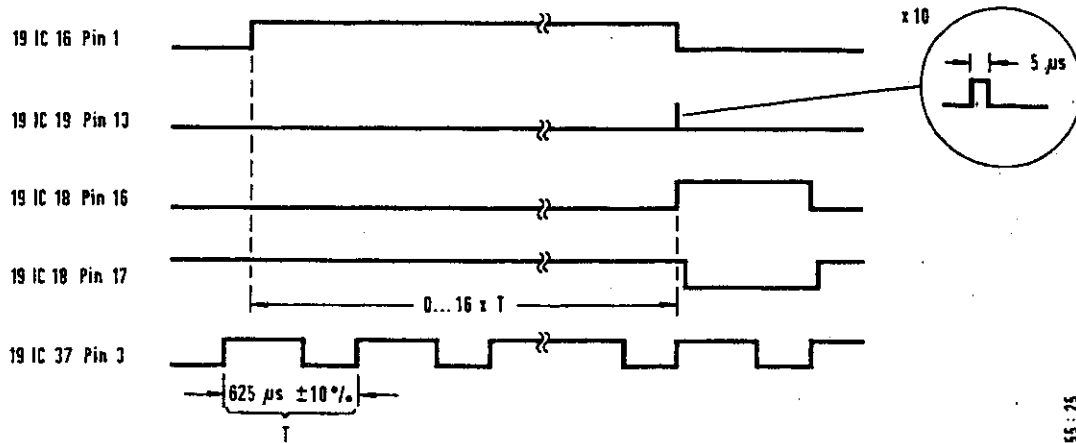


Fig. 7.4-2 Clock profile of RAM controller

Data flow on display logic

Check signatures	
19 IC 18 Pin 6	5857 (5148)
19 IC 18 Pin 7	5167
19 IC 18 Pin 8	7U27
19 IC 18 Pin 10	7U25
19 IC 18 Pin 11	0028
19 IC 18 Pin 12	1009
19 IC 18 Pin 13	0020
19 IC 18 Pin 14	0072
Signatures OK?	
Yes	No
	Fault in RAM 19 IC 18
Check signatures	
19 IC 21 Pin 3	0072
19 IC 21 Pin 5	0020
19 IC 21 Pin 7	1009
19 IC 21 Pin 9	0028
Signatures OK?	
Yes	No
	Line interruptions, 19 IC 21 defective 19 IC 21 Pin 1 not LOW, 19 IC 33 Pin 1 not HIGH

Check signatures	
19 IC 27 Pin 10	1029
19 IC 26 Pin 4	5167
19 IC 26 Pin 10	5167
Signatures OK?	
Yes	No
Line interruption	
Fault in 19 IC 26/3, 19 IC 27/4, 19 IC 26/4, 19 IC 7/2, 19 IC 6/4, 19 IC 6/3	

Address flow, front panel

Check signatures	
20 c 8	007U
20 c 9	078C
20 c 10	19A7
20 c 11	2AP8
Signatures OK?	
Yes	No
Line interruption, defective connecting cable between [955-B] and [955-C]	
Check signatures	
20 IC 15 Pin 2	2AP8
20 IC 15 Pin 3	19A7
20 IC 15 Pin 21	078C
20 IC 15 Pin 22	007U
Signatures OK?	
Yes	No
Line interruption	
Check signatures	
20 IC 15 Pin 4	0081
20 IC 15 Pin 5	0102
20 IC 15 Pin 6	0205

20 IC 15 Pin 7	040A
20 IC 15 Pin 8	0814
20 IC 15 Pin 9	2052
20 IC 15 Pin 10	1029
20 IC 15 Pin 11	40A5
20 IC 15 Pin 13	0002
20 IC 15 Pin 14	0004
20 IC 15 Pin 15	0000
20 IC 15 Pin 16	0001
20 IC 15 Pin 17	0020
20 IC 15 Pin 18	0040
Signatures OK?	
Yes	No
20 IC 15 defective	
Record signatures	
20 IC 50 Pin 1	7439
20 IC 50 Pin 2	2052
20 IC 50 Pin 3	0000
20 IC 50 Pin 4	40A5
20 IC 50 Pin 5	0002
20 IC 50 Pin 6	0001
20 IC 50 Pin 7	0001
20 IC 65 Pin 1	0020
20 IC 65 Pin 2	0040
20 IC 65 Pin 3	0081
20 IC 65 Pin 4	0102
20 IC 65 Pin 5	0205
20 IC 65 Pin 6	040A
20 IC 65 Pin 7	0814
20 IC 66 Pin 1	0002
20 IC 66 Pin 2	0004
20 IC 66 Pin 3	0008
20 IC 66 Pin 4	0010
Check signatures	
19 c 1	40A5
19 c 2	0002
19 c 3	0001

19 c 4	0000
19 c 22	2052
19 c 28	1029
Signatures OK?	
Yes	No
Line interruption, cable from [955-B] to [955-C] defective	

Data flow, front panel

Check signatures	
20 c 12	585F
20 c 13	0072
20 c 14	0020
20 c 15	1009
20 c 16	0028
20 c 17	7U27
20 c 18	7U27
20 c 19	5167
Signatures OK?	
Yes	No
Line interruption, connecting cable between [955-C] and [955-B] defective	
Record signatures	
20 IC 60 Pin 2	1009
20 IC 60 Pin 3	0020
20 IC 60 Pin 4	0028
20 IC 60 Pin 5	0072
20 IC 62 Pin 5, 6	5167
20 IC 62 Pin 8, 9	585F
20 IC 63 Pin 2	0072
20 IC 63 Pin 4	0020
20 IC 63 Pin 6	1009
20 IC 63 Pin 10	0028
20 IC 63 Pin 12	7U25
20 IC 63 Pin 14	7U27



Signatures OK?	
Yes	No
Line interruptions	
Record signatures	
20 IC 60 Pin 9	6U62
20 IC 60 Pin 10	7U19
20 IC 60 Pin 11	7U19
20 IC 60 Pin 12	6U62
20 IC 60 Pin 13	6U62
20 IC 60 Pin 14	1021
20 IC 60 Pin 15	7U4C
Signatures OK?	
Yes	No
20 IC 60 defective	
Record signatures	
20 IC 61/63 Pin 3	6U7F
20 IC 61/63 Pin:5	7U07
20 IC 61/63 Pin:7	7U07
20 IC 61/63 Pin:9	6U66
20 IC 61/63 Pin:11	6U6P (6U6F)
20 IC 61/63 Pin:13	7U47
20 IC 61 Pin 1, 15	001P
20 IC 63 Pin 1, 15	001P
20 IC 62 Pin 3	1029
20 IC 62 Pin 4	5167
20 IC 62 Pin 10	585F
Signatures OK?	
Yes	No
20 IC 20, 20 IC 63, 20 IC 61, 20 IC 52, 20 IC 62	
Signatures OK?	
Yes	No
Line interruption, IC 50, 65 or 66 defective	

### Segment driver

The defective segment or all defective segments can be checked with the aid of the voltage data listed below.

The DAC built up around IC 64 is used to compensate for the current consumption fluctuations of the input circuitry resulting from multiplex operation. This means that the circuitry represents a constant load on the power supply.

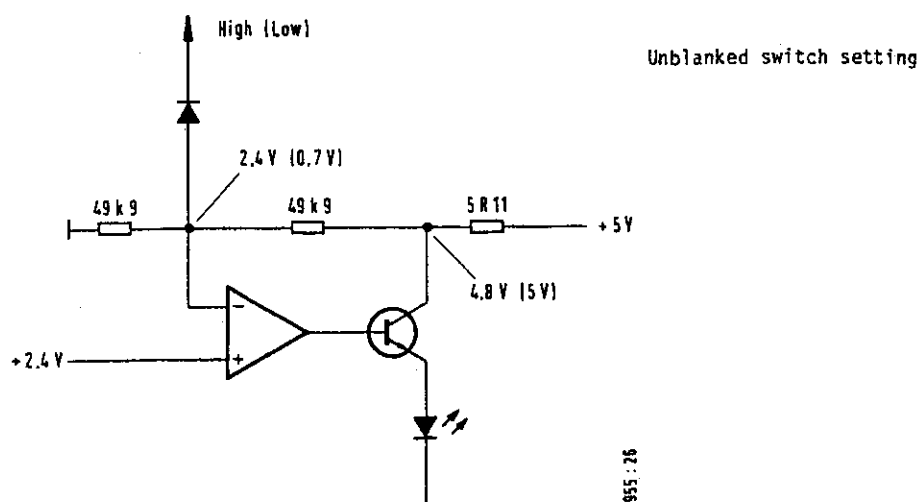


Fig. 7.4-3 Voltages at the segment driver

### Current compensation

The defective voltage compensator can be checked with the aid of the voltage data listed below.

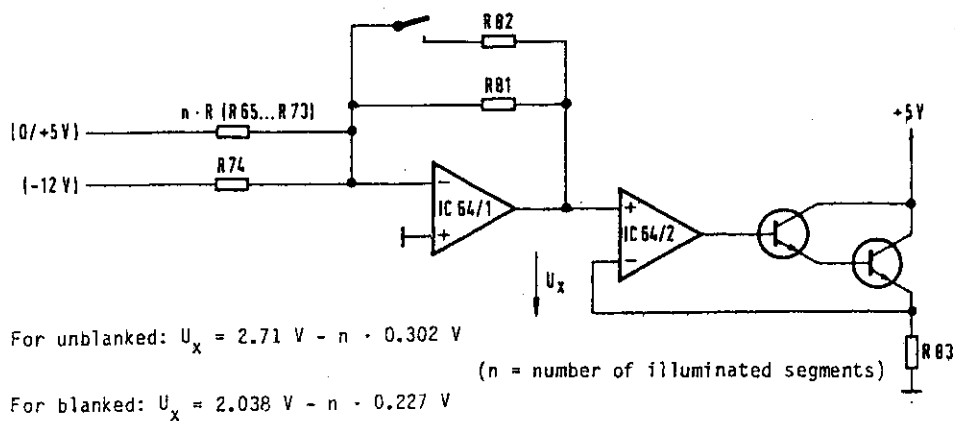


Fig. 7.4-4 Voltages at the current compensator

Writing data into a digit

If the following commands are executed, the 10 dB digit of the level display is no longer displayed correctly. Consequently, it is impossible from this point onwards to state whether the information stored in this segment is correct or not. This is only possible if data are purposely written into address 1H in the RAM on the display logic.

## Writing into a digit

- |                           |                 |   |
|---------------------------|-----------------|---|
| 1) Output DATA for RAM    | Command 0:44.XY | See software description (9.3) for X-Y data |
| 2) Output address for RAM | Command 0:45.0X | $0 \leq x \leq F$                           |
| 3) Reset DAV signal       | Command 0:46.10 |   |
| 4) Set DAV signal         | Command 0:46.11 |   |

7.4.3.2 Check interrupt logic

Test all interrupt lines	
Reset frequency interrupt:      0:44.01 -> 20 IC 13 Pin 14 = LOW	
OK?	
Yes	No
Fault sources: Addressing of Adr. 40H, 19 IC 61, 19 IC 79	
Check level interrupt 20 IC 13 Pin 10 = LOW	
OK?	
Yes	No
Fault sources: 20 IC 102/1, 20 IC 100	
Check keyboard interrupt Set keyboard logic to defined status: Reset columns: 0:42.00H -> 20 IC 23 Pin 1 to LOW and 20 IC 13 Pin 12 to LOW	
OK?	
Yes	No
Fault sources: 20 IC 21, 20 IC 22, 20 IC 23, 20 G1 2...20 G1 8, 20 IC 34, keys, addressing of 42H	

Check calibrating clock interrupt	
Reset calibrating clock interrupt 0:47.01 -> 20 IC 13 Pin 2 to LOW	
OK?	
Yes	No
Fault sources: 20 IC 10/1, 20 IC 5, addressing of Adr. 47H	
Check dB/dBm interrupt Reset dB/dBm interrupt: 0:47.01 -> 20 IC 13 Pin 4 to LOW	
OK?	
Yes	No
Fault sources: 20 IC 23/2, 20 IC 11, 20 IC 5, addressing of Adr. 47H	
Check level interrupt Check 20 IC 13 Pin 6: required state LOW	
OK?	
Yes	No
Fault sources: 19 IC 76, 19 IC 4/3 19 IC 9, Adr. 46H The required state of the DGTL signal (20 IC 9 Pin 5) is LOW	
Check common interrupt line 20 IC 12 Pin 1: required state LOW Note: If more than 30 seconds have passed since resetting the calibrating clock interrupt, the calibrating clock interrupt is set again.	
OK?	
Yes	No
Fault sources: 20 IC 12	

## 7.4.3.3 Keyboard logic

If it is known which key does not react, only the reaction of the entire circuitry to this one key need be observed during the following procedure.

Reset columns: 0:42.00H -> 20 IC 34 Pin 2, 5, 6, 9, 12, 15, 16, 19 to LOW	
OK?	
Yes	No
Fault sources: 20 IC 34, addressing of Adr. 42H	
Press all keys in succession Each time a key is pressed, 20 IC 23 Pin 1 must change from HIGH to LOW	
OK?	
Yes	No
Examine related line (20 IC 14 Pin 2, 4, 6, 10) Required value for pressed key from line	
OK?	
Yes	No
Fault source 20 IC 23/1	20 G1 2 ... 20 G1 8, 20 IC 23 Pin 1
Check key debouncing	
After pressing each key, 20 IC 21 Pin 14 must change to HIGH	
OK?	
Yes	No
Fault sources: 20 IC 21, 20 IC 22	

## 7.4.3.4 Level switch

Activate level switch: 0:47.08 Emitter T 101, T 102, T 103 to LOW Note levels of 20 IC 100 Pin 1, 5, 11					
Turn level switch to right. The following combinations result: The reference is always the starting configuration noted above.					
IC 100	nth stop	n+1th stop	n+2th stop	n+3th stop	n+4th stop
Pin 1	L	H	H	L	H
Pin 5	H	H	L	H	H
Pin 11	H	L	H	H	L
OK?					
Yes	No				
Fault sources: 20 G1 100 ... G1 102, 20 T 100 ... 20 T 102, level switch voltage supply, mechanical equipment					
Read in level switch direction: 1:46					
Note value and turn level switch to right again, read in again and compare with Table below. Reference: first value					
	nth stop	n+1th stop	n+2th stop	n+3th stop	n+4th stop
	4	1	2	4	1
OK?					
Yes	No				
Fault sources: 20 IC 100, 20 IC 101, addressing of Adr. 46H					
Turn level switch to left. The following combinations result: The reference is always the starting configuration noted above.					
20 IC 100	nth stop	n+1th stop	n+2th stop	n+3th stop	n+4th stop
Pin 1	L	H	H	L	H
Pin 5	H	L	H	H	L
Pin 11	H	H	L	H	H
OK?					
Yes	No				
Fault sources: 20 G1 100 ... G1 102, 20 T 100 ... 20 T 102, level switch voltage supply, mechanical equipment					

Read in level switch direction: 1:46											
Note values and turn level switch to left again, read in again and compare with Table below. Reference: first value											
	<table border="1"> <thead> <tr> <th>nth stop</th> <th>n+1th stop</th> <th>n+2th stop</th> <th>n+3th stop</th> <th>n+4th stop</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>3</td> <td>5</td> <td>6</td> <td>3</td> </tr> </tbody> </table>	nth stop	n+1th stop	n+2th stop	n+3th stop	n+4th stop	6	3	5	6	3
nth stop	n+1th stop	n+2th stop	n+3th stop	n+4th stop							
6	3	5	6	3							
OK?											
Yes	No										
Fault sources: 20 IC 100, 20 IC 101, addressing of Adr. 46H											

#### 7.4.3.5 Frequency adjustment

Check basic clock at 10 IC 60 Pin 10: required value 9 kHz $\pm$ 10%	
OK?	
Yes	No
Fault source: astable multivibrator 19 IC 60	
Turn frequency switch rapidly to right -> Observe pulses at 19 IC 92 Pin 1 Required value $5\text{ V} \leq x \leq 9.5\text{ V}$	
Turn frequency-switch rapidly to right -> Observe pulses at 19 IC 92 Pin 7 Required value $5\text{ V} \leq x \leq 9.5\text{ V}$	
OK?	
Yes	No
Fault sources: Comparators 19 IC 92/1 and 19 IC 92/2	
Check direction detection Turn switch rapidly to right Observe 19 IC 80 Pin 1 Required: Pulses $5\text{ V} \leq x \leq 9.5\text{ V}$	
Turn switch rapidly to left Observe 19 IC 80 Pin 1 Required: LOW	
Can pulses be measured at 19 IC 56 Pin 10 in both directions?	
Yes	No
Fault sources: 19 IC 80, 19 IC 56/4	

Check "zero setting", corresponding to a counter reading of 5000	
Set counter: 0:40.11	
Read out counter reading: I:42 required value 00 I:43 required value 50	
OK?	
Yes	No
Fault sources: Addressing of Adr. 40H, 42H, 43H 19 IC 61 ... 19 IC 68/1	
Enable counter: 0:40.10	
Turn switch to right -> Frequency changes to higher values	
Turn switch to left -> Frequency changes to lower values	
OK?	
Yes	No
Check frequency interrupt; refer to Section 7.4.3.3	

#### 7.4.3.6 Input section controller

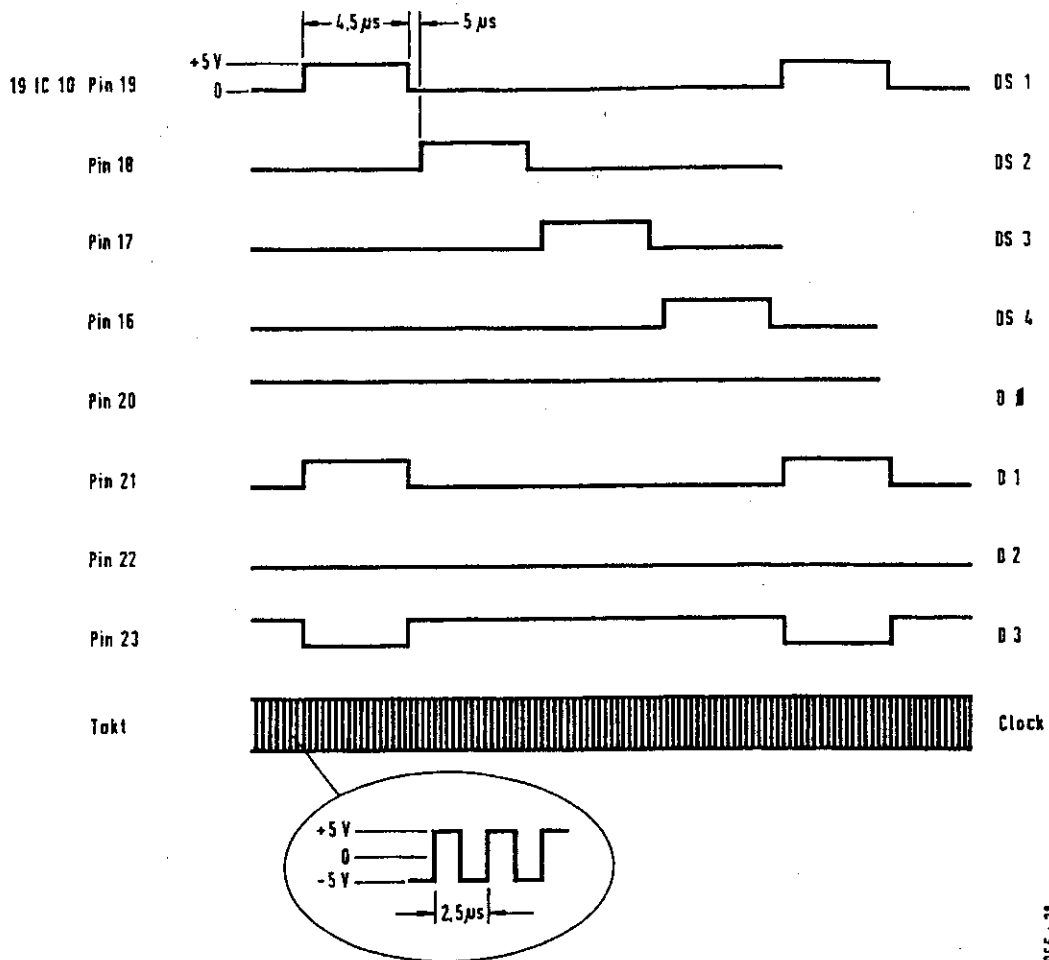
Check operation of data lines of Adr. 41H	
Load and start program as per Section 9.5.6	
Observe data lines of 19 IC 53	
Do all data lines change from HIGH to LOW and vice versa?	
Yes	No
Fault sources: Addressing of Adr. 41H, 19 IC 53	
Check power driver	
Write bit to be changed into Adr. 41H	
Trigger driver with output 0:40.00 -> 19 IC 61 Pin 1 LOW	
Outputs of 19 IC 51, 19 IC 52 must change in accordance with data entered	
Switch driver back to high impedance: 0:40.10 -> 19 IC 61 Pin 1 HIGH	
OK?	
Yes	No
Driver 129 IC 51, 52 defective - Addressing of Adr. 40H, 19 IC 61	



## 7.4.3.7 ADC

Conditions of basic setting (can be achieved by pressing the RESET key on the CPU). No level at the input jack.

<u>Check input voltages</u>	
19 IC 10 Pin 1	Required value Chassis
19 IC 10 Pin 2	Required value $+2\text{ V} \pm 1\text{ mV}$
19 IC 10 Pin 3	Required value $\leq 2.5\text{ V}$
OK?	
Yes	No
Check DC amplifier	
Enable ADC: 0:46.10	
Read in ADC data	
I:40	Required value X9
I:41	Required value 39
OK?	
Yes	No
Check data flow on the basis of the following timing diagram	



955 : 28

Fig. 7.4-5 Timing diagram: ADC data flow

## 7.5 TROUBLESHOOTING IN THE MEASURING SECTION

### 7.5.1 GENERAL INFORMATION

For a wideband measurement, the signal applied is amplified in the pre-amplifier and in the IF wideband amplifier and then passed to the rectifier and jack [35]. The rectified signal is conditioned for the analog/digital converter (digital measurement) and for the display instrument (analog measurement) in the DC evaluation circuit. Fig. 7.5-1 (level diagram for coaxial wideband measurement) shows the assemblies involved in the form of function blocks. In addition,  $V_{RF}$ ,  $V_{dBm}$  und  $V_{DC}$  are listed as a function of the measuring range set (dB/dBm).

The signal passes through the following assemblies for a selective measurement: (Also refer to Fig. 7.5-2, Level plan of the selective measurement path up to the IF output, at the end of the Service Instructions of the SPM-15).

Input section (2)	
Pre-amplifier (3)	
10 MHz low-pass filter (4)	
Mixer 1 (5)	
40 MHz crystal band-pass filter (7)	
Mixer 2 (8)	
10 kHz band-pass filters (9)	
10 kHz band-pass filter/25 Hz mech. (22)	
IF selective amplifier (15)	} IF evaluation circuit (15)
IF wideband amplifier (15)	
Rectifier (15)	
DC evaluation circuit (15)	

The signal path of an applied level of 0 dB/dBm can be tracked with the aid of the level diagram. Measurements must be made at high impedance at the test points. In addition, the level diagram also shows the gains and/or attenuations of the individual assemblies. The adjustable gains  $V_{RF}$ ,  $V_{dBm}$  and  $V_{IF}$  are listed in their setting range with the START commands (refer to Section 9.5.5), which force a defined setting. This allows checking of all the possible settings of the selective measuring path.

All circuits on the RF chassis operate with a single supply voltage of +12 V. The wiring of this supply voltage, as well as the affected resistors, inductors and feed-through capacitors, is shown in Fig. 7.5-3 (+12 V supply voltage on the RF chassis, at the end of the Service Instructions of the SPM-15).

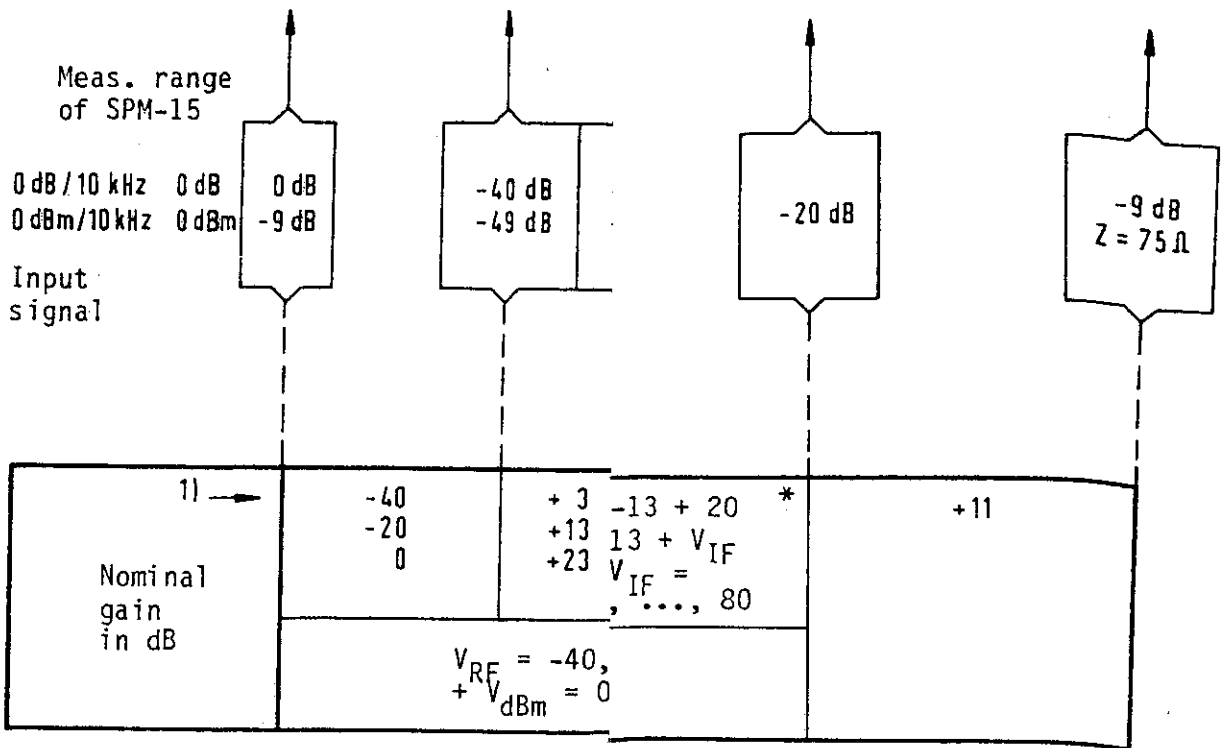
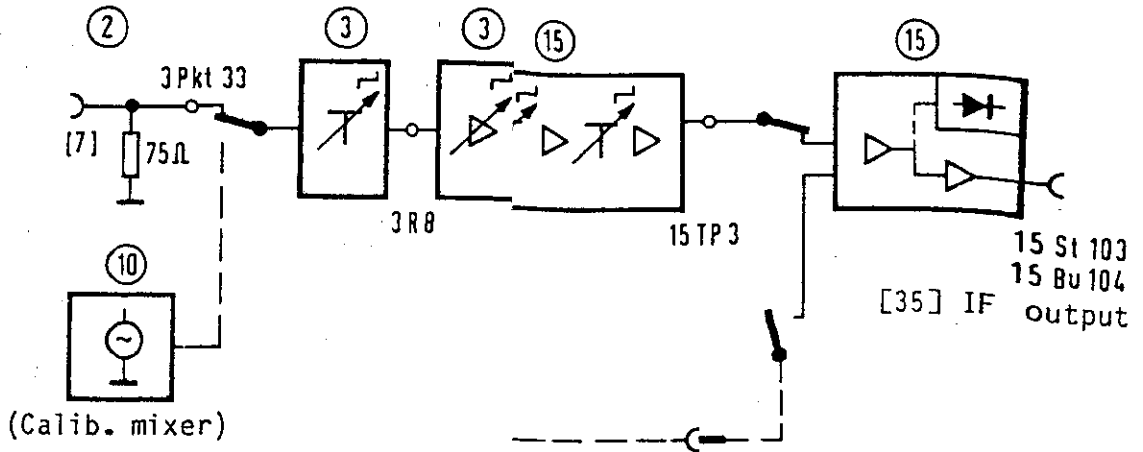
#### Monitor (MONEX) functions

An explanation of the monitor (MONEX) mode can be found in Section 9.5.

A list of the most important test programs which also allow through-connection of the calibrating level and manipulation of the calibration controller can be found in Section 9.5.5 (Monitor test programs).

Input section

assis, underside



1) → Gain in 0 dB measuring range

\* ± 1 dB tolerance

Level at test point  
Z = ∞ / f = 10 kHz

955:30

Fig. 7.5-2 Level diagram of the sel



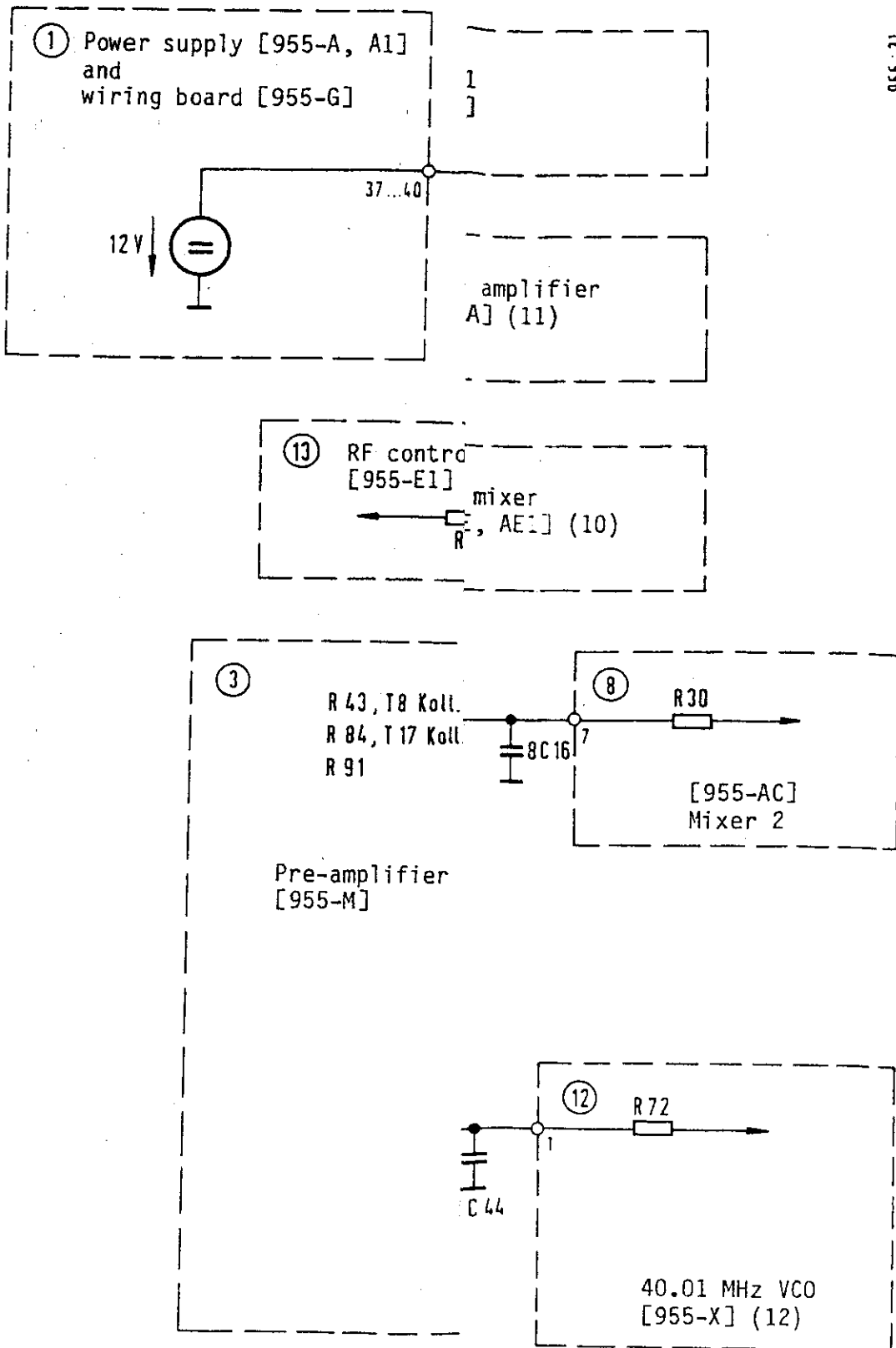
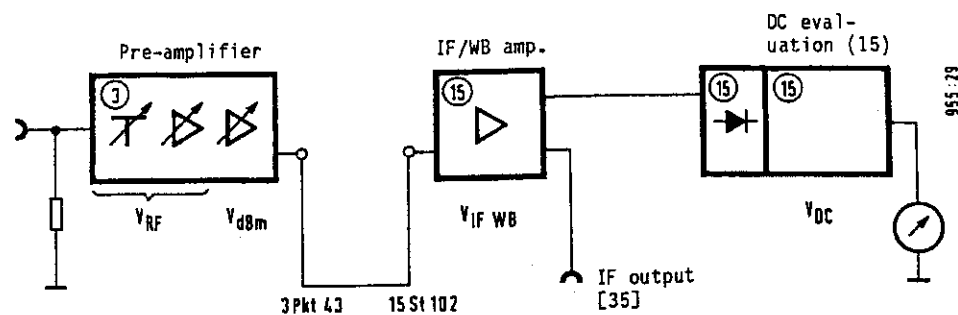


Fig. 7.5-3 +12 V supply voltage of



## Coaxial wideband measurement level diagram



Input level and measuring range	$V_{RF}$	$V_{dBm}$ in dB	Level at 15 St 102	$V_{IF WB}$	Level at IF outp. [35]	$V_{DC}$
+20 dB/dBm	-40 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
+10 dB/dBm	-30 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
0 dB/dBm	-20 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
-10 dB/dBm	-10 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
-20 dB/dBm	0 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
-30 dB/dBm	+10 dB	0/9.03	-20 dB	+11 dB	0 dBm/75 $\Omega$	0 dB/0 dB
-40 dB/dBm	+10 dB	9.03/9.03	-20.97 dB	+11 dB	-0.97 dBm/75 $\Omega$	+1 dB/+10 dB
-50 dB/-	+10 dB	9.03/-	-20.97 dB	+11 dB	-0.97 dBm/75 $\Omega$	+11 dB/-

Fig. 7.5-1 Level diagram for coaxial wideband measurement

## Selective signal path level diagram

see figure 7.5-2 at end of SPM-15 service manual.

## HF chassis +12 V power supply

see figure 7.5-3 at end of SPM-15 service manual.



### 7.5.2 INPUT SECTION AND PRE-AMPLIFIER

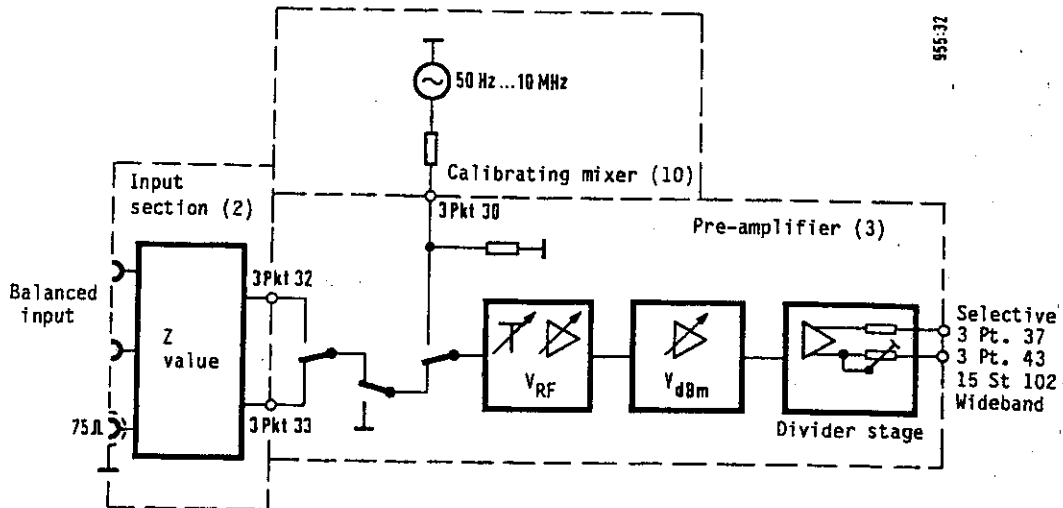


Fig. 7.5-4 Block circuit diagram, input section and pre-amplifier

#### Troubleshooting in the input section:

Select the  $Z_0$  value for the input jacks via the front panel keys and check the signal paths.

#### Troubleshooting in the pre-amplifier:

The signal inputs of the pre-amplifier are 3 Pt. 30, 32, 33. The MONEX input S:9108 switches through the calibrating level ( $V_{RF} = 0$  dB,  $V_{dBm}$  unchanged). The TK-11 and SPM-19 can be used to track the signal path as far as the signal outputs of the pre-amplifier, 3 Pt. 37, 43. Fig. 7.5-2 (Level diagram of the selective measuring path up to the IF output, at the end of the Service Instructions for the SPM-15) lists the start commands for all settings of  $V_{RF}$  and  $V_{dBm}$ .

A complete check of the pre-amplifier can be made in accordance with Section 7.8.4.

### 7.5.3 10 MHz LOW-PASS FILTER, MIXER 1, 40 MHz CRYSTAL BAND-PASS FILTER, MIXER 2

These input section assemblies are used for selective measurement only.

With an input signal of 0 dB/0 dBm at the 75 Ω input of the SPM-15, the signal path can be tracked with the SPM-16 and a TK-11. Fig. 7.5-2 (Level diagram of the selective measurement path up to the IF output, at the end of the Service Instructions for the SPM-15) states the test points and the level values to be measured.

Fig. 7.5-3 (12 V supply voltage on the RF chassis, at the end of the Service Instructions for the SPM-15) can be used for tracking the supply voltage on the RF chassis.

The carrier signal (40 ... 50 MHz) of the OD-15 must be available in mixer 1. It is supplied via the buffer stage (11) and the carrier limiter 1 (6).

The 40.01 MHz carrier must be available in mixer 2. The carrier is supplied from the 40.01 MHz generator (12) via carrier limiter 2 (8). Troubleshooting in the 40.01 MHz generator can be performed in accordance with Section 7.8.14.

Section 7.8.5 describes how to check and, if necessary, re-align the 10 MHz input low-pass filter (4).

The pass band of the 40 MHz crystal band-pass filter influences the selectivity curve of the band-pass filter  $b = 3.1$  kHz in the overall instrument. The range  $40 \text{ MHz} \pm 1.5 \text{ kHz}$  must be symmetrical about 40 MHz, and the attenuation at the limits must not exceed 0.4 dB. The selectivity curve of the 3.1 kHz filter can be checked with little effort in accordance with 7.5.4. If the tolerances stated there are maintained, the pass band of the crystal band-pass filter and the 10 kHz band-pass filter are correct. Re-alignment of the pass band necessitates a balanced measurement at the input of the 10 kHz band-pass filter. Board [955-7026] is then modified and alignment carried out in accordance with 7.8.7.

The attenuation peaks of the 40 MHz crystal band-pass filter are correctly aligned if the instrument displays intrinsic noise levels of less than -135 dB with open measuring input and  $b = 25 \text{ Hz}$  for the frequencies 18.5 kHz, 20 kHz and 21.5 kHz.

#### 7.5.4 10 kHz BAND-PASS FILTERS, IF SELECTIVE AMPLIFIER

These receive section assemblies are used for selective measurement only.

The 10 kHz band-pass filters with bandwidths of  $b = 3.1$  kHz and  $b = 1.74$  kHz (with option /00,23: 1.95 kHz) are located on board [955-AA]. The 10 kHz band-pass filter/ $b = 25 \text{ Hz}$  is on [955-K] or -K1].

Checking the pass-band attenuation compensation:

For  $b = 1.74$  kHz (1.95 kHz), see description in 7.8.9

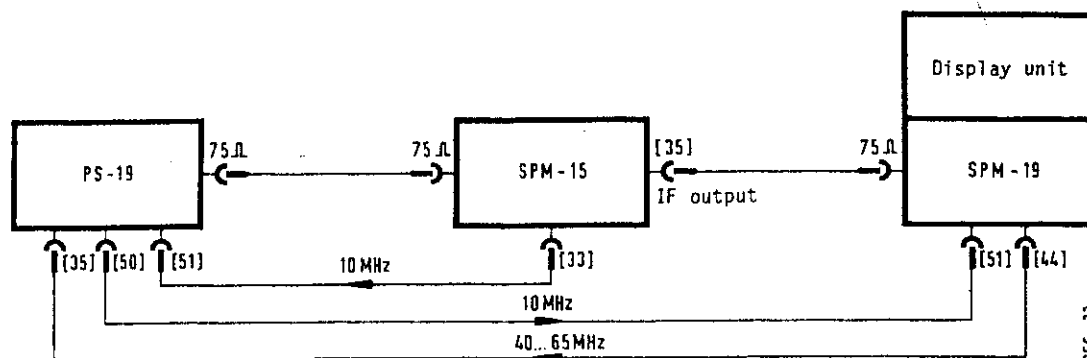
For  $b = 25 \text{ Hz}$ , see description in 7.8.10

Checking the selectivity curves:

Instruments required

Level generator	PS-19	W&G
Level meter	SPM-19	W&G
Display unit	SG-3 or SG-4	W&G

Test set-up:



Settings:

PS-19: 0 dB/75 Ω, external frequency control

SPM-19:  $f_{\text{cent}} = 10 \text{ kHz}$

$\Delta f = 10 \text{ kHz}$  and  $1 \text{ kHz}$

$b = 400 \text{ Hz}$  and  $25 \text{ Hz}$ /"Abs-Ref" measurement with 10 kHz/80 dB scale

CAL OFF

SPM-15:  $f = 10 \text{ kHz}$

Measuring range 0 dB/20 dB scale

CAL OFF

Examine the attenuation profile of the band-pass filters activated on the SPM-15 and check for compliance with the tolerances:

$b = 3.1 \text{ kHz}$ :  $10 \text{ kHz} \pm 1.5 \text{ kHz} \geq -3 \text{ dB}$ ,  $\pm 2 \text{ kHz} \leq -60 \text{ dB}$

$b = 1.74 \text{ kHz}$ :  $10 \text{ kHz} \pm 650 \text{ Hz} \geq -3 \text{ dB}$ ,  $\pm 2 \text{ kHz} \leq -60 \text{ dB}$

$b = 25 \text{ Hz}$ :  $10 \text{ kHz} \pm 7 \text{ Hz} \geq -3 \text{ dB}$ ,  $\pm 80 \text{ Hz} \leq -50 \text{ dB}$

For  $b = 3.1 \text{ kHz}$  and  $b = 1.74 \text{ kHz}$ , the 10 kHz band-pass filter [955-AA] must be repaired and/or aligned by the manufacturer if the tolerances are exceeded.

If the 3.1 kHz filter has a "slanting" pass band, the 40 MHz crystal band-pass filter must also be considered during troubleshooting.

A signal can be fed directly into 22 St 1 to check the IF selective amplifier ((15) Page 1). All gain settings  $V_{IF} = 0, \dots, 80 \text{ dB}$  can be checked with the MONEX. The procedure is described in 7.8.11.2. This presupposes correct functioning of the downstream IF wideband amplifier, which couples out the IF signal at jack [35] ((15) Page 2).

#### 7.5.5 IF WIDEBAND AMPLIFIER, RECTIFIER

The IF wideband amplifier ((15) Page 2) has a fixed gain of 11 dB.

In selective measurements, the 10 kHz IF signal is amplified and fed to the rectifier and jack [35], the 50 Hz ... 10 MHz signal supplied by the pre-amplifier being used for wideband measurements.

The 10 kHz IF signal is passed to the amplifier input by 15 T 101, the wideband signal by re1 102.

The DC operating point of 15 IC 105 is set to approx. 5.5 V by the voltage divider R 115, R 116. This voltage must also be measured at IC 105 Pins 1, 8 and 14.

The reference potential of the operational amplifier (centre voltage) is determined by G1 101, G1 102 and sets IC 105 Pin 8 to approx. 5.4 V.

The frequency response of the IF amplifier is best checked and/or aligned in the manner described in 7.8.11.3. This ensures that the instrument is correctly aligned for wideband measurements.

The rectifier ((15) Page 2) operates at 10 kHz for selective measurement, the applied signal frequency being rectified for wideband measurement.

A functional description can be found in Section 9.2.15.

The linearity of the rectifier can easily be checked by a 20 dB level jump at the instrument input. To do so, set the 0 dB display in ANALOG mode to wideband and measure the voltage at 15 TP 12. If the input level is reduced by 20 dB, the voltage at 15 TP 12 must drop to 1/10 of the value previously displayed.

Checking the frequency response:

Using the PS-19/Z = 75  $\Omega$ , externally controlled by the SPM-19, feed Z = 75  $\Omega$  into the test input. Set the UUT to wideband, analog. Measure at jack [35] with SPM-19. The frequency response of the rectifier is OK if the frequency response measured at [35] corresponds to the display on the instrument of the UUT (1 dB scale). (This presupposes correct functioning of the DC evaluation circuit).

7.5.6 DC EVALUATION CIRCUIT [955-J]

Circuit diagram 15, Page 3

7.5.6.1 Tools required - General information

## Tools required:

Generator with 0 dB output level and possibility for varying the output level in both mB and 1 dB increments (the PS-15 is highly suitable for this purpose).

MONEX with adapter board for SPM-15

If the instrument is working properly, a level of 0 dB/75  $\Omega$  is applied to the UUT and the UUT then set to a defined state with the aid of the standard set-up. Section 7.5.6.2 must then always be worked through next.

If the fault is known and included in the list below, the search can be continued at the Section stated; otherwise, work through all Sections, starting with Section 7.5.6.2.

The DC amplifier must be re-aligned after completing the repair.

If the digital section is not working properly, start with Section 7.4 Control section.

Fault:	Continue with:
Level present at 15 TP 10, but not displayed	7.5.6.2 - 7.5.6.10
1 dB scale cannot be switched on	7.5.6.9
1 dB increments displayed incorrectly in scale range	7.5.6.7
20 dB scale cannot be switched on	7.5.6.8
Analog displays functioning correctly, but DGTL not working properly	7.5.6.6, 7.5.6.7, 7.5.6.10
Instrument does not switch off for DGTL	7.5.6.11
Noise is displayed correctly in analog mode, but cannot be measured in DGTL mode	7.5.6.5 - 7.5.6.7, 7.5.6.10

7.5.6.2 First step on DC evaluation circuit

Measure -12 V at Pt. R298/C210. Required value -12 V $\pm$ 100 mV	
Measure +12 V at Pt. R287/C206. Required value +12 V $\pm$ 100 mV	
Measure +5 V at Pt. R296/C208. Required value +5 V $\pm$ 50 mV	
Measure -0,6 V at Pt. R293/cathode G1208. Required value -0.6 V $\pm$ 100 mV	
Voltages OK?	
Yes	No
Check power supply	
Change input levels at TP 12 until 5.7 V $\pm$ 2 mV at TP 12	

Setting possible?	
Yes	No
Measure voltages from bridge a-b. Required value 4.5 V - 5.5 V	
Voltage OK?	
Yes	No
Check amplifier IC 201	Recommence troubleshooting in pre-amplifier

#### 7.5.6.3 Check calibration controller

<u>Check calibration controller</u>	Voltage at TP 12	5.7 V $\pm$ 2 mV
Use command S:9394 to set calibration controller (IC 207) to centre setting		
Measure voltage at TP 13. Required value -3.97 V $\pm$ 5 mV		
Use command S:9395 to set calibration controller to minimum setting		
Measure voltage at TP 13. Required value -3.395 V $\pm$ 10 mV		
Use command 0:25.FF to set calibration controller to maximum setting		
Measure voltage at TP 13. Required value -4.537 V $\pm$ 10 mV		
Voltages OK?		
Yes	No	
Check addressing of Adr. 25H (IC 9, IC 204/2) Check calibration controller (IC 210, IC 207)		

#### 7.5.6.4 Check 0/16 dB amplifier

<u>Check 0/16 dB amplifier</u>	Voltage at TP 12	5.7 V $\pm$ 2 mV $\rightarrow$ P <sub>in</sub> = 0 dB
Voltages OK?		
Yes	No	
Check addressing of Adr. 27H (IC 9, IC 204/4) Check intermediate latch (IC 227) Check amplifier (IC 202, T 201, T 202)		

Reduce input level by 14 dB	
Output command 0:27.08 - Measure voltage at TP 14. Required value 4.99 V $\pm$ 30 mV	
Voltages OK?	
Yes	No
Check addressing of Adr. 27H (IC 9, IC 204/4) Check intermediate latch (IC 227) Check amplifier (IC 202, T 201, T 202)	

#### 7.5.6.5 Check 0.1/1 dB amplifier

<u>Check 0.1 dB controller</u> Voltage at TP 12 = 5.7 V $\pm$ 2 mV $\rightarrow$ P <sub>in</sub> = 0 dB	
Reduce input level by 11 dB	
Commands 0:23.0F 0:24.FF 0:25.80 0:27.00 $\rightarrow$ Calibration controller at centre, 0/16 dB amplifier at 0 dB, controller at 11 dB	
Voltages at TP 15 OK? (Required value 3.97 V $\pm$ 30 mV)	
Yes	No
Check addressing of Adr. 23H, 24H (IC 9, IC 10/4, IC 204/1) Check amplifier (IC 213, IC 212, IC 211)	
Increase input level by 11 dB $\rightarrow$ Input level = 0 dB $\rightarrow$ Voltage at TP 12 = 5.7 V $\pm$ 2 mV	
Commands 0:23.03 0:24.95 0:25.80 0:27.00 $\rightarrow$ Calibration controller at centre, 0/16 dB amplifier at 0 dB, controller at -2 dB	
Voltages at TP 15 OK? (Required value 3.15 V $\pm$ 7 mV)	
Yes	No
Check amplifier (IC 213, IC 212, IC 211)	

Commands 0:23.05 0:24.AC 0:25.80 0:27.00 -> Calibration controller at centre, 0/16 dB amplifier at 0 dB, controller at +2 dB	
Voltages at TP 15 OK? (Required value 5.00 V $\pm$ 10 mV)	
Yes	No
	Check amplifier (IC 213, IC 212, IC 211)

#### 7.5.6.6 Check reference voltages

<u>Check reference voltages</u>	
Measure 2 V reference voltage at TP 18. Required value +2.000 V $\pm$ 1 mV	
Voltage OK?	
Yes	No
	Check reference voltage at G1 202. Required value 6.4 V $\pm$ 320 mV
	Check reference amplifier (IC 232)
Measure -2.5 V reference voltage at Pin 6/IC 231. Required value -2.5 V $\pm$ 3 mV	
Voltage OK?	
Yes	No
	Check reference voltage amplifier (IC 231)

#### 7.5.6.7 Check logarithmizer and shift amplifier

<u>Check logarithmizer and shift amplifier</u>	Voltage at TP 12 = 5.7 V $\pm$ 2 mV
Output commands 0:23.03 0:24.95 0:25.80 0:27.00 -> 0.1 dB controller at -2 dB	
Note $U_x$ at TP 16	

Output commands 0:23.05 0:24.AC -> 0.1 dB controller at + 2 dB	
Voltages at TP 16 OK? Required value $U_x = -2 V \pm 5 mV$	
Yes	No
Re-align voltage with the aid of P 206	
Is this possible?	
Yes	No
Check reference generator IC 229, IC 226/2	
Check logarithmizing amplifier IC 225, IC 226/1	
Output commands 0:23.04 0:24.82	
Voltages at TP 17 OK? (Required value $0 V \pm 10 mV$ )	
Yes	No
Re-align voltage with the aid of P 205	
Is this possible?	
Yes	No
Check shift and reference voltage amplifier (IC 230, IC 231)	



7.5.6.8 Check 20 dB scale

<u>Check 20 dB scale</u>	
Apply 0 dB input level (5.7 V)	
Output commands 0:23.04 0:24.82 0:25.80 0:27.04 -> Calibration controller at centre, 0.1 dB controller at 0 dB, unexpanded scale on	
Voltage at Pin 2 IC 233 = 3.97 V $\pm$ 7 mV?	
Yes	No
Check switch IC 233/2 Check addressing of Adr. 27H (IC 9, IC 204/4) Check intermediate latch IC 227	
Voltage at Pin 10 IC 233 = 3.97 V $\pm$ 10 mV?	
Yes	No
Switch IC 233/3 - Required state ON Switch IC 233/4 - Required state OFF Check addressing of Adr. 27H (IC 9, IC 204/4) Check intermediate latch IC 227	

7.5.6.9 1 dB scale

<u>Check 1 dB scale</u>
Input level 0.00 dB (5.7 V)
Output commands 0:23.04 0:24.82 0:25.80
Output command 0:27.00 -> 1 dB scale on, 10 dB scale off
Measure voltage at Pin 4/IC 233 - Required value 2.5 V $\pm$ 20 mV

Voltage OK?	
Yes	No
	Check switch IC 233/1 - Required status ON Check switch IC 233/3 - Required status ON Check switch IC 233/4 - Required status OFF
	Check addressing and intermediate latch (IC 9, IC 204/4, IC 227) Check logarithmizer and shift amplifier

## 7.5.6.10 Check 4-bit ADC

Check 4-bit ADC	
Perform a RESET to force the system to assume the basic settings The following levels must be applied consecutively: -20.1, -10.1, -1.05, 0.00, +1.05 dB. The following bit configurations must appear when reading address 26H:	
Level	ADR 26H
-20.1	00H
-10.1	01H
-1.1	03H
+0.0	07H
+1.1	0FH
Bit configurations OK?	
Yes	No
Measure reference voltage at Pin 4 IC 208 - Required value $2\text{ V} \pm 1\text{ mV}$	
Voltage OK?	
Yes	No
Cf. above, Check reference voltage	
Apply level of +1 dB - Measure voltage at Pin 5 IC 208 Required value $2\text{ V} \pm 5\text{ mV}$	
Voltage OK?	
Yes	No
Check complete DC amplifier	
Check comparator IC 208	

7.5.6.11 Check instrument shut-off

<u>Check instrument shut-off</u>	
Input level 0 dB -> Voltage at TP 12 = 5.7 V <u>±</u> 2 mV	
Output commands 0:23.04 0:24.82 0:25.80 0:27.07 -> Calibration controller at centre, 0/16 dB amplifier at 0 dB, instrument off	
Instrument pointer at left-hand stop?	
Yes	No
	Check switches IC 233/3 - Required status OFF IC 233/4 - Required status ON Check addressing of ADR 27H (IC 9, IC 204/4) Check intermediate latch (IC 227)

7.5.7 DEMODULATOR

The demodulator is shown in (15) Page 4.

The detailed functional description in Section 9.2.15 and the alignment instructions in Section 7.8.11.6 can be used for troubleshooting.

7.5.8 CALIBRATING MIXER

In instruments of Series A ... D: [955-AE]

In instruments of Series E ...: [955-AE1]

This distinction between Series is unnecessary for instruments without tracking generator.

The calibrating mixer has two calibration sources:

The wideband calibration source supplies a 10 kHz square-wave signal with a fixed level of -40 dB. The selective calibration source supplies a signal in the frequency range from 50 Hz to 10 MHz. This signal is additionally made available for the tracking generator at 10 St 1 via a decoupling stage. The calibrating level can be attenuated very accurately by up to 6.9 dB in instruments of Series A ... D and by up to 10.5 dB in instruments of Series E .... The MONEX input S:9500 sets  $A_{dB} = 0$  (-> -40 dB calibrating level).

Refer to Section 9.2.10 for a more detailed circuitry description.

When troubleshooting, it should first be ensured that the carrier (40 ... 50 MHz) is present at 10 Pt. 1 with approx. -21 dB and the signal (40 MHz) at 10 Pt. 5 with approx. -5 dB (measured at high impedance).

The MONEX inputs S:9108 (selective calibrating level) and S:9109 (wideband calibrating level) can be used to switch both calibration sources into the measuring path of the receiver. If the instrument is in "dBm" mode,  $V_{dBm}$  must additionally be set to 0 - S:9390. If operating correctly, both calibration sources produce a 0 dB display on the 1 dB scale. Any re-alignment of the absolute level of the selective calibration source (after finding an unacceptable high measuring error at  $f = 10$  kHz and deviation from the 0 dB/1 dB scale with calibrating level switched through) must be carried out in accordance with 7.8.15.2.

Unacceptable high selective measuring errors which are frequency-dependent necessitate re-alignment of the calibrating level frequency response in accordance with 7.8.15.1

## 7.6 TROUBLESHOOTING IN THE TRACKING GENERATOR (PSE)

### 7.6.1 GENERAL INFORMATION

Fig. 7.6-1 shows a highly simplified block circuit diagram of the assemblies making up the tracking generator.

It can be seen that, for test purposes (particularly for frequency response measurements), the internal synthesizer OD-15 can be disconnected and the carrier fed in at 6 Bu 1 using a sweepable OD-19 (synthesizer of the SPM/PS-19).

Fine level adjustment (0.1 dB increments) takes place in the calibrating mixer and is controlled by a digital/analog converter on the amplifier board of the tracking generator. Coarse level adjustment (5 dB increments on instruments of Series A ... D and 10 dB increments on instruments of Series E ...) is performed by resistance dividers in the PSE amplifier.

The attenuation in the calibrating mixer for fine adjustment is stated as  $A_{dB}$ . Refer to Section 9 for a more detailed circuitry description.

All settings can be established in a defined form and then checked using the MONEX. The function of the start programs can be found in Section 9.5.5 (Monitor test programs).

Before going into detail on possible causes of faults in the subsequent Sections, there follows a list of the most important fault sources of a general nature:

- The two switches 10 S 1 and 10 S 2 in the calibrating mixer must be open for operating the tracking generator.
- Check the voltages +12 V and -12 V at plug "b" for the digital section of the PSE amplifier.
- Check the +15 V supply voltage of the analog section (can be de-energized with 23 T 15 or 23 T 6).
- Check the connections between the calibrating mixer and the PSE amplifier and between the output field and output jacks.
- The dividers are only controlled correctly if the PSE is switched on.

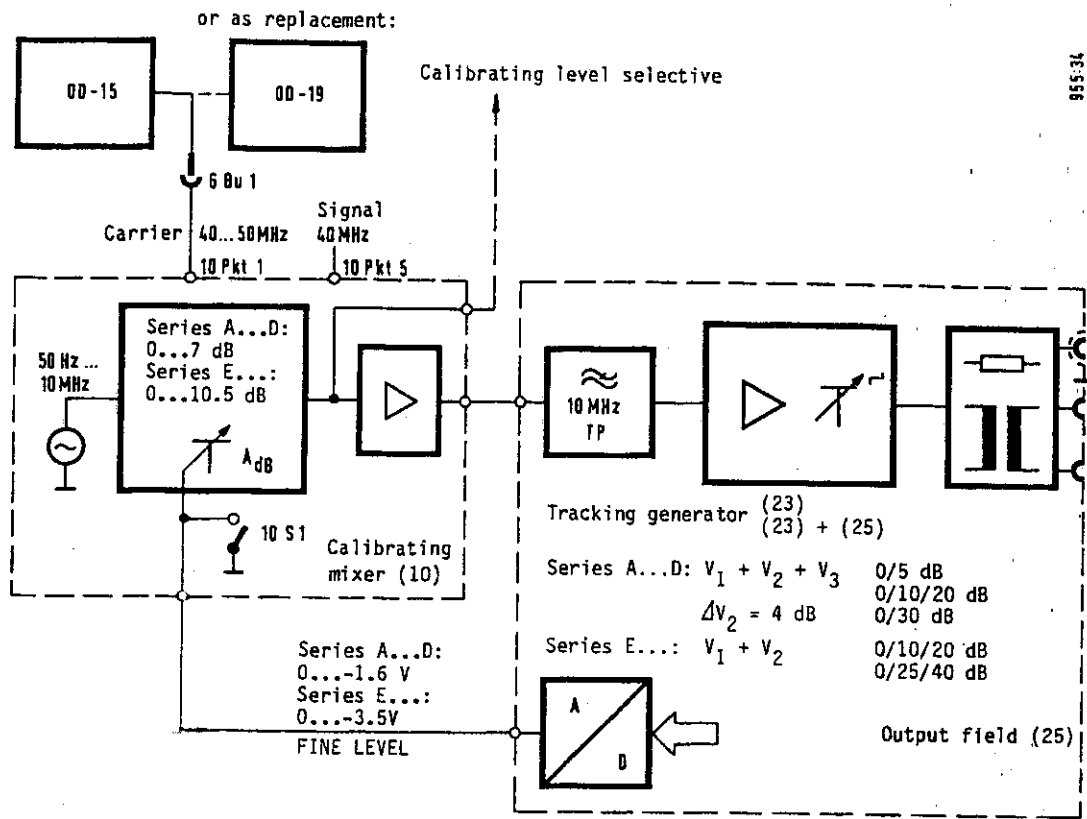


Fig. 7.6-1 Block circuit diagram of the PSE

7.6.2 FINE LEVEL ADJUSTMENT

Instruments of Series A...D:

To check the fine level adjustment, set the tracking generator to  $Z = 75 \Omega$  and check the send level setting between +10 dB and -4.0 dB.

(On instruments with the "dBrnC" option, the send level can be set in "dB" by means of the MONEX input S:9902).

Send level	Equivalent setting with MONEX	Attenuation of calib. mixer level $A_{dB}$	23 IC 5 Pin 6 = $V_{DAC}$
+1.0 dB	S:9505	0.5 dB	-0.16 V
0 dB	S:9515	1.5 dB	-0.46 V
-4.0 dB	S:9555	5.5 dB	-1.36 V
	S:9556	5.6 dB	
	S:9557	5.7 dB	
	S:9569	6.9 dB	-1.60 V

Possible fault sources are the digital/analog converter (23 IC 4, 5, 6 and 9) and the attenuation of the 40 MHz signal in the calibrating mixer (10 IC 7).  
The reference voltage (23 P 8) must be re-aligned in accordance with 7.8.16.2.

#### Instruments of Series E...:

To check the fine level adjustment, set the tracking generator to  $Z = 75 \Omega$  and check the send level setting between -5.0 dB and -14.9 dB.  
(On instruments with the "dBmC" option, the send level can be set in "dB" by means of the MONEX input S:9902).

Send level	Equivalent setting with MONEX	Attenuation of the calib. mixer level $A_{dB}$	23 IC 15 Pin 6 = $U_{DAC}$
	S:9600	0 dB	0 V
	S:9601	0.1 dB	-60 mV
-5.0 dB	S:9605	0.5 dB	-0.28 V
-5.1 dB	S:9606	0.6 dB	-0.33 V
	↓	↓	↓
-10.0 dB	S:9655	5.5 dB	-2.31 V
-10.1 dB	S:9656	5.6 dB	-2.34 V
	↓	↓	↓
-14.5 dB	S:96A0	10.0 dB	-3.37 V
-14.6 dB	S:96A1	10.1 dB	-3.38 V
	↓	↓	↓
-14.9 dB	S:96A4	10.4 dB	-3.44 V

Possible faults sources are the digital/analog converter (23 IC 14, 15, 16 and 19) and the attenuation of the 40 MHz signal in the calibrating mixer (10 IC 7).  
Re-alignment of the reference voltage (23 P 3) must be carried out in accordance with 7.8.16.2.

### 7.6.3 DIVIDER CONTROLLER

#### Instruments of Series A ... D:

To check the dividers, start with a send level of 0 dB and then set level values of -5 dB, -10 dB, -20 dB, and 30 dB. This successively switches on the 5 dB, 10 dB, 20 dB, 30 dB dividers.

The amplifier  $\Delta V_2 = 4$  dB, which can be switched on additionally, is only required for  $R_i \approx 0$  and level values  $> 7,0$  dB. The alignment of 23 P 2 is OK if the level jump from 7.0 dB to 7.1 dB at  $R_i \approx 0$  to  $R_a = 600 \Omega$  is  $10 \text{ mB} \pm 1 \text{ mB}$ .

Accurate divider measurement and alignment of 23 P 1 and 23 P 2 are described in 7.8.16.2.

## 7.8 ALIGNMENT OPERATIONS AND TEST MEASUREMENTS

### 7.8.1 SUMMARY: LIST OF ALL ALIGNMENT ELEMENTS, ALIGNMENT OPERATIONS AND TEST MEASUREMENTS AFTER REPLACING ASSEMBLIES

A list of the measuring equipment required can be found in Section 6.2.

#### List of all alignment elements

Alignment element	Alignment	Section
1 P 1	Tripping threshold, line undervoltage	7.8.2
1 P 2	Tripping threshold, battery undervoltage	7.8.2
2 C 2	Return loss 75 $\Omega$ input (WECO: 2 C 14)	7.8.3.1
2 C 3	Balance 600 $\Omega$ input (WECO: 2 C 1)	7.8.3.2
2 C 5	Balance 124 $\Omega$ , 150 $\Omega$ input (WECO: 2 C 3)	7.8.3.2
2 C 11	Frequency response 124 $\Omega$ , 150 $\Omega$ input (WECO: 2 C 12)	7.8.3.3
3 C 4	Frequency response 20 dB divider (also 3 P 1)	7.8.4.3
3 C 8	Frequency response 40 dB divider (also 3 P 8)	7.8.4.3
3 C 23	Frequency response 0 dB amplifier 1 (also 3 P 2)	7.8.4.3
3 C 25	Frequency response +10 dB amplifier 1 (also 3 P 3)	7.8.4.3
3 C 28	Frequency response +20 dB amplifier 1 (also 3 P 4)	7.8.4.3
3 P 1	Frequency response 20 dB divider (also 3 C 4)	7.8.4.3
3 P 2	Frequency response 0 dB amplifier 1 (also 3 C 23)	7.8.4.3
3 P 3	Frequency response +10 dB amplifier 1 (also 3 C 25)	7.8.4.3
3 P 4	Frequency response +20 dB amplifier 1 (also 3 C 28)	7.8.4.3
3 P 5	DC operating point of the pre-amplifier	7.8.4.1
3 P 6	Wideband level at the pre-amplifier output	7.8.4.4
3 P 8	Frequency response 40 dB divider (also 3 C 8)	7.8.4.3
4 C 1	10 MHz TP input capacitance	7.8.5
4 C 3	10 MHz TP peak at 48.8 MHz (also 4 L 1)	7.8.5
4 C 6	10 MHz TP peak at 21.9 MHz (also 4 L 2)	7.8.5
4 C 10	10 MHz TP peak at 20.1 MHz (also 4 L 3)	7.8.5
4 C 14	10 MHz TP peak at 27.7 MHz (also 4 L 4)	7.8.5
4 C 17	10 MHz TP output capacitance	7.8.5
4 L 1	10 MHz TP peak at 48.8 MHz (also 4 C 3)	7.8.5
4 L 2	10 MHz TP peak at 21.9 MHz (also 4 C 6)	7.8.5
4 L 3	10 MHz TP peak at 20.1 MHz (also 4 C 10)	7.8.5
4 L 4	10 MHz TP peak at 27.7 MHz (also 4 C 14)	7.8.5
5 C 9	40 MHz resonant circuit in mixer 1	7.8.6
5 C 20	Residual carrier in mixer 1	7.8.6
5 C 21	Residual carrier in mixer 1	7.8.6

Fig. 7.8-1 List of alignment elements

Alignment element	Alignment	Section
7 C 6	40 MHz crystal band-pass filter: peak at 40.0185 MHz	7.8.7
7 C 7	40 MHz crystal band-pass filter: peak at 40.0215 MHz	7.8.7
7 L 2	40 MHz crystal band-pass filter:	7.8.7
7 L 5	40 MHz crystal band-pass filter:	7.8.7
7 L 6	40 MHz crystal band-pass filter:	7.8.7
7 O 1	40 MHz crystal band-pass filter:	7.8.7
7 O 2	40 MHz crystal band-pass filter:	7.8.7
	} Resid. atten. at 40 MHz and attenuation profile	
8 P 1	Residual carrier mixer 2	7.8.8
9 L 1	10 kHz band-pass filter	
9 L 2	10 kHz band-pass filter	
9 L 3	10 kHz band-pass filter	
9 L 4	10 kHz band-pass filter	
9 L 5	10 kHz band-pass filter	
9 L 6	10 kHz band-pass filter	
9 L 7	10 kHz band-pass filter	
9 L 8	10 kHz band-pass filter	
9 L 9	10 kHz band-pass filter	
9 L 12	10 kHz band-pass filter	
9 L 13	10 kHz band-pass filter	
9 O 1	10 kHz band-pass filter	
9 P 1	Residual attenuation alignment for $b = 1.74$ kHz (1.95 kHz)	7.8.9
10 C 51	} Calibrating level frequency response	7.8.15.1
10 C 52		
10 L 3	} 40 MHz resonant circuit for signal conditioning	7.8.15.1
10 L 4		
10 P 1	(Selective) calib. level and signal for PSE absolute	7.8.15.2
10 P 2	Wideband calib. level (10 kHz square-wave) absolute	7.8.15.3
11 C 6	} Frequency response of carrier (40...50 MHz) for calib. mixer and backplane [34]	7.8.13
11 C 8		
12 C 4	10 MHz resonant circuit on multiplier	7.8.14
12 L 2	} 40 MHz resonant circuit on multiplier	7.8.14
12 L 3		
12 C 64	Resonant circuit 13.3367 MHz = 40.01 MHz/3	7.8.14
12 L 5	} Resonant circuit 40.01 MHz	7.8.14
12 L 6		
15 C 110	Frequency response of IF wideband amplifier	7.8.11.3
15 C 126	Frequency response of rectifier	7.8.11.4
15 P 1	Gain correction of IF (selective) amplifier	7.8.11.1

Fig. 7.8-1 List of alignment elements (contd.)



Alignment element	Alignment	Section
	Tracking generator, Series E...	
23 C 18	Frequency response of PSE amplifier	7.8.16.3
23 C 21	Frequency response of 20 dB divider	7.8.16.4
23 L 1	Pass-band ripple of 10 MHz low-pass filter	7.8.16.3
23 L 2		
23 P 2	Absolute level (also 10 P 1)	7.8.16.7
23 P 3	Reference voltage for the digital/analog converter	7.8.16.2
23 C 1	Return loss 75 $\Omega$ output	7.8.16.1
23 C 3	Balance 124 $\Omega$ , 150 $\Omega$ (not fitted)	7.8.16.5
23 C 5	Balance 600 $\Omega$	7.8.16.5
23 P 1	Frequency response 124 $\Omega$	7.8.16.6
23 P 2	Frequency response 600 $\Omega$ (not fitted) (n.a. for WECO version)	7.8.16.6
23 P 3	Frequency response 150 $\Omega$ (normal version); 600 $\Omega$ (WECQ vers.)	7.8.16.6

Fig. 7.8-1 List of alignment elements (contd.)

Alignment operations and test measurements after replacing assemblies

Assembly	Series	Designation	Shown in circuit diagram	Alignment and test acc. to Section
955-	A	Power supply	1	7.8.2
	A1	Power supply	1	7.8.2
	B	Input circuitry	20	
	C	Display logic	19	
	D	Level display	20	
	E	RF controller	13	
	E1	RF controller	13	
	F	CPU board	21	
	F1	(A) B... CPU board	21	
	G	Wiring board	1	
	H	Level switch	20	
	J	IF evaluation circuit	15	7.8.11
	K	10 kHz BP filter/25 Hz mech.	22	7.8.10
	K1	10 kHz BP filter/25 Hz mech.	22	7.8.10
	L	Input section 1-US (955/02 only)	2	7.8.3
	M	Pre-amplifier	3	7.8.4
	N	10 MHz low-pass filter 1	4	7.8.5

Fig. 7.8-2 Alignment operations after replacing assemblies

Assembly	Series	Designation	Shown in circuit diagram	Alignment and test acc. to Section	
955-	O	A...	10 MHz low-pass filter 2	4	7.8.5
	R	A...	Mixer 1	5	7.8.6
	S	A...	Carrier limiter 1	6	
	T	A...	40 MHz crystal band-pass filter 1	7	7.8.7
	U	A...	40 MHz crystal band-pass filter 2	7	7.8.7
	V	A...	40 MHz crystal band-pass filter 3	7	7.8.7
	W	A...	40 MHz crystal band-pass filter 4	7	7.8.7
	X	A...	40.01 MHz VCO	12	7.8.14
	Y	A...	40.01 MHz PLL	12	7.8.14
	Z	A...	Multiplier	12	7.8.14
	AA	A...	Buffer amplifier	11	7.8.13
	AB	A...	10 kHz band-pass filter	9	7.8.9
	AC	A...	Mixer 2	8	7.8.8
	AD	A...	Carrier limiter 2	8	
	AE	A...D	Calibrating mixer	10	7.8.15
	AE1	E...	Calibrating mixer	10	7.8.15
	AF	A, B	Input section 1	2	7.8.3
	AF	C...	Input section 1 (board outp. 4...)	2	7.8.3
	AG	A, B	Input section 2	2	7.8.3
	AG	C...	Input section 2 (board outp. 2...)	2	7.8.3
	AJ	A...	Switch wiring	1	
	AL	A...	Input filter	2	
	AM	A, B	Interface	14	
	AM1	C...	Interface	14	
			Display meter	19	7.8.12
	AH	A...	DC converter	23	
	AK	A...D	PSE amplifier	23	7.8.16
	AN	A...D	Filter 1	23	7.8.16
	AO	A...D	Filter 2	23	7.8.16
	AP	A...	PSE filter	23	
	AT	E...	PSE amplifier	23	7.8.16
	AU	E...	Output field, normal version	25	7.8.16
	AV	E...	Output field, WECO Vers. (only in 955/02)	25	7.8.16

Fig. 7.8-2 Alignment operations after replacing assemblies (contd.)

7.8.2 POWER SUPPLY: TRIPPING THRESHOLDS FOR UNDERVOLTAGE (1 P 1, 1 P 2)

## Instruments required:

Current measuring adaptor	PGI-955	W&G
Digital multimeter	any	
Variable-ratio transformer	any	
Power supply 8 V ... 20 V/4 A	any	

Functional check:

Operate the instrument in line mode with rated voltage. Use the current measuring adaptor to measure voltages and currents:

+12 V  $\pm$  100 mV;  $\leq$  430 mA

-12 V  $\pm$  100 mV;  $\leq$  45 mA

+5 V dig.  $\pm$  50 mV;  $\leq$  400 mA

+5 V analog  $\pm$  50 mV;  $\leq$  150 mA (without PSE),  $\leq$  520 mA (PSE "on")

Alignment of the line tripping threshold (1 P 1):

Switch [4] to "unblanked"; PSE "on", IEC bus or dummy load plugged in. Gradually increase the voltage on the variable-ratio transformer and align the tripping threshold of the 5 V controller with 1 P 1 to 186 V  $\pm$  1 V for voltage selector on 220 V  
83 V  $\pm$  1 V for voltage selector on 110 V

Alignment of the battery tripping threshold (1 P 2)

Instrument settings as above.

Power supply to the SPM-15 via battery jack [32] with power supply (8 ... 20) V. Align the tripping threshold of the 5 V controller in "battery" mode to 12 V  $\pm$  0.2 V.

7.8.3 INPUT SECTION (2)7.8.3.1 Return loss 75  $\Omega$  (2 C 2, for WECO instruments: 2 C 14)

## Instruments required:

Level meter	SPM-19	W&G
Level generator	PS-19	W&G
Display unit	SG-3 or SG-4	W&G
Return loss measuring attachment	RFZ-5/BN 394	W&G

## Test set-up:

Connect PS-19, SPM-19/ $Z_0 = 75 \Omega$  to RFZ-5

## Settings:

PS-19: +1 dB/75  $\Omega$ ; ext. frequency control

SPM-19:  $f_{\text{start}} = 10 \text{ kHz}$ ,  $f_{\text{stop}} = 10 \text{ MHz}$   
 $b = 3.1 \text{ kHz/80 dB scale}$ ,  $Z = 75 \Omega$

SPM-15:  $f$  any, measuring range 0 dBm, 20 dB scale

## Measurement:

Determine reference level for open RFZ-5,

Return loss at 10 kHz  $\geq$  52 dB

Return loss 10 kHz ... 10 MHz  $\geq$  40 dB Align with 2 C 2 (or 2 C 14)

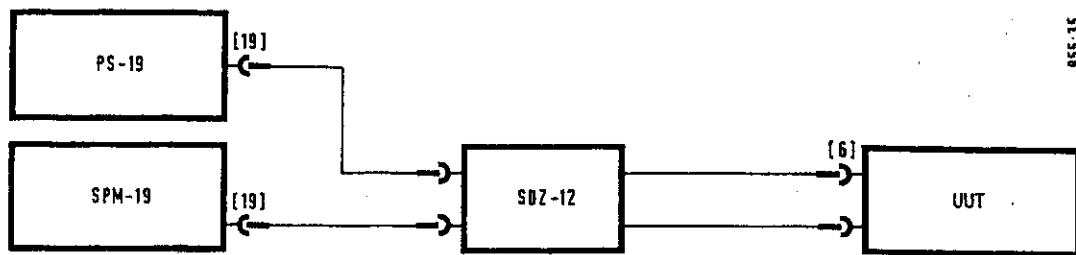
Also refer to the RFZ-12/BN 810 Operating Instructions for further details on measurement

### 7.8.3.2 Signal balance ratio 600 $\Omega$ , 124 $\Omega$ (2 C 3, 2 C 5, for WECO instruments: 2 C 1, 2 C 3)

#### Instruments required:

Level meter	SPM-19	W&G
Level generator	PS-19	W&G
Signal balance ratio measuring attachment	SDZ-12/BN 811	W&G

#### Test set-up:



SPM-19: DGTL;  $Z_0 = \infty$ ,  $f = 500$  kHz, 5 MHz

PS-19: 0 dB/ $Z_0 = 75 \Omega$ ;  $f = 500$  kHz, 5 MHz

SPM-15:  $Z_0 = 600 \Omega$ ,  $Z = 124 \Omega$ ;  $f = 500$  kHz, 5 MHz

Measuring range -50 dBm/20 dB scale

Refer to the SDZ-12/BN 811 Operating Instructions for details on the test set-up

#### Measurements:

$Z = 600 \Omega$ , at 500 kHz; align 2 C 3 (WECO: 2 C 1) to min. level display

$Z = 124 \Omega$ , at 5 MHz; align 2 C 5 (WECO: 2 C 3) to min. level display

$a_B$  (in dB) = Send level (SPM-19) - Receive level (UUT)

### 7.8.3.3 Frequency responses 124 $\Omega$ , 150 $\Omega$ , (135 $\Omega$ ), 600 $\Omega$ (2 C 11, WECO: 2 C 12)

#### Instruments required:

Level generator	PS-19	W&G
EPM-1 with TKS-10, TKSA-124, 150, 600		W&G

#### Test set-up:

Connect the output of the PS-19 directly to the balanced test input of the SPM-15.

(a) Frequency responses 124  $\Omega$ , 150  $\Omega$  (135  $\Omega$  for 955/00.21)

#### Settings:

PS-19: 0 dBm/124  $\Omega$ , 150  $\Omega$  (BAL I)

PS-19 and SPM-15:  $f = 0.1$  MHz,  $f_{\text{step}} = 1.98$  MHz

SPM-15:  $b = 3.1$  kHz/0 dBm/1 dB scale

$Z_0 = 124 \Omega$ , 150  $\Omega$

#### Measurements:

Measure the level of the PS-19 directly with the EPM-1, TKS-10 and TKSA-" $Z_0$ " and note the level values at  $f = 0.1/2.08/4.06/6.04/8.02/10$  MHz. Feed the UUT from the PS-19, determine the measuring error of the SPM-15 after calibration.

For  $Z = 124 \Omega$ , align frequency response to  $\pm 10$  mB with 2 C 11 (WECO: 2 C 12)

For  $Z = 150 \Omega$ , check frequency response for  $\pm 10$  mB tolerance.

(b) Frequency response 600  $\Omega$  (WECO version: additionally 135  $\Omega$ ) (check only)

Settings:

PS-19: 0 dBm/600  $\Omega$ , (150  $\Omega$ ) BAL II  
 PS-19 and SPM-15:  $f = 10$  kHz,  
 SPM-15:  $b = 3.1$  kHz/0 dBm/1 dB scale  
 $Z_0 = 600$   $\Omega$ , (135  $\Omega$ )

Measurements:

Measure the level of the PS-19 directly with the EPM-1, TKS-10 and TKSA-600 (150) and note the level values at  $f = 10/210/410/610$  kHz.

Feed the UUT from the PS-19, determine the measuring error of the SPM-15 after calibration.

Permissible tolerances:  $Z_0 = 600$   $\Omega$ ,  $f = 10$  kHz:  $\pm 10$  mB;  
 PS-19:  $Z_0 = 150$   $\Omega$ , SPM-15:  $Z_0 = 135$   $\Omega$ ;  $f = 210, 410, 610$  kHz:  $\pm 25$  mB  
 $f = 10$  kHz:  $-0.5$  dB  $\pm 10$  mB;  
 $f = 210, 410, 610$  kHz:  $-0.5$  dB  $\pm 25$  mB

#### 7.8.4 PRE-AMPLIFIER (3)

##### 7.8.4.1 DC operating point (3 P 5)

Instruments required:

Digital voltmeter any

UUT setting:

Close switch 3 S 1, 3 S 2

Alignment:

Use 3 P 5 to set to voltage at 3 TP 3 to 4.5 V  $\pm 10$  mV

Check: U (3 TP 1) = 4.8 ... 5.3 V, U (3 TP 2) = 3.9 ... 4.3 V

Fine alignment may be carried out to optimize the distortion products:

Using the generator, feed 0 dBm/75  $\Omega$ ,  $f$  any  $< 5$  MHz,  $a_{k2} > 80$  dB into the test input of the UUT and measure at 2f; align to minimum level display with 3 P 5 ( $b = 25$  Hz/measuring range -50 dBm/20 dB scale).

##### 7.8.4.2 Absolute accuracy of dividers, amplifiers (check only)

Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

Test set-up:

Feed the test input of the UUT with PS-19/ $Z_0 = 75$   $\Omega$  and measure at the IF output [35] of the UUT with SPM-19/ $Z_0 = 75$   $\Omega$ .

## Settings:

PS-19:  $f = 10$  kHz, level as per TableSPM-19:  $b = 3.1$  kHz/measuring range  $-29$  dB/1 dB scale $f = 10$  kHz, CAL OFFSPM-15: Wideband,  $f$  any, CAL OFF

## Measurement:

PS-19	MONEX	$V_{RF}$	$V_{dBm}$	SPM-19
-40 dB	S:9210, S:9390	0 dB	0 dB	Read reference value
-20 dB	S:9212	-20 dB	0 dB	} Reference value $\pm 10$ mB
0 dB	S:9214	-40 dB	0 dB	
-50 dB	S:9201	+10 dB	0 dB	} Reference value $\pm 10$ mB
-60 dB	S:9202	+20 dB	0 dB	
-40 dB	S:9210	0 dB	0 dB	CAL ON, "Abs-Ref" measurement
-40 dB	S:9391	0 dB	9.03 dB	"Ref" +9.03 dB $\pm 10$ mB
-40 dB	S:9392	0 dB	6.85 dB	"Ref" + 6.85 dB $\pm 10$ mB
-40 dB	S:9393	0 dB	6.02 (6.48) dB	"Ref" + 6.02 (6.48) dB $\pm 10$ mB

## 7.8.4.3 Frequency responses of dividers, amplifiers

## Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
MONEX	MONEX	W&G
Display unit	SG-4/BN 957	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

## Test set-up:

Feed the test input of the UUT with PS-19/ $Z = 75 \Omega$  and measure at the IF output [35] of the UUT with SPM-19/ $Z = 75 \Omega$ .

## Settings:

PS-19: ext. frequency control from SPM-19, level as per Table

SPM-19:  $b = 3.1$  kHz/measuring range  $-29$  dB/1 dB scale $f_{start} = 10$  kHz,  $f_{stop} = 10$  MHz, CAL OFFSPM-15: Wideband,  $f$  any, CAL OFF

## Measurements:

Record and store intrinsic frequency response of PS-19 ( $-29$  dB) - SPM-19 (reference frequency response)

## Measurement:

PS-19	MONEX	V <sub>RF</sub>	V <sub>dBm</sub>	Alignment elements	SPM-19/SG-4
-40 dB	S:9210, S:9390	0 dB	0 dB	3 P 2, 3 C 23	} Ref. freq. resp. $\pm$ 0.1 dB
-20 dB	S:9212	-20 dB	0 dB	3 P 1, 3 C 4	
0 dB	S:9214	-40 dB	0 dB	3 P 8, 3 C 8	
-50 dB	S:9201	+10 dB	0 dB	3 P 3, 3 C 25	
-60 dB	S:9202	+20 dB	0 dB	3 P 4, 3 C 28	
					Ref. freq. resp. $\pm$ 0.2 dB
-40 dB	S:9210	0 dB	0 dB	-	} "ABS-REF" meas. 10 kHz Ref. freq. resp. $\pm$ 0.15 dB
-40 dB	S:9391	0 dB	9.03 dB	poss. 3 R 60    10 pF	
-40 dB	S:9392	0 dB	6.85 dB	poss. 3 R 62    6.8 pF	
-40 dB	S:9393	0 dB	6.02 (6.48) dB	-	

Note on frequency response alignment: first set potentiometer to centre position

#### 7.8.4.4 Absolute level of the wideband output (3 P 6)

## Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

Measurement: (at  $f = 10$  kHz)

Feed PS-19/0 dBm, 75  $\Omega$  into SPM-15 (wideband, 0 dBm, 1 dB scale).

MONEX S:9394 (calibrating controller at "centre")

Use 3 P 6 to align the UUT display to 0 dBm.

Then align the wideband calibrating level (refer to Section 7.8.15.3)

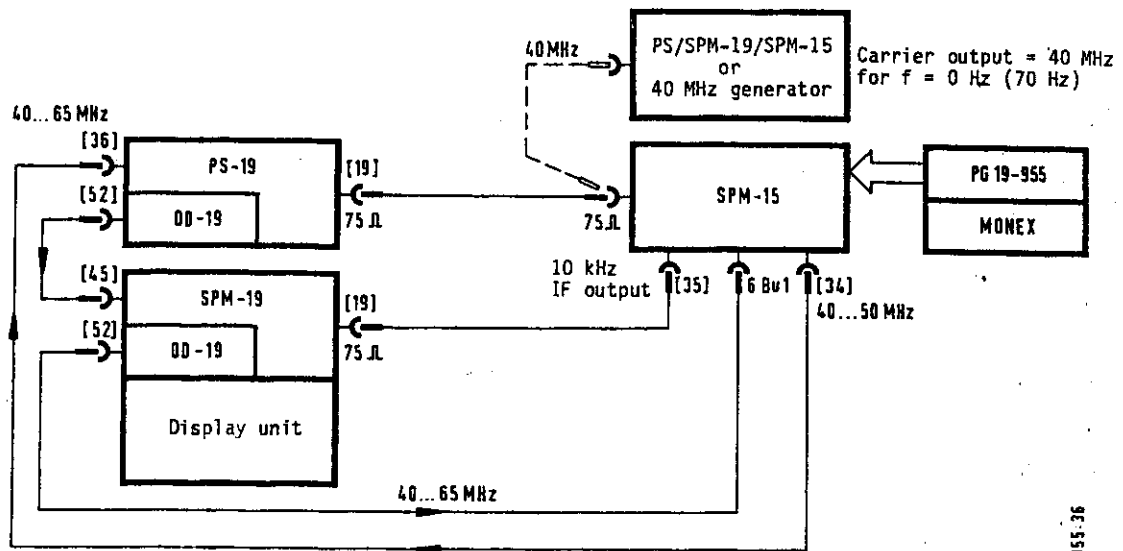
After repairing or replacing the pre-amplifier, check the gain of the selective path (7.8.11.1) and the selective calibrating level (7.8.15.2)!

#### 7.8.5 INPUT LOW-PASS FILTER 10 MHz (4)

## Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
Display unit	SG-3/SG-4	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G
40 MHz generator or carrier output	PS/SPM-19/SPM-15	W&G

Test set-up:



Settings:

PS-19:  $f = 10 \text{ kHz}$  (receive frequency of the SPM-19)  
 $-40 \text{ dB}/75 \Omega$

SPM-19:  $f_{\text{start}} = 10 \text{ kHz}$   
 $f_{\text{stop}} = 10 \text{ MHz}$  } Control of the PS-19 and the SPM-15  
 $b = 3.1 \text{ kHz}/\text{measuring range } 0 \text{ dBm}/80 \text{ dB and } 1 \text{ dB scale}$   
 $Z = 75 \Omega, \text{ CAL OFF}$

SPM-15:  $Z = 75 \Omega, b = 3.1 \text{ kHz}, \text{ CAL OFF}$

MONEX: S:9200 ( $V_{\text{RF}} = 0 \text{ dB}$ )  
 S:9320 ( $V_{\text{RF}} = 20 \text{ dB}$ )

(a) Alignment of stop peaks (4 C 3, 4 C 6, 4 C 10, 4 C 14)

Caution: Coils 4 L 1, L 2, L 3, L 4 are pre-aligned. Do not adjust!

f (SPM-19)	Align to minimum level display on SPM-19
20.1 MHz	with 4 C 10 } alternately with 4 C 6 } with 4 C 14 }
21.9 MHz	
27 MHz	
Disconnect PS-19, feed in 40 MHz	with 4 C 3

(b) Alignment of pass-band (4 C 1, 4 C 17)

Use 4 C 1 and 4 C 17 to align to minimum ripple 10 kHz ... 10 MHz:

Tolerance  $\pm 0.1 \text{ dB}$  ( $\pm 0.05 \text{ dB}$ )

After repairing or replacing the input low-pass filter, check the gain of the selective path (7.8.11.1) and the selective calibrating level (7.8.15.2)!



7.8.6 MIXER 1 (5)(a) 40 MHz resonant circuit (5 C 9)

## Instruments required:

Level generator

PS-19/BN 870

W&amp;G

## Settings:

PS-19:  $f = 10 \text{ kHz}$ ,  $0 \text{ dBm}/75 \Omega$ SPM-15:  $b = 3.1 \text{ kHz}/0 \text{ dBm}$  $f = 10 \text{ kHz}$ 

## Alignment:

Align 5 C 9 to maximum IF level (max. level display).

(b) Residual carrier (5 C 20, 21)

## Settings on the SPM-15:

No input signal;  $b = 3.1 \text{ kHz}$  (measuring range  $0 \text{ dB}/20 \text{ dB}$  scale)

## Alignment:

Fit twisted insulated single core Cu wires in the positions 5 C 20 or 5 C 21 (try out) and cut off to the length yielding the minimum residual carrier (always bend the wire ends apart to avoid shorting).

After replacing or repairing mixer 1, check the gain of the selective path (7.8.11.1) and the selective calibrating level (7.8.15.2)!

7.8.7 CRYSTAL BAND-PASS FILTER 40 MHz (7)

## Instruments required:

Level meter

SPM-19

W&amp;G

Level generator

PS-19

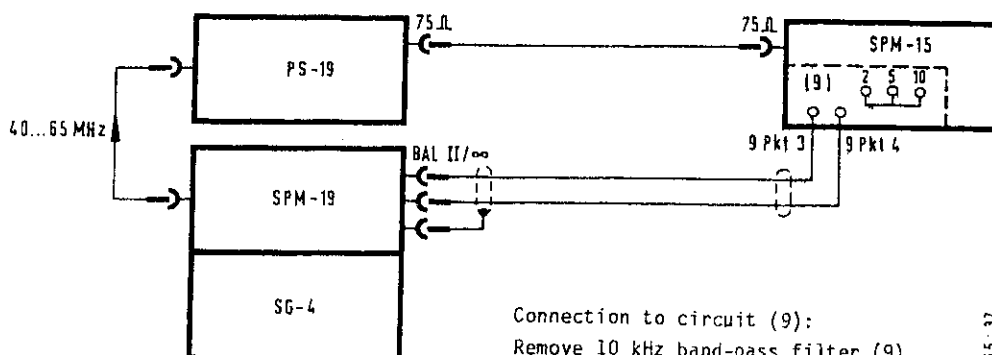
W&amp;G

Display unit

SG-3 or SG-4

W&amp;G

## Test set-up:



Connection to circuit (9):  
 Remove 10 kHz band-pass filter (9)  
 Connect CF cable to 9 Pt. 3,  
 9 Pt. 4  
 Connect 9 Pt. 2  
 and 5 to Pt. 10

955:37

(a) Alignment of the stop peaks (7 C 6, 7 C 7)

## Settings:

SPM-15: Use PS-19 to feed into 75  $\Omega$  input

b = 3.1 kHz/measuring range 0 dBm/20 dB scale/CAL OFF

SPM-19: BAL II/ $\infty$ 

b = 400 Hz/Auto Set/80 dB scale

f = 10 kHz

PS-19: +10 dBm/ext. frequency control

## Measurement:

SPM-15 at f = 28.5 kHz; alignment: 7 C 6 to min. level display on SPM-19

SPM-15 at f = 31.5 kHz; alignment: 7 C 7 to min. level display on SPM-19

(b) Alignment of pass band (7 L 2, 7 O 1, 7 O 2, 7 L 5)

## Settings:

SPM-15: Use PS-19 to feed into 75  $\Omega$  input

f = 10 kHz

b = 3.1 kHz/measuring range 0 dBm/20 dB scale/CAL OFF

PS-19: 0 dBm/75  $\Omega$ , ext. frequency controlSPM-19: BAL II/ $\infty$ 

b = 400 Hz/Auto Set/1 dB and 20 dB scale

 $f_{\text{start}} = 5 \text{ kHz}$ ,  $f_{\text{stop}} = 15 \text{ kHz}$ 

## Note:

The 5 kHz ... 15 kHz input signal is converted to 40.005 MHz ... 39.995 MHz in mixer 1. This signal passes through the pass band of the 40 MHz crystal band-pass filter and is again converted to the 5 kHz ... 15 kHz frequency range in mixer 2.

## Alignment:

\* Solder in output value for 7 L 6 = 15  $\mu\text{H}$ 

\* Alternately align 7 L 2, 7 O 1, 7 O 2, 7 L 5 in such a way that the maximum output level is reached at the centre frequency (10 kHz).

\* Continue to align carefully to extend the pass band in such a way that the following tolerances are maintained:

10 kHz	0 dB reference level
10 kHz $\pm$ 1.5 kHz	0 dB ... -0.4 dB, profile symmetrical to 10 kHz
7 kHz	-1.8 dB ... -3 dB
14.5 kHz	0 dB ... -3 dB

If the desired attenuation profile cannot be set: change 7 L 6 and repeat alignment.

After repairing or replacing the 40 MHz crystal band-pass filter, check the selective path (7.7.11.1) and the selective calibration level (7.7.15.2)!

Also check the selectivity of the overall instrument in the 3.1 kHz band-pass filter (Section 8.5)!

7.8.8 MIXER 2 (8)

Alignment of the residual carrier (8 P 1)

Instruments required:

Oscilloscope ( $\geq 100$  MHz) with test probe, any

SPM-15:  $f$  any  $> 0$  Hz

Connect test probe to 8 IC 2 Pin 6, 13 or 8 IC 2 Pin 7, 14, align RF voltage component to minimum with 8 P 1.

After repairing or replacing mixer 2, check the gain of the selective path (7.8.11.1) and the selective calibrating level (7.8.15.2).

7.8.9 BAND-PASS FILTERS 10 kHz/b = 3.1 kHz AND b = 1.74 kHz (9)

The pass-band curves of the band-pass filters are best adjusted by the manufacturer. A check can be made in accordance with Section 7.5.4.

Pass-band attenuation alignment for b = 1.74 kHz (1.95 kHz) (9 P 1)

Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

Test set-up:

Connect the PS-19/Z =  $75 \Omega$  to the test input of the SPM-15.

Settings:

PS-19:  $f = 100$  kHz, 0 dBm/75  $\Omega$

SPM-15:  $f = 100$  kHz

Measuring range 0 dBm/1 dB scale

CAL OFF

Alignment:

SPM-15: b = 3.1 kHz MONEX: S:9394

Read reference value on instrument

SPM-15: b = 1.74 (1.95) kHz MONEX: S:9394

Align to reference value with 9 P 1

(The calibration controller is at the centre setting for both measurements)

After repairing or replacing the 10 kHz band-pass filter, check the gain of the selective path (7.8.11.1) and the selective calibration level (7.8.15.2)!

7.8.10 BAND-PASS FILTER 10 kHz/b = 25 Hz MECH. (22)

Alignment of 22 L 1 and pass-band attenuation alignment (22 P 1)

Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

Test set-up:

Connect the PS-19/Z =  $75 \Omega$  to the test input of the SPM-15.

## Settings:

PS-19:  $f = 100 \text{ kHz}$ ,  $0 \text{ dBm}/75 \Omega$ SPM-15:  $f = 100 \text{ kHz}$ Measuring range  $0 \text{ dBm}/1 \text{ dB scale}$ 

CAL OFF

SPM-15: Set to  $b = 25 \text{ Hz}$  and align 22 L 1 to max. level display.SPM-15:  $b = 3,1 \text{ kHz}$  MONEX: S:9394 Read reference value on instrumentSPM-15:  $b = 25 \text{ Hz}$  MONEX: S:9394 Align to reference value with 22 P 1

(The calibration controller is set to centre position for both measurements)

7.8.11 IF EVALUATION CIRCUIT (15)7.8.11.1 Gain correction of the selective path (15 P 1)

## Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

## Test set-up:

Connect the PS-19/ $Z_0 = 75 \Omega$  to the  $Z_0 = 75 \Omega$  test input of the SPM-15.

## Settings:

PS-19:  $0 \text{ dB}/75 \Omega$ ,  $f = 12 \text{ kHz}$ SPM-15:  $f = 12 \text{ kHz}$  $b = 3.1 \text{ kHz}/\text{measuring range } 0 \text{ dB}/1 \text{ dB scale}$ 

CAL OFF

## Measurements:

MONEX: S:9394 -> Calibration controller at centre position, use 15 P 1 to align the display of the SPM-15 to  $0 \text{ dB}$ .

Alignment of the selective calibration level is described in 7.8.15.2.

7.8.11.2 IF selective amplifier ( $V_{IF} = 0 \dots 80 \text{ dB}$ ) (check)

## Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G
Attenuator pad $10 \text{ dB}/Z = 75 \Omega$		

## Test set-up:

Use the PS-19/ $Z_0 = 75 \Omega$  to feed the  $25 \text{ Hz}$  filter 22 St. 1 via the  $10 \text{ dB}$  attenuator pad.

## Settings:

SPM-15:  $b = 3.1 \text{ kHz}/0 \text{ dBm}/1 \text{ dB scale}/\text{CAL OFF}$ PS-19: Set send level (approx.  $-21 \text{ dB}$ ) in such a way that a value of roughly  $0 \text{ dBm}$  is displayed on the instrumentMONEX: A display of exactly  $0 \text{ dBm}$  can be achieved with S:9398 or S:9399 (calibration controller +,  $-1 \text{ mB}$ )

The IF gain and the send level of the PS-19 are switched through in  $10 \text{ dB}$  increments in accordance with the Table.

## Measurement:

PS-19	MONEX	$V_{IF}$	SPM-15 display
approx. $-21 \text{ dB}$	(S:9320)	$20 \text{ dB}$	Reference value } Reference value $\pm 5 \text{ mB}$
$-11 \text{ dB}$	S:9310	$10 \text{ dB}$	
$-1 \text{ dB}$	S:9300	$0 \text{ dB}$	
$-21 \text{ dB}$	S:9320	$20 \text{ dB}$	
$-31 \text{ dB}$	S:9330	$30 \text{ dB}$	
$-41 \text{ dB}$	S:9340	$40 \text{ dB}$	
$-51 \text{ dB}$	S:9350	$50 \text{ dB}$	
↓	↓	↓	Reference value $\pm 0.1 \text{ dB}$
$-81 \text{ dB}$	S:9380	$80 \text{ dB}$	

## 7.8.11.3 IF wideband amplifier (15 C 110), IF output [35]

## Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G

## Test set-up:

Use the PS-19 to feed into the  $75 \Omega$  input of the SPM-15. SPM-19 at IF output [35].

## Settings:

PS-19:  $-20 \text{ dB}/75 \Omega$ 

ext. frequency control of SPM-19

SPM-15: Wideband/ $-20 \text{ dB}/1 \text{ dB scale}$ (If instrument with "dBrnC" option:  $-20 \text{ dBm}$ , MONEX: S:9390)SPM-19:  $b = 3.1 \text{ kHz}/-9 \text{ dB}/1 \text{ dB scale}$  $f_{\text{start}} = 10 \text{ kHz}/f_{\text{stop}} = 10 \text{ MHz}$ 

CAL OFF

Use 15 C 110 to align the frequency response at the IF output [3] to the lowest possible level change between send frequencies of  $10 \text{ kHz}$  and  $10 \text{ MHz}$ . Check the frequency response on the meter of the SPM-15. If necessary, also align the frequency of the rectifier in accordance with 7.8.11.4.

7.8.11.4 Rectifier (15 C 126, 15 P 101, 15 P 102, 15 P 103)

## Instruments required:

Level generator	PS-19/BN 870	W&G
Digital voltmeter	any	
75 $\Omega$ attenuation set with 10 dB increments, accuracy $\pm 1$ mB		

(a) Offset 15 IC 110 (15 P 102)

## Test set-up:

Break connection 9 Bu 2 - 22 St 1

## Settings:

SPM-15: Measuring range 0 dB/dBm, b = 3.1 kHz

## Alignment:

Set 15 P 101 to centre position, short test points 15 TP 8, TP9, connect digital voltmeter between 15 TP 10 and chassis, align 15 P 102 in such a way that the voltage value drifts slowly downwards.

(b) Rectifier offset (15 P 103)

## Test set-up:

Break connection 9 Bu 2 - 22 St 1

## Settings:

SPM-15: Measuring range 0 dB/dBm, b = 3.1 kHz

## Alignment:

Close bridge 15 a-b

Use 15 P 103 to align voltage at 15 TP 12 to -5 ... -10 mV

(c) Rectifier linearity (15 P 101 and 15 P 201)

## Test set-up:

PS-19 75  $\Omega$  attenuation set 15 St 102 of UUT

## Settings:

PS-19: -20 dB/75  $\Omega$ , f = 10 kHz

SPM-15: Wideband

## Measurements:

Alternately repeat the following alignments until the voltage tolerances for both input levels are maintained:

Attenuation set level = 0 dB: use 15 P 201 to align to 5.700 V  $\pm$  2 mV at 15 TP 12Attenuation set level = -20 dB: use 15 P 101 to align to 0.570 V  $\pm$  2 mV at 15 TP 12(d) Rectifier frequency response (15 C 126)

This presupposes an IF wideband amplifier correctly aligned in accordance with 7.8.11.3

## Test set-up:

Re-make the connection 9 Bu 2 to 22 St 1.

Use the PS-19 to feed into the 75  $\Omega$  input of the SPM-15, measure voltage at 15 TP 12.

## Settings:

PS-19: -20 dB/75  $\Omega$ ; f = 10 kHz,  $f_{\text{step}} = 1$  MHz

SPM-15: Wideband/-20 dB/1 dB scale

(For instruments with "dBrnC" option: -20 dBm, MONEX: S:9390)

## Measurement:

$f = 10$  kHz: Voltage at 15 TP 12 and instrument display → Reference values

$f = 10$  kHz ... 10.01 MHz: Observe voltage at 15 TP 12 and instrument display and align to minimum tolerance band with 15 C 126.

After re-alignment of the rectifier, align 15 P 1 (7.8.11.1)!

7.8.11.5 DC evaluation circuit (15 P 2xx)

## Instruments required:

Level generator	PS-19/BN 870	W&G
Digital voltmeter	any	
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G
75 $\Omega$ attenuation set with 1/10 dB increments, accuracy $\pm 1$ mB		

## Test set-up:

PS-19      75  $\Omega$  attenuation set      15 St 102 of UUT

## Settings:

PS-19: -20 dB/75  $\Omega$ ,  $f = 10$  kHz

SPM-15: Wideband/0 dB/20 dB scale

## Measurements:

Gain alignment 15 IC 201 (15 P 201):

Alignment in accordance with "7.8.11.4(c) Rectifier linearity"

MONEX	Setting	Atten. set	Voltage at ...
Calibration controller alignment			
0:25.80	Cal. controller "centre"	0 dB	15 TP 13 with 15 P 202 to $-3.970$ V $\pm 5$ mV
0:25.00	Cal. controller Minimum	0 dB	15 TP 13 to $-3.395$ V $\pm 10$ mV
0:25.FF	Cal. controller Maximum	0 dB	15 TP 13 to $-4.537$ V $\pm 10$ mV
Check of the 0/16 dB amplifier			
0:25.80	Cal. controller "centre"		
0:27.00	0 dB gain	0 dB	15 TP 14 to $-3.970$ V $\pm 5$ mV
0:27.08	16 dB gain	-14 dB	15 TP 14 to $-4.990$ V $\pm 30$ mV
Alignment of (0 ... 11) dB cal. controller			
0:25.80	Cal. controller "centre"		
0:27.00	0/16 dB gain = 0 dB		
0:23.0F	} Controller = 11 dB	-11 dB	15 TP 15 with 15 P 203 to $U = 3.548 \times U$ (15 TP 14)
0:24.FF			
Alignment of logarithmizer reference voltage:			
Align voltage at 15 TP 18 to $+2.000$ V $\pm 1$ mV with 15 P 210			

Logarithmizer alignment			
0:25.80	Cal. controller "centre"		
0:27.00	0/16 dB ampl. to 0 dB		
0:23.05	} Controller = +2 dB	-20 dB	Pre-align 15 TP 16 with 15 P 206 to -6.14 V ... -6.15 V
0:24.AC			
0:23.03	} Controller = -2 dB	-20 dB	Note 15 TP 16 = $U_x$
0:24.95			
0:23.05	} Controller = +2 dB	-20 dB	15 TP 16 with 15 P 206 to $(U_x - 2 V) \pm 5 mV$
0:24.AC			
Shift voltage for 0 dB/1 dB scale			
0:23.04	} Controller = 0 dB	-20 dB	15 TP 17 with 15 P 205 to 0 V $\pm$ 10 mV
0:24.82			
0 dB/20 dB scale alignment (cf. mech. zero point 7.8.12)			
0:27.04	20 dB scale	-20 dB	with 15 P 211 to 0 dB/20 dB scale

After re-aligning the DC evaluation circuit, align 15 P 1 (7.8.11.1)!

#### 7.8.11.6 Demodulator (15 C 424, 428, 15 P 401, 402)

Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
Frequency counter	any	

Test set-up:

PS-19/ $Z_o$  = 75  $\Omega$     75  $\Omega$  input of SPM-15

Demod. output 15 Bu 401, [14]    SPM-19/ $Z_o$  = 600  $\Omega$

Remote control of SPM-15 via jack 6 Bu 1 by carrier of PS-19

Settings:

PS-19:  $f$  = 10 kHz, 0 dB (or 0 dBm)/75  $\Omega$

SPM-15: 0 dB (or 0 dBm)/20 dB scale

upper ( $\nabla$ ) and lower ( $\triangleleft$ ) sideband

SPM-19:  $Z_o$  = 600  $\Omega$

$f$  = 1.85 kHz

$b$  = 400 Hz/measuring range 0 dB

#### (a) Alignment of the crystal oscillators (15 C 424, 15 C 428)

Use a frequency counter at 15 TP 20 to measure the frequency and align to

$f$  = 12.1344 MHz at  $\triangleleft$  (lower sideband) with 15 C 424

$f$  = 8.3456 MHz at  $\nabla$  (upper sideband) with 15 C 428

(b) Switch between upper and lower sideband and align the absolute level of the demodulator output to 0 dB  $\pm$  0.5 dB with 15 P 401.



(c) Residual carrier alignment (15 P 402)

Disconnect PS-19 from 75  $\Omega$  input; SPM-19: 80 dB scale

$f = 8.15$  kHz

Switch on " $\triangleleft$ " upper sideband, use 15 P 402 to align to minimum level display on the SPM-19 (< -65 dB).

7.8.12 DISPLAY METER: MECHANICAL ZERO POINT (19)

SPM-15 settings:

$b = 3.1$  kHz/+20 dB or dBm/20 dB scale

$f \geq 10$  kHz

Test input of UUT open, instrument in normal operating position

Using the mechanical zero point alignment element of the meter (plastic screw on the front panel), align the pointer to the scale mark above " $-\infty$ ".

7.8.13 BUFFER AMPLIFIER (11 C 6, 11 C 8), CARRIER OUTPUT [34]

Instruments required:

Oscilloscope with test probe  $\geq 100$  MHz any

75  $\Omega$  terminating impedance any

Settings:

SPM-15: Terminate carrier output [34] with 75  $\Omega$

$f = 0$  kHz,  $f_{\text{step}} = 2500$  kHz

Connect the test probe to the external 75  $\Omega$  impedance and align the amplitude response of the carrier signal with 11 C 6, 11 C 8.  $f = 0/2.5/5/7.5/9.999\ 999$  MHz  $\rightarrow$  200 mV peak  $\pm$  30 mV  
(The measurement can also be performed with a level meter (40 MHz ... 50 MHz,  $Z = 75 \Omega$ ): -6 dBm  $\pm$  1,5 dB)

7.8.14 40.01 MHz GENERATOR (12)

Instruments required:

Oscilloscope with test probe  $\geq 100$  MHz any

Digital multimeter any

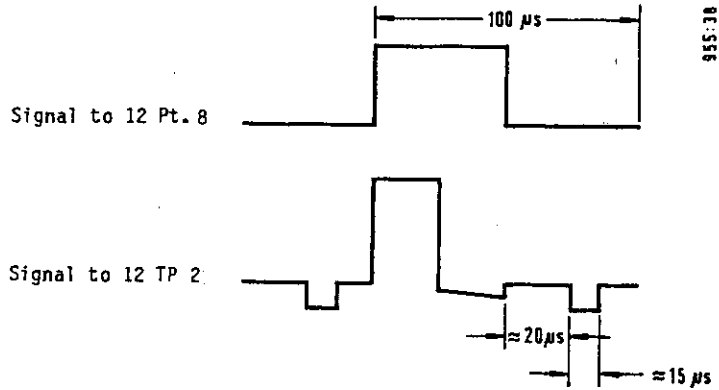
(a) Multiplier alignment (12 C 4, 12 L 2, L3)

Use 12 C 4 to align the 10 MHz signal at 12 TP 1 to maximum (approx.  $3.5 V_{pp}$ ); use 12 L 2, 12 L 3 to align the 40 MHz signal at 12 Pt. 12/12 Pt. 15 to maximum (approx.  $1 V_{pp}$ )

(b) 40.01 MHz VCO alignment (12 C 64, 12 L 5, 12 L 6)

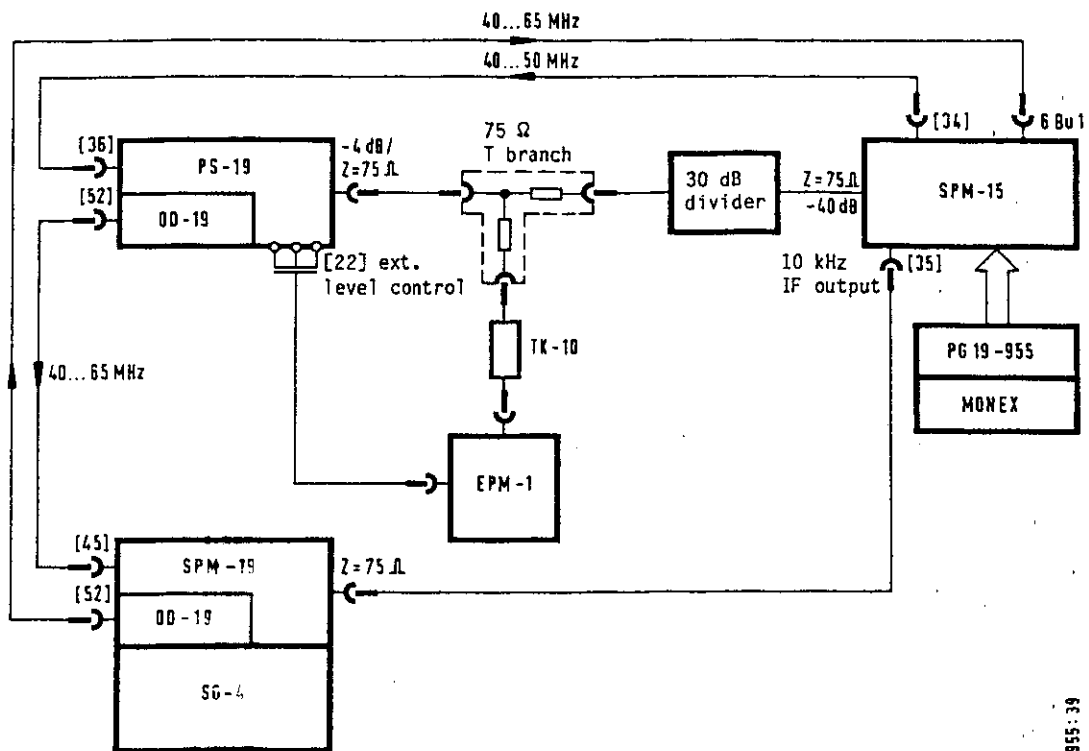
Use 12 L 5, L 6 to align the 40.01 MHz signal at 12 Pt. 5 to maximum (approx.  $0.5 V_{pp}$ )

Use 12 C 64 to set the DC voltage at 12 TP 3 to 5.2 V.

(c) Checking the signal profile of the 40.01 MHz PLL7.8.15 CALIBRATING MIXER (10)7.8.15.1 Calibration level frequency response (10 C 51, 10 C 52)

## Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
Display unit	SG-4	W&G
75 $\Omega$ T branch		
Attenuator set 30 dB/Z = 75 $\Omega$		
EPM-1 with TK-10	EPM-1	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G



The actual calibration level frequency response, which states the measuring error of the instrument after a calibration operation, is obtained by forming the difference between the "Measurement" and "Calibration" frequency responses.

Settings:

PS-19: -4 dB/75 Ω  
 $f = 10 \text{ kHz}$  (receive frequency of the SPM-19)  
 SPM-19:  $f = 10 \text{ kHz}$  (send frequency of the PS-19)  
 $b = 3.1 \text{ kHz}/-40 \text{ dB}/1 \text{ dB scale}$   
 CAL ON  
 EPM-1:  $-1 \text{ dBm} \pm 0.2 \text{ dB}$

First measure with the SPM-19 directly at the output of the 30 dB attenuator pad. Adjust the control voltage of the EPM-1 in such a way that the SPM-19 measures -40 dB.

Establish the test set-up as shown in the sketch.

SPM-19:  $f_{\text{start}} = 12 \text{ kHz}$ ,  $f_{\text{stop}} = 10 \text{ MHz}$   
 (Sweep limits of the PS-19 and SPM-15)  
 $b = 3.1 \text{ kHz}/-9 \text{ dB}/1 \text{ dB scale}$   
 CAL OFF  
 SPM-15:  $Z = 75 \Omega$ , CAL OFF  
 $b = 3.1 \text{ kHz}/\text{measuring range any}$


## Measurement sequence:

MONEX: S:9108, calibration path switched through with  $V_{RF} = 0$  dB,  $V_{IF} = +20$  dB

If a new calibrating mixer board [955-AE,AE1] has been fitted, alternately align 10 L 3 and 10 L 4 to maximum level display on the SPM-19.

MONEX: S:9105, calibration switch in "Measurement" position,  $V_{RF}$  and  $V_{IF}$  unchanged

Use "Abs-Ref" measurement on the SPM-19 to position the measuring point at 12 kHz on a reference line of the SG-4.

Start the sweep in "Sweep time" = 300 sec ("  "); increase sweep rate after settling

Store as "Measurement" curve in store "B"!

MONEX: S:9108, switch through calibration path


For a newly fitted board, plug in the starting value for 10 C 12 = 39 pF.

The display mode can now be selected on the SG-4:

"A&B" displays both frequency responses

"A-B" displays the "Calibration-Measurement" differential frequency response

At  $f = 12$  kHz, set the measuring point of the "Calibration" curve to the selected reference line with 10 P 1.

SPM-19: "Sweep time" = 10 sec., "Sweep  "

Check whether the two curves deviate by not more than 3 mB -> Differential frequency response  $0$  dB  $\pm$  3 mB

Align the frequency response with 10 C 51, 10 C 52. If the required tolerance is not achieved -> 10 C 12 = (33...47) pF. Occasionally check the test point at 12 kHz and re-align 10 P 1, if necessary.

Subsequently solder 10 C 12 firmly in position.

#### 7.8.15.2 Absolute selective calibration level (10 P 1)

Do not carry out this alignment until the gain correction of the selective path (7.8.11.1) has been checked and/or aligned.

## Instruments required:

Level generator	PS-19/BN 870	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G
EPM-1 with TK-10	EPM-1	W&G

## Settings:

PS-19:  $f = 12$  kHz,  $0$  dBm/75  $\Omega$

Measure the send level of the PS-19 with a calibrated EPM-1, use the PS-19 to feed the

$Z_0 = 75$   $\Omega$  test input of the SPM-15.

SPM-15:  $f = 12$  kHz

$b = 3.1$  kHz/0 dBm/1 dB scale

CAL OFF

## Coarse alignment:

MONEX: S:9390,  $V_{dBm} = 0$  dB

S:9107, Switch through calibration level ( $V_{RF} = -40$  dB,  $V_{IF} = +60$  dB)

Use 10 P 1 for coarse alignment to 0 dB display

## Fine alignment:

Exit monitor mode; settings as above.

Use the CAL key (press twice) to trigger calibration and check the UUT display for (send level of the PS-19)  $\pm 1$  mB.

If necessary, slightly re-align 10 P 1 and re-check the display after calibration.

Important note: Adjustment of 10 P 1 changes the absolute level of the tracking generator!

### 7.8.15.3 Absolute wideband calibration level (10 P 2)

## Instruments required:

Level generator	PS-19/BN 870	W&G
EPM-1 with TK-10	EPM-1	W&G

## Settings:

PS-19:  $f = 12$  kHz

0 dBm/75  $\Omega$

Measure the send level of the PS-19 with the calibrated EPM-1, then use the PS-19 to feed into the test input of the SPM-15

SPM-15: f any

"Wideband" 0 dBm/1 dB scale

## Measurement:

Use the CAL key (press twice) to trigger calibration and check the UUT display.

Adjust 10 P 2 until the send level of the PS-19 is displayed to within  $\pm 2$  mB after calibration.

## Note:

If the calibrating mixer board is replaced in an instrument with tracking generator, it is also necessary to re-align the fine level adjustment of the tracking generator (7.8.16.2).

### 7.8.16 TRACKING GENERATOR, Series A ... D: (23), Series E ...: (23) and (25)

#### 7.8.16.1 Return loss 75 $\Omega$ (Series A ... D: 23 C 33) (Series E ...: 25 C 1)

## Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
Display unit	SG-3 or SG-4	W&G
Return loss measuring attachment	RFZ-12/BN 810	W&G

## Test set-up:

Connect PS-19/Z = 75  $\Omega$ , SPM-19/Z =  $\infty$  to RFZ-12 (refer to RFZ-12 description).

## Settings:

PS-19: 1 dB/75  $\Omega$ ; ext. frequency controlSPM-19:  $f_{\text{start}} = 10$  kHz,  $f_{\text{stop}} = 10$  MHz $b = 3.1$  kHz/80 dB scale;  $Z_0 = \infty$ 

Determine reference level for open RFZ-12

SPM-15:  $f = 0$  kHzOutput  $Z_0 = 75$   $\Omega$ 

Send level in dBm as per Table

Series	Send level	Return loss at	
		10 kHz	10 MHz
A...D	-15 dBm	> 53 dB	Use 23 C 33 to align to identical values
A...D	-20 dBm	> 53 dB	
E...	-15 dBm	> 53 dB	} Use 25 C 1 to align to identical values
E...	-20 dB	> 53 dB	
E...	-45 dBm	> 53 dB	

7.8.16.2 Accuracy of fine level adjustment and dividers

(Series A...D: 23 P 1, P 2, P 8; Series E...: 23 P 3)

## Instruments required:

75  $\Omega$  attenuation set with (0.1)/1/10 dB increments, accuracy  $\pm 1$  mB

Level meter SPM-19/BN 829 W&amp;G

MONEX MONEX W&amp;G

Cable and adaptor board for MONEX PG 19-955 W&amp;G

## Test set-up:

Connect the output of the tracking generator to the  $Z_0 = 75$   $\Omega$  input of the SPM-19 via the attenuation set.

## Settings:

SPM-15:  $f = 10 \dots 100$  kHzPSE:  $Z_0 = 75$   $\Omega$ , send level in "dB" as per TableSPM-19:  $f$  as for SPM-15 $b = 3.1$  kHz/1 dB scale

CAL OFF

Measurements for instruments of Series A ... D:

Send level	Attenuation of attenuation set	SPM-19 and alignment on the SPM-15
-9.5 dB -13.5 dB -9.5/-13.5	30.5 dB 26.5 dB 30.5/26.5 dB	SPM-19 measured value = reference value Align to reference value with 23 P 8 Repeat operation until level difference minimum
-14.0 dB -19.0 dB	26.0 dB 21.0 dB	SPM-19 measured value = reference value Align to reference value with 23 P 1 (5 dB divider)
-4.0 dB -14.0 dB -24.0 dB -34.0 dB	36.0 dB 26.0 dB 16.0 dB 6.0 dB	Reference value Error of 10 dB divider: $\pm 4$ mB of 20 dB divider: $\pm 5$ mB of 30 dB divider: $\pm 7$ mB

Alignment  $\Delta V_2 = +4$  dB (23 P 2):

Connect PSE-15 to 600  $\Omega$  input of the SPM-19 via CF cable

PSE-15:  $Z_o \approx 0$ , send level = +7.0 dB

Use 23 P 2 to align level difference between +7.0 dB and +7.1 dB to 10 mB  $\pm 1$  mB.

Measurements for instruments of Series E ...:

The monitor functions allow the send level to be set in "dB" on instruments with the "dBrnC" option. In this case, the send levels should also be set in monitor mode.

Send level	Attenuation of attenuation set	SPM-19 and alignment on the SPM-15
-5.5 dB -14.5 dB -5.5/-14.5	49.0 dB 40.0 dB 49.0/40.0 dB	SPM-19 measured value = reference value Align to reference value with 23 P 3 Repeat operation until level difference minimum
-4.5 dB -14.5 dB -24.5 dB -29.5 dB -4.5 dB and MON. S:9584 -54.5 dB	50.0 dB 40.0 dB 30.0 dB 25.0 dB 10.0 dB 0.0 dB	Reference value Error of 10 dB divider: $\pm 4$ mB of 20 dB divider: $\pm 4$ mB of 25 dB divider: $\pm 6$ mB*)  of 40 dB divider: $\pm 6$ mB*) Cumulative error 40 dB and 10 dB dividers

\*) If 25 dB or 40 dB divider beyond tolerance: change 23 R 51 or 23 R 56, respectively.

### 7.8.16.3 Frequency response of 10 MHz low-pass filter and PSE amplifier without dividers

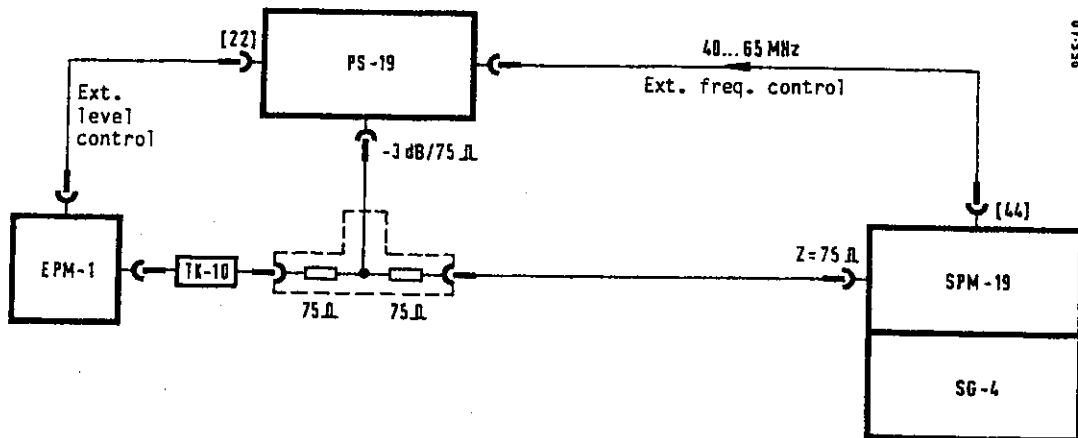
(Series A ... D: 23 L 201, L 302, C 5, C 26; Series E ...: 23 L 1, L 2, C 18)

#### Instruments required:

Level generator	PS-19/BN 870	W&G
Level meter	SPM-19/BN 829	W&G
Display unit	SG-4	W&G
EPM-1 with TK-10	EPM-1	W&G
75 $\Omega$ branch		W&G
5 dB attenuator pat/Z = 75 $\Omega$	any	

#### (a) Natural frequency response of the SPM-19 in the -9 dB measuring range with test cable

#### Test set-up:



#### Settings:

PS-19: -3 dB/75  $\Omega$ ; ext. frequency control

SPM-19:  $f_{\text{start}} = 10 \text{ kHz}$ ;  $f_{\text{stop}} = 13 \text{ MHz}$

$b = 3.1 \text{ kHz}/-9 \text{ dB}/1 \text{ dB scale}$

CAL OFF

EPM-1:  $0 \text{ dBm} \pm 0.2 \text{ dB}$

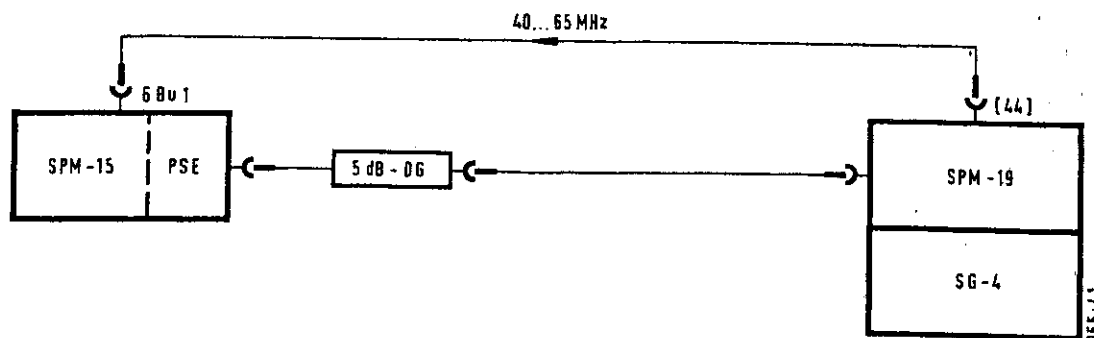
At  $f = 10 \text{ kHz}$  use ref. potentiometer to set to -9.0 dB on the SPM-19

Record natural frequency response of SPM-19 with test cable and store in SG-4 store "B".



(b) Frequency response of tracking generator

Test set-up:



Settings:

SPM-19: No adjustments!

SPM-15: Send level = -4 dB

Alignment for instruments of Series A ... D:

First measure at 23 R 80 with digital voltmeter and set 23 P 4 to max. voltage display (minimum distortion).

SPM-19:  $f = 10$  kHz; use 23 P 10 or 23 P 3 to align to -9.0 dB display on SPM-19.

Switch SG-4 to "A-B" display and sweep.

Use alignment elements 23 L 201, L 302, C 5 and C 26 to align the 10 kHz ... 10 MHz frequency response to a tolerance of  $0 \text{ dB} \pm 10 \text{ mB}$ .

Alignment for instruments of Series E ...:

For instruments with "dBrnC" option: send level = +5 dBm

SPM-19:  $f = 10$  kHz; use 23 P 2 to align to -9.0 dB display on SPM-19.

Switch SG-4 to "A-B" display and sweep.

Use alignment elements 23 L 1, L 2, C 18 to align the 10 kHz ... 10 MHz frequency response to a tolerance of  $0 \text{ dB} \pm 5 \text{ mB}$ .

7.8.16.4 Frequency responses for all divider settings

(Series A...D: 23 C 22; Series E...: 23 C 21)

Instruments required:

Level meter	SPM-19/BN 829	W&G
Display unit	SG-4	W&G
5 dB attenuator $\text{pad}/Z_0 = 75 \Omega$		
10 dB attenuator $\text{pad}/Z_0 = 75 \Omega$		
20 dB attenuator $\text{pad}/Z_0 = 75 \Omega$		
30 dB attenuator $\text{pad}/Z_0 = 75 \Omega$		

Test set-up:

As under 7.8.16.3 (b), but attenuator pad value as per Tables below.

## Settings:

SPM-15: Send level as per Table

SPM-19:  $f_{\text{start}} = 10 \text{ kHz}$ ,  $f_{\text{stop}} = 10 \text{ MHz}$   
 $b = 3.1 \text{ kHz/AUTO SET/1 dB scale}$   
 CAL OFF

Alignment and test for instruments of Series A...D:

Send level	Attenuator pads	
0 dB	10 dB + 20 dB	Store reference frequency response in "B", "A&B"
-5 dB	5 dB + 20 dB	Reference frequency response $\pm 5 \text{ mB}$ (reduction by 23 C 82 = 10...33 pF)
-20 dB	10 dB	Align with 23 C 22 to minimum deviation from reference frequency response ( $\pm 5 \text{ mB}$ )
-10 dB	20 dB	Reference frequency response $\pm 5 \text{ mB}$
-30 dB	-	Reference frequency response $\pm 5 \text{ mB}$

Alignment and test for instruments of Series E...:

Send level "dB"	"dBm"	Attenuator pads	
0 dB	+5 dBm	20 dB + 30 dB	Store ref. frequency response in "B", "A&B"
-20 dB	-15 dBm	30 dB	Align with 23 C 22 to minimum deviation from reference frequency response ( $\pm 5 \text{ mB}$ )
-10 dB	-5 dBm	10 dB + 30 dB	Reference frequency response $\pm 5 \text{ mB}$
-25 dB	-20 dBm	5 dB + 20 dB	Reference frequency response $\pm 7 \text{ mB}$
-50 dB	-45 dBm		Reference frequency response $\pm 7 \text{ mB}$

7.8.16.5 Signal balance ratio 124  $\Omega$ , 150  $\Omega$ , (132  $\Omega$ ), 600  $\Omega$ 

(Series A...D: 23 C 40, C 50; Series E...: 25 C 3, C 5)

## Instruments required:

Level meter	SPM-19/BN 829	W&G
Signal balance ratio measuring attachment	SDZ-12/BN 811	W&G
MONEX	MONEX	W&G
Cable and adaptor board for MONEX	PG 19-955	W&G

## Test set-up:

PSE-15/bal. output	SDZ-12	SPM-19/ $Z_0 = \infty$
SPM-15: remote control via jack 6 Bu 1 by carrier output of SPM-19		

## Settings:

SPM-19:  $b = 3.1 \text{ kHz/0 dB/80 dB scale}$   
 $Z_0 = \infty$

Instruments of Series A...D:

Z = 124  $\Omega$ : at f = 5 MHz, align 23 C 40 to minimum level display on SPM-19  
 Z = 600  $\Omega$ : at f = 500 kHz, align 23 C 50 to minimum level display on SPM-19  
 (a signal balance ratio of > 40 dB is required over the entire frequency range)

Instruments of Series E... (normal version):

Z = 124  $\Omega$ : at f = 5 MHz, check display of SPM-19 < -45 dB  
 Z = 600  $\Omega$ : at f = 500 kHz, align 25 C 5 to minimum level display of SPM-19

Instruments of Series E... (WECO version):

The following additional connectors are required for the SDZ-12:

WE 379 A	(Z = 124 $\Omega$ )	BN 810/00.03	W&G
PJ 1	(Z = 135 $\Omega$ )	BN 810/00.04	W&G
WE 310	(Z = 600 $\Omega$ )	BN 810/00.05	W&G

Z = 124  $\Omega$ , send level 0 dB  $\approx$  +6.9 dBm, at f = 5 MHz, alignment with 25 C 3  
 Z = 600  $\Omega$ , send level 0 dB  $\approx$  0 dBm, at f = 500 kHz, alignment with 25 C 5  
 Z = 135  $\Omega$ , send level 0 dB  $\approx$  +6.5 dBm, at f = 500 kHz, check  
 Level display of the SPM-19 for all measurements < -45 dB

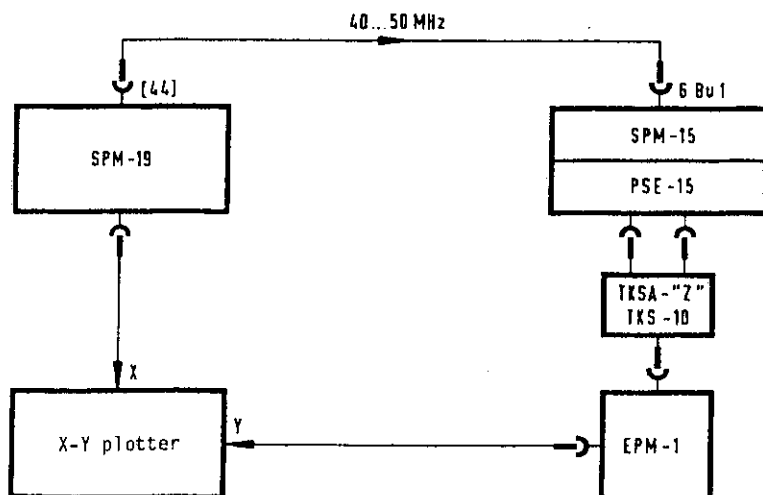
7.8.16.6 Frequency responses 124  $\Omega$ , 150  $\Omega$ , (135  $\Omega$ ), 600  $\Omega$ ,  $R_i \approx 0$ 

(Series A...D: 23 P 5, P 6, P 7; Series E...: 25 P 1, P 2, P 3)

## Instruments required:

Level meter	SPM-19/BN 829	W&G
Milliwatt power meter	EPM-1	W&G
with TKS-10, TKSA-124, -150, -600		W&G
X-Y plotter	any	

## Test set-up:



21-535-02

## Settings:

SPM-19:  $f_{\text{start}} = 10 \text{ kHz}$ ,  $f_{\text{stop}} = 10 \text{ MHz}$  or  $620 \text{ kHz}$ 

EPM-1: No calibration required

SPM-15: Send level =  $0 \text{ dBm}$ 

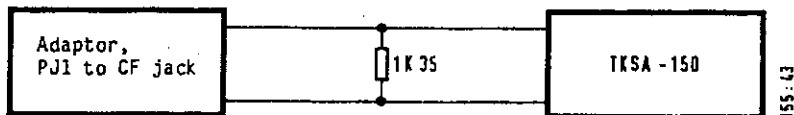
## Measurements:

Switch on  $Z_0$  value at PSE-15 and use TKSA-" $Z_0$ " for measurement. $Z_0 = 124 \Omega$ :At  $f = 100 \text{ kHz}$ , adjust the calibrating potentiometer to set the EPM-1 display to  $0 \text{ dBm}$ .Align the  $10 \text{ kHz} \dots 10 \text{ MHz}$  frequency response to minimum deviation from the reference value at  $100 \text{ kHz}$  using 23 P 6 (Series A...D) or 25 P 1 (Series E...); tolerance:  $\pm 12 \text{ mB}$ .

(For WECO instruments: use TKSA-124 with connector WE 379 A (W&amp;G).)

 $Z_0 = 150 \Omega$ :Align to minimum deviation from the reference value at  $100 \text{ kHz}$  using 23 P 5 (Series A...D) or 25 P 3 (Series E...); tolerance at  $10 \text{ kHz} \dots 10 \text{ MHz}$ :  $\pm 12 \text{ mB}$ . $Z_0 = 135 \Omega$  in option 955/00.21 ( $135 \Omega$  instead of  $150 \Omega$ ):

Use TKSA-124 for measurement.

Align the  $10 \text{ kHz} \dots 10 \text{ MHz}$  frequency response with 25 P 3; tolerance:  $\pm 12 \text{ mB}$ ; check alignment with TKSA-150. $Z_0 = 135 \Omega$  in WECO instruments (955/02): $f = 10 \text{ kHz}$ ; set EPM-1 display to  $0 \text{ dBm}$ :Adjust send level of PSE =  $+0,5 \text{ dBm}$  and calibrating potentiometer on EPM-1. Select an appropriate 25 C 20 between  $10 \dots 100 \text{ pF}$  to align the  $10 \text{ kHz} \dots 620 \text{ kHz}$  frequency response to a tolerance of  $+10 \text{ mB}/-20 \text{ mB}$ . Then solder 25 C 20 into position. $Z = 600 \Omega$ :For  $f = 10 \text{ kHz}$ , set a display of  $0 \text{ dBm}$  on the EPM-1; check the  $f = 10 \text{ kHz} \dots 620 \text{ kHz}$  frequency response for a tolerance of  $\pm 15 \text{ mB}$ . The frequency response can be reduced by an R/C parallel to the balanced output of the transformer. WECO instruments can be aligned with 25 P 3. $R_f \approx 0/\text{TKSA-600}$ :Align the frequency response by fitting 23 C 49 (Series A...D) or 25 C 6 (Series E...) with  $10 \text{ pF} \dots 100 \text{ pF}$  to a tolerance of  $\pm 15 \text{ mB}$ . Solder in the alignment value used.

7.8.16.7 Absolute level 0 dBm/75  $\Omega$ 

(Series A...D: 23 P 3, P 10; Series E...: 23 P 2)

Instruments required:

Milliwatt power meter with TK-10

EPM-1

W&G

Settings:

SPM-15: f = 12 kHz

Send level = 0 dBm/75  $\Omega$

EPM-1: Calibrate to 0 dBm

Measurement:

Measure the send level of the UUT with the EPM-1 and align to 0 dBm with 23 P 10 and 23 P 3 (Series A...D) or with 23 P 2 (Series E...).

## 8 SPECIFICATION CHECK

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### 8.1 INTRODUCTION

The following is a description of methods allowing verification of the technical data of the instrument. Commercially available measuring equipment has been proposed wherever possible. The tests can only be performed on a fully functional instrument.

Unless otherwise noted, the tests and any adjustments necessary should be made within the specified nominal temperature range and after the specified warm-up time.

The purpose of verifying the technical data is to establish whether the display or output of measured variable lies within the specified error limits. The results can only be reliably accurate if the intrinsic error of the test set-up used is negligible. Wherever commercially available measuring equipment would result in significant errors in the test set-up, a second method is given using company-internal measuring equipment. These methods are headed "Internal Test".

When evaluating compliance with the specified error limits, the error of the test set-up used is added to the that of the point to be tested (IEC Publication 359).

The following example illustrates this principle for symmetrical error limits:

If the error of the test set-up used is  $\pm m$ , and if  $\pm e$  is stated as the specified error limit for the unit under test, then

a value exceeding the limits  $\pm (e + m)$   
means that the specified error limits  
will certainly be exceeded;

a value below the limits  $\pm (e - m)$   
means that the specified error limits  
will certainly be complied with.

Where necessary, the values for  $e$  and  $m$  are given for each test procedure. The value  $m$  depends on the measuring instrument used and must, therefore, be re-determined in cases of deviation from the test instructions.

When carrying out a systematic check of the technical data, we recommend that you adhere to the given sequence of measurements.

The unit under test should only be adjusted if it is found that the limit  $\pm (e + m)$  is exceeded.

#### Notes on instruments settings

Unless otherwise stated for individual measurements, the following settings always apply:

SPM-15 (unit under test - UUT):

Input	[5] : Z = 75 $\Omega$
Mode	DGTL : Digital
AUTO CAL	[1] : On
Frequency setting	[10] : Coarse
Display	[31] : dB

PSE-15 (unit under test - UUT):

Output	[11] : Z = 75 $\Omega$
--------	------------------------

SPM-15 with PSE-15 (measuring equipment):  
(or SPM-19/PSS-19)

Input	[5] : Z = 75 Ω
Mode	DGTL : Digital
AUTO CAL	[1] : On
Frequency setting	[10] : Coarse
Display	[31] : dB
Output	[11] : Z = 75 Ω

EPM-1:

Measuring range : 0 dBm ± 0.2 dB

## 8.2 TUNING FREQUENCY ACCURACY

Measuring instruments required:

Level generator	SPM-15 with PSE-15
Frequency counter	PM 6673/03

W&G  
Philips

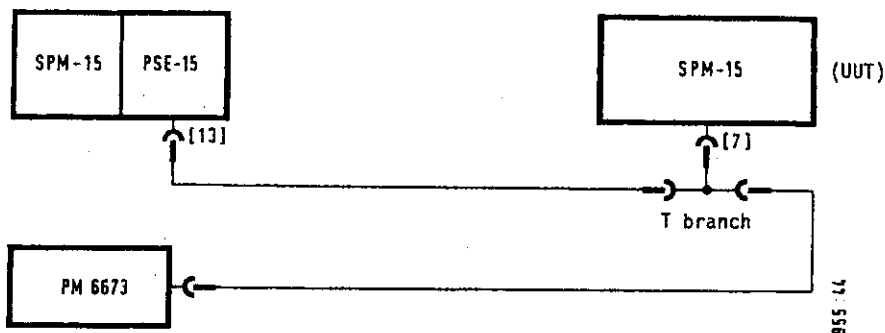


Fig. 8-1 Test set-up (tuning frequency accuracy)

Instrument settings:

SPM-15 (UUT):

Measurement mode	[9] : Selective/25 Hz
Frequency	[10] : 9.9 MHz
Mode	ANLG : 1 dB scale
Frequency setting	[10] : Fine

PSE-15:

Frequency	[10] : 9.9 MHz
Frequency setting	[10] : Fine
Send level	[9], [8] : 0 dB

PM 6673:

Frequency range	: 80 MHz
Resolution	: 1 Hz

Set the send frequency of the PSE-15 to 9.9 MHz on the frequency counter. Then tune the SPM-15 to give a maximum level display. Compare the difference between the frequency displays on the frequency counter and the SPM-15 (UUT) with the specified error limit.

Specified error limit (e):  $3 \times 10^{-6} \cong 29.7$  Hz

Error of the test set-up (m):  $\pm 6$  Hz

The error of the test set-up includes the ageing of the frequency counter-over 6 months.

### 8.3 NOISE FLOOR

With the test input open-circuit, set the SPM-15 in accordance with the data in the table. The noise floor level of the SPM-15 should not exceed the error limits specified in the tables.

Frequency \ Bandwidth	50 Hz	200 Hz	3 kHz	10 MHz
Wideband	-75 dB/-65 dB			
1.74 kHz/3.1 kHz	—			-125 dB/-115 dBm
25 Hz	-100 dB/-90 dBm	-115 dB/-105 dBm	-135 dB/-125 dBm	

Fig. 8-2 Table for checking the noise floor for  $Z_0 = 75 \Omega$

Frequency \ Bandwidth	6 kHz	10 MHz
Wideband	-65 dB/-60 dBm	
1.74 kHz/3.1 kHz	-115 dB/-110 dBm	
25 Hz	-125 dB/-120 dBm	

Fig. 8-3 Table for checking the noise floor for  $Z_0 = 124/150 \Omega$

Frequency \ Bandwidth	50 Hz	200 Hz	3 kHz	620 kHz
Wideband	-65 dB/dBm			
1.74 kHz/3.1 kHz	—			-110 dB/dBm
25 Hz	-90 dB/dBm	-105 dB/dBm	-125 dB/dBm	

Fig. 8-4 Table for checking the noise floor for  $Z_0 = 600 \Omega$



## 8.4 LEVEL ACCURACY, SPM-15

## 8.4.1 ABSOLUTE ACCURACY, COAXIAL INPUT

Perform this measurement at an ambient temperature of  $23\text{ }^{\circ}\text{C} \pm 3\text{ K}$ .

Measuring instruments required:

Level generator	SPM-15 with PSE-15	W&G
Milliwatt power meter	EPM-1	W&G
Test probe $75\ \Omega$	TK-10	W&G

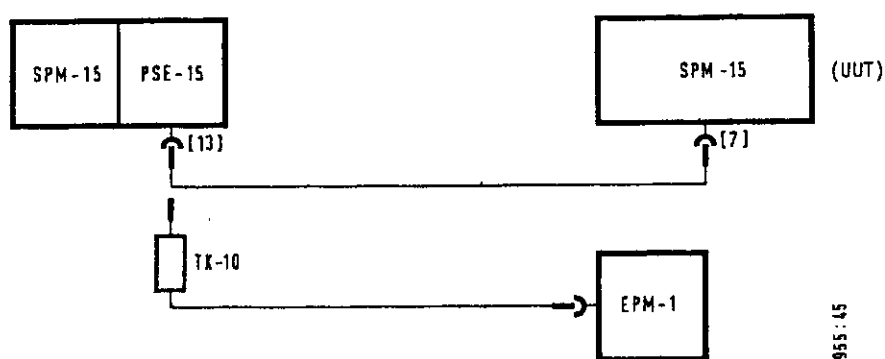


Fig. 8-5 Test set-up (absolute accuracy, coaxial)

Instrument settings:

SPM-15 (UUT):

Measurement mode	[9] : Selective/1.74 kHz
Frequency	[10] : 10 kHz
Display	[31] : dBm

PSE-15:

Frequency	[10] : 10 kHz
Send level	[9], [8] : 0 dBm

EPM-1:

Calibration level	: 0 dBm/ $R_f = 0$
-------------------	--------------------

Before the measurement, first calibrate the EPM-1 and then connect it to the PSE-15 [13].

Check the send level of the PSE-15 with the EPM-1. Connect the SPM-15 [7] (UUT) to the PSE-15 [13] and trigger the calibration operation on the unit under test by pressing the "AUTO CAL" key [1] twice. Read the receive level on the SPM-15 and calculate the difference between the readings of the SPM-15 and the EPM-1.

Specified error limit (e):	$\pm 6\text{ mB}$
Error of the test set-up (m):	$\pm 2\text{ mB}$

Repeat the measurement with a bandwidth of 25 Hz.

Specified error limit (e):	$\pm 11\text{ mB}$
Error of the test set-up (m):	$\pm 2\text{ mB}$

## 8.4.2 ABSOLUTE ACCURACY, BALANCED INPUT

Perform the measurement at an ambient temperature of  $23\text{ }^{\circ}\text{C} \pm 3\text{ K}$ .

## Measuring instruments required:

Level generator	SPM-15 with PSE-15	W&G
Milliwatt power meter	EPM-1	W&G
Basic balanced test probe	TKS-10	W&G
Test probe adaptor	TKSA-124	W&G
Test probe adaptor	TKSA-150	W&G
Test probe adaptor	TKSA-600	W&G
Calibration adaptor	TKSE-124	W&G
Calibration adaptor	TKSE-150	W&G
Calibration adaptor	TKSE-600	W&G

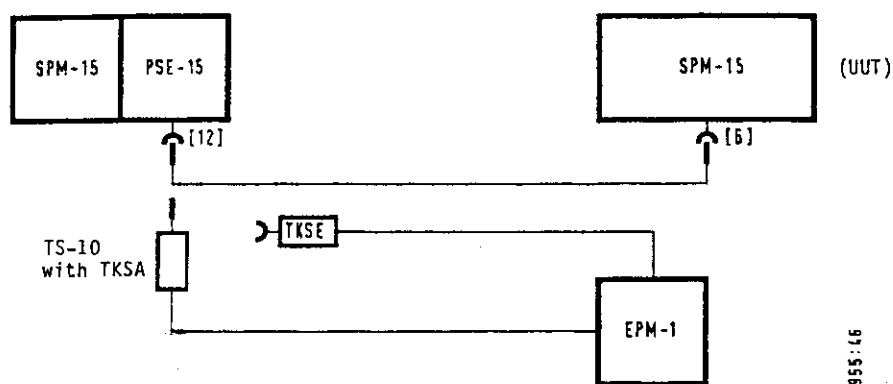


Fig. 8-6 Test set-up (absolute accuracy, balanced)

## Instrument settings:

## SPM-15 (UUT):

Input	[5] : Refer to table for Z value
Measurement mode	[9] : Selective/1.74 kHz
Display	[31] : dBm
Frequency	[10] : Refer to table

## PSE-15:

Output	[11] : Refer to table for Z value
Frequency	[10] : Refer to table
Send level	[9], [8] : 0 dBm

## EPM-1:

Calibration level	: Refer to table
-------------------	------------------

Before the measurement, first calibrate the EPM-1 with the test probe adaptor via the calibration adaptor and then connect to the PSE-15 [12].

Check the send level of the PSE-15 with the EPM-1 and connect the SPM-15 [6] (UUT) to the PSE-15 [12]. Use the "AUTO CAL" key [1] on the unit under test to trigger the calibration process and read the receive level. Calculate the difference between the readings on the SPM-15 and the EPM-1.

Z value	Test probe adaptor	Calibration adaptor	EPM-1	Frequency	Specified error limit (e)	Error of test set-up (m)
124 $\Omega$	TKSA-124	TKSE-124	0 dB/R <sub>i</sub> = 0	100 kHz	$\pm 10$ mB	$\pm 2$ mB
150 $\Omega$	TKSA-150	TKSE-150				
600 $\Omega$	TKSA-600	TKSE-600	0 dB/R <sub>i</sub> = 75 $\Omega$ 10 kHz			

Fig. 8-7 Table for verifying the absolute accuracy (balanced)

Repeat the measurement with a bandwidth of 25 Hz

Specified error limit (e):  $\pm 15$  mB  
 Error of test set-up (m):  $\pm 2$  mB

#### 8.4.3 DIVIDER ERROR

Measuring instruments required:

Level generator

SPM-15 with PSE-15

W&G

Attenuation set 75  $\Omega$

D 2053

Siemens

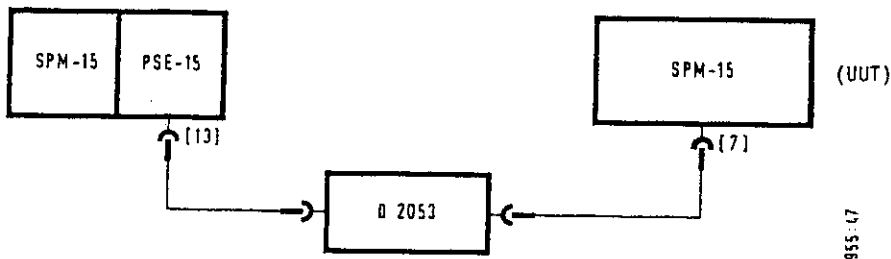


Fig. 8-8 Test set-up (divider test)

Instrument settings:

SPM-15 (UUT):

Measurement mode

[9] : Selective/3.1 kHz

Frequency

[10] : 10 kHz

PSE-15:

Frequency

[10] : 10 kHz

Send level

[9], [8] : 1 dB

D 2053:

Attenuation (residual attenuation)

: 1 dB

Set the attenuation set, generator and SPM-15 (UUT) in accordance with the following table and read the level display L on the SPM-15.

Deduct the value  $L_1$  from the SPM-15 displays (UUT)  $L_2$  to  $L_6$  and the value  $\Delta L = L_7 - L_6 + L_1$  from  $L_8$  to  $L_{13}$  and compare with the set values.

PSE-15 L [dB]	D 2053 a [dB]	SPM-15		Specified error limit (e)	Error of test set-up (m)
		Set value	Display		
1 ↓	1	0	L <sub>1</sub>	1st reference value	
	11	-10	L <sub>2</sub>	1 ± 0.1 dB	± 0.2 dB
	21	-20	L <sub>3</sub>		
	31	-30	L <sub>4</sub>		
	51	-50	L <sub>6</sub>		
-49 ↓	1	-50	L <sub>7</sub>	2nd reference value	
	11	-60	L <sub>8</sub>	± 0.1 dB	± 3 mB
	21	-70	L <sub>9</sub>		
	31	-80	L <sub>10</sub>	± 0.15 dB	
	41	-90	L <sub>11</sub>		
	51	-100	L <sub>12</sub>	± 0.3 dB	± 5 mB
	61	-110	L <sub>13</sub>		

Fig. 8-9 Table for verifying the divider error

Technical note: The external attenuation has been limited to 50 (60) dB in order to avoid any measuring errors due to possible earth circuits.

#### 8.4.4 FREQUENCY RESPONSE, COAXIAL INPUT

Measuring instruments required:

Level generator	SPM-15 with PSE-15	W&G
Milliwatt power meter	EPM-1	W&G
Test probe, 75 Ω	TK-10	W&G

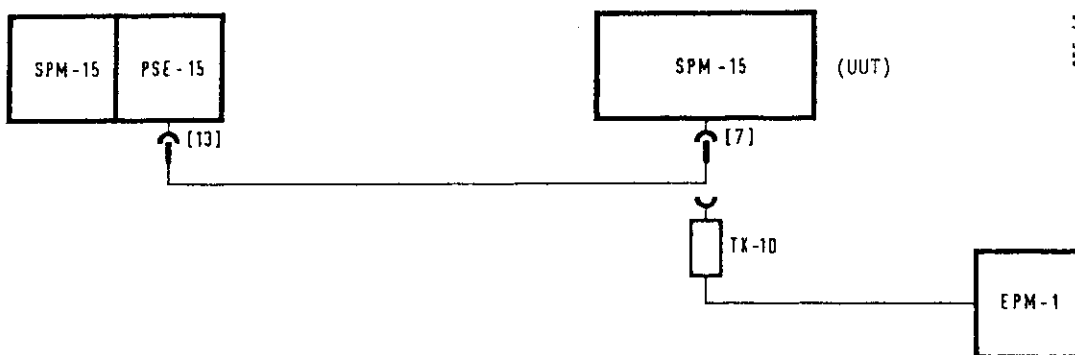


Fig. 8-10 Test set-up (frequency response, coaxial)

Selective measurement:

## Instrument settings:

## SPM-15 (UUT):

Measurement mode	[9] : Selective/25 Hz
Mode	ANLG : 1 dB scale
Display	[31] : dBm

## PSE-15:

Send level	[9], [8] : 0 dBm
------------	------------------

Recording the natural frequency response:

Connect the EPM-1 to the PSE-15 via the cable to be used for measuring the frequency response. Set the PSE-15 to a reference frequency of  $f = 10$  kHz. Use the "Calibration" potentiometer to set the display on the EPM-1 to 0 dBm. Determine and note the natural frequency response of the PSE-15 at the frequencies stated in the table.

Measurement:

Connect the SPM-15 (UUT) to the PSE-15, using the same cable as for recording the intrinsic frequency response. Set a reference frequency of  $f = 10$  kHz on the SPM-15 and PSE-15. Trigger the calibration operation with the "AUTO CAL" key [1] on the unit under test and store the level measured as the reference value using the "ABS -> REF" key [2]. Set "ABS-REF" measurement [2]. Tune the level display on the unit under test to maximum at the frequencies stated in the table. Calculate the difference between the values displayed and the values noted and compare with the specified error limit.

Frequency	Specified error limit (e)	Error of test set-up (m)
50 Hz	$\pm 0.3$ dB	$\pm 2$ mB
200 Hz 2; 100 kHz 1; 5; 10 MHz	$\pm 0.08$ dB	

Fig. 8-11 Table for verifying the frequency response error (coaxial/selective)

Wideband measurement

## Changed settings:

## SPM-15 (UUT):

Measurement mode	[9] : WIDEBAND
------------------	----------------

Repeat the measurement as described under "Selective measurement".

Frequency	Specified error limit (e)	Error of test set-up (m)
50; 200 Hz 2; 100 kHz 1; 5; 10 MHz	$\pm 0.35$ dB	$\pm 2$ mB

Fig. 8-12 Table for verifying the frequency response error (coaxial/wideband)

### 8.4.5 FREQUENCY RESPONSE, BALANCED INPUT

#### Measuring instruments required:

Level generator	SPM-15 with PSE-15	W&G
Milliwatt power meter	EPM-1	W&G
Basic balanced test probe	TKS-10	W&G
Test probe adaptor	TKSA-124	W&G
Test probe adaptor	TKSA-150	W&G
Test probe adaptor	TKSA-600	W&G
"T" branch	S 833	W&G

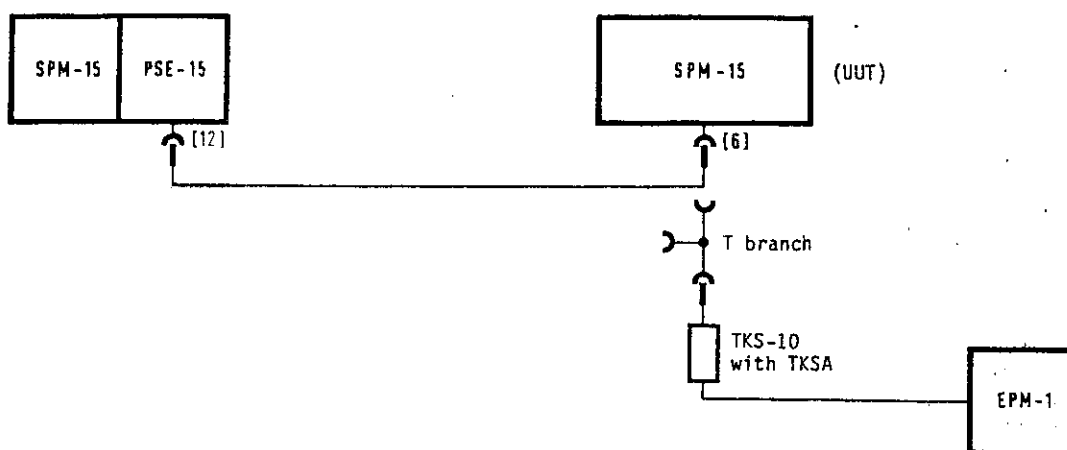


Fig. 8-13 Test setup (frequency response, balanced)

#### Instrument settings:

##### SPM-15 (UUT):

Input	[5] : Refer to table for Z value
Measurement mode	[9] : Selective/25 Hz
Mode	ANLG : 1 dB scale
Display	[31] : dBm

##### PSE-15:

Output	[11] : Refer to table for Z value
Send level	[9], [8] : 0 dBm

#### Recording the natural frequency response:

Operate the TKS-10 with the corresponding test probe adaptor (table).

Connect the EPM-1 to the PSE-15 via the cable to be used for measuring the frequency response and the "T" branch. Proceed as described in Section 8.4.4; refer to table for reference frequency.

Measurement:

Proceed as described in Section 8.4.4; refer to table for reference frequency.

Fre- quency	Z <sub>0</sub> value	Test probe adapter	Reference frequency	Specified error limit (e)	Error of test set-up (m)
6 kHz	124 Ω 150 Ω	TKSA-124 TKSA-150	100 kHz	± 0.4 dB	+2/-3 mB
60 kHz 2 MHz	124 Ω 150 Ω	TKSA-124 TKSA-150		± 0.15 dB	
5, 10 MHz	124 Ω 150 Ω*	TKSA-124 TKSA-150		± 0.15 dB	+2/-4 mB
50 Hz	600 Ω	TKSA-600	10 kHz	± 0.8 dB	+2/-3 mB
200 Hz				± 0.25 dB	
2 kHz				± 0.15 dB	
100 kHz 620 kHz				± 0.25 dB	

\* The characteristic data of the EPM-1 are no longer guaranteed in this frequency range. The error of the test set-up may increase marginally.

Fig. 8-14 Table for verifying the frequency response error (balanced)

### 8.5 SELECTIVITY

Measuring instruments required:

Level generator

SPM-15 with PSE-15

W&G

Instrument settings:

SPM-15 (UUT):

Measurement mode

[9] : Refer to table for bandwidth

Frequency

[10] : 100 kHz

Frequency setting

[10] : Fine

PSE-15:

Frequency

[10] : 100 kHz

Send level

[9], [8] : 0 dB

Connect the SPM-15 [7] (UUT) to the PSE-15 [13]. Set the frequency separation from the centre of the filter on the unit under test in accordance with the table and compare the level display with the specified error limit.

Bandwidth			Specified error limit (e)	Error of test set-up (m)
25 Hz	1.74 kHz	3.1 kHz		
$\pm 7$ Hz	$\pm 650$ Hz	$\pm 1.5$ kHz	$\leq 3$ dB	negligible
$\pm 80$ Hz	-	-	$\geq 50$ dB	
$\pm 250$ Hz	$\pm 2$ kHz	$\pm 2$ kHz	$\geq 60$ dB	

Fig. 8-15 Table for verifying the selectivity

### 8.6 HARMONIC DISTORTION PRODUCTS

Measuring instruments required:

Level generator SPM-15 with PSE-15 W&G  
 with  
 Low-pass filter,  $Z = 75 \Omega$   $300 \text{ Hz} \leq f_g \leq 1 \text{ MHz}$   
 Attenuation at  $2f_g$  und  $3f_g \geq 50 \text{ dB}$   
 Intrinsic harmonic ratio  $\geq 90 \text{ dB}$   
 or equivalent low distortion generator

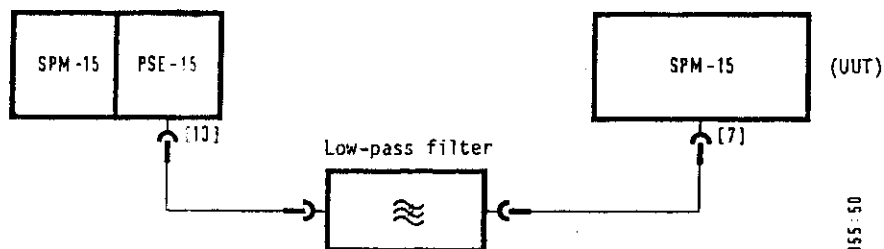


Fig. 8-16 Test set-up (harmonic distortion products)

Instrument settings:

SPM-15 (UUT):

Measurement mode [9] : Selective/25 Hz

PSE-15:

Send level [9], [8] : 0 dB

Set the basic frequency on the unit under test and on the PSE-15. Store the level on the unit under test as the reference value using the "ABS -> REF" key [2]. Set "ABS-REF" measurement [2]. Compare the intrinsic harmonic ratios  $a_{k2}$  and  $a_{k3}$  of the unit under test with the specified error limits at  $2x$  and  $3x$  the basic frequency.



Basic frequency	Specified error limit (e)	Error of test set-up (m)
$300 \text{ Hz} \leq f < 3 \text{ kHz}$	$\geq 70 \text{ dB}$	$\pm 1 \text{ dB}$
$3 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$\geq 80 \text{ dB}$	$+3.5/-2.5 \text{ dB}$

Fig. 8-17 Table for verifying the harmonic distortion products

8.7 NOISE POWER RATIO

Measuring instruments required:

White noise generator	RS-25	W&G
Band limiting filter	RSB-12/8160	W&G
Bandstop filter	RSS-3886	W&G

Instrument settings:

SPM-15 (UUT):

Measurement mode	[9] : Selective/1.74 kHz
Display	[31] : dBm
Frequency	[10] : 3886 kHz
AUTO CAL	[1] : Off

RS-25:

Band limiting filter	[6] : On
Bandstop filter	: Off
Send level	[5] : -11 dBm

Connect the SPM-15 [7] to the RS-25 [1]. With the bandstop filter switched off, store the level on the SPM-15 as the reference value using the "ABS -> REF" key [2]. Set "ABS-REF" measurement [2]. Switch on the bandstop filter and compare the level on the SPM-15 with the specified error limit.

Specified error limit (e):	$\geq 54 \text{ dB}$
Error of test set-up (m):	$\pm 0.1 \text{ dB}$

## 8.8 MEASURING INPUTS

### 8.8.1 RETURN LOSS, COAXIAL INPUT

Measuring instruments required:

Level meter and	SPM-15 with PSE-15	W&G
Level generator		
Return loss measuring attachment	RFZ-5	W&G

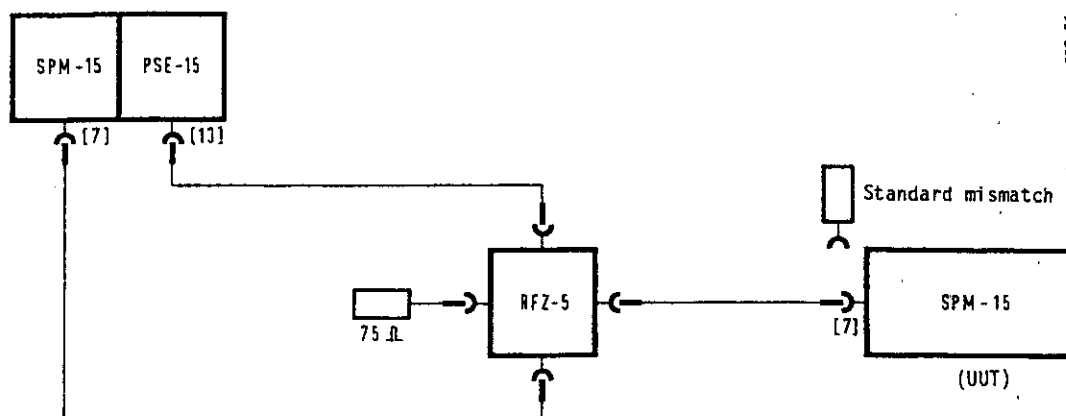


Fig. 8-18 Test set-up (Return loss, coaxial)

Instrument settings:

SPM-15 (UUT):

AUTO CAL [1] : Off

SPM-15:

Measurement mode [9] : Selective/25 Hz  
Mode ANLG : 20 dB scale

PSE-15:

Send level [9], [8] : 0 dB

Align the intrinsic return loss in accordance with Section 3.3 of the RFZ-5 Description and Operating Instructions for a test frequency of 10 MHz.

Switch the SPM-15 to "digital" mode. Operate the RFZ with a standard mismatch ( $r = 0.1$ ). Carry out a reference measurement at the test frequency. Store the level obtained as the reference value using the "ABS -> REF" key [2]. Set "ABS-REF" measurement [2]. Remove the standard mismatch and connect the RFZ-5 to the unit under test.

Return loss:  $a_r = 20 \text{ dB} - a_{\text{SPM-15}}$

Repeat the measurement at a test frequency of 10 kHz.

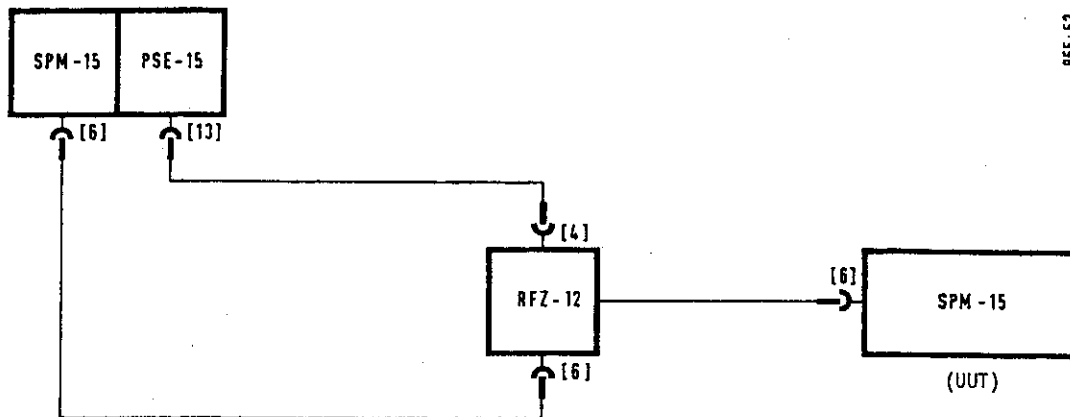
Specified error limit (e):  $\geq 36 \text{ dB}$

Error of test set-up (m):  $+2.2/-1.7 \text{ dB}$

## 8.8.2 RETURN LOSS, BALANCED INPUT

Measuring instruments required:

Level meter and	SPM-15 with PSE-15	W&G
Level generator		
Return loss measuring attachment	RFZ-12	W&G



955:52

Fig. 8-19 Test set-up (return loss, balanced)

Instrument settings:

SPM-15 (UUT):

Input	[5] : Refer to table for $Z_0$ value
AUTO CAL	[1] : Off

SPM-15:

Input	[6] : $Z_0 = \infty$
Measurement mode	[9] : Selective/25 Hz

PSE-15:

Send level	[9], [8] : 0 dB
------------	-----------------

RFZ-12:

$Z_0$ value	[3] : Refer to table
Mode	[7] : Balanced

With the input on the RFZ-12 open ( $|r| = 1$ ), carry out a reference measurement at  $f = 10$  kHz and store the level as the reference value using the "ABS -> REF" key [2]. Repeat the reference measurement for every new  $Z_0$  value set. Connect the RFZ-12 to the SPM-15 (unit under test). Tune the SPM-15 (measuring instrument) to the test frequency and perform an "ABS-REF" measurement.

$Z_0$ value	Test frequency	Specified error limit (e)	Error of test set-up (m)
124 $\Omega$	100 kHz	$\geq 40$ dB	+1.9/-1.6 dB
150 $\Omega$			
600 $\Omega$	10 kHz	$\geq 50$ dB	+4.5/-2.9 dB

Fig. 8-20 Table for verifying the return loss (balanced)

### 8.8.3 SIGNAL BALANCE RATIO

Measuring instruments required:

Level meter and	SPM-15 with PSE-15	W&G
Level generator		
Signal balance ratio measuring attachment	SDZ-12	W&G

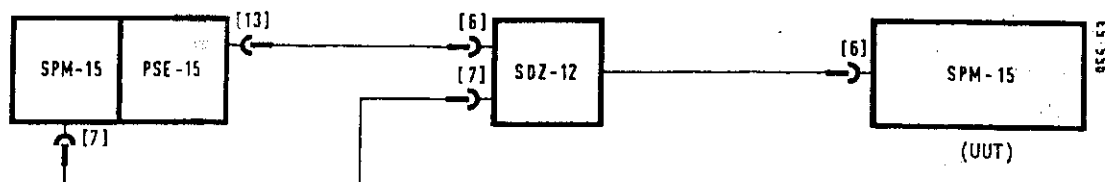


Fig. 8-21 Test set-up (signal balance ratio)

Instrument settings:

SPM-15 (UUT):

Input	[5] : Refer to table for $Z_0$ value
Measurement mode	[9] : Selective/1.74 kHz
Frequency	[10] : Refer to table

PSE-15:

Send level	[9], [8] : 0 dB
------------	-----------------

SPM-15:

Input	[5] : $Z_0 = \infty$
Measurement mode	[9] : Selective/25 Hz
Frequency	[10] : Refer to table

SDZ-12:

$Z_0$ value	[4] : Refer to table
Unit under test	[2] : Receiver

The signal balance ratio is calculated as the difference between the level displays on the SPM-15 (measuring instrument) and the SPM-15 (unit under test).

$Z_0$ value	Frequency	Specified error limit (e)	Error of test set-up (m)
124 $\Omega$	1 MHz	$\geq 40$ dB	+1.9/-1.6 dB
124 $\Omega^*$	4.5 MHz	$\geq 25$ dB ( $\geq 32$ dB)	$\pm 0.6$ dB
600 $\Omega$	620 kHz	$\geq 40$ dB	+6/-3.5 dB

Fig. 8-22 Table for verifying the signal balance ratio

\* This characteristic value can only be verified up to 4.5 MHz with the test set-up specified. To ensure compliance with this characteristic value even at 10 MHz, the signal balance ratio should not be less than 32 dB at 4.5 MHz.

## 8.9 LEVEL ACCURACY, PSE-15

### 8.9.1 ABSOLUTE ACCURACY, COAXIAL OUTPUT

Carry out the measurement at an ambient temperature of  $23\text{ }^\circ\text{C} \pm 3\text{ K}$ .

Measuring instruments required:

Milliwatt power meter	EPM-1	W&G
Test probe, 75 $\Omega$	TK-10	W&G

Instrument settings:

PSE-15:

Frequency	[10] : 12 kHz
Send level	[9], [8] : 0 dBm

EPM-1:

Calibration level : 0 dBm,  $R_f = 75\ \Omega$

Operate the EPM-1 with the TK-10 and calibrate before measurement. Subsequently connect the EPM-1 to the PSE-15 [13] and read the display on the EPM-1.

Specified error limit (e):	$\pm 8$ mB
Error of test set-up (m):	$\pm 1$ mB

## 8.9.2 ABSOLUTE ACCURACY, BALANCED OUTPUT

Carry out the measurement at an ambient temperature of  $+23\text{ }^{\circ}\text{C} \pm 3\text{ K}$ .

## Measuring instruments required:

Milliwatt power meter	EPM-1	W&G
Basic balanced test probe	TKS-10	W&G
Test probe adaptor	TKSA-124	W&G
Test probe adaptor	TKSA-150	W&G
Test probe adaptor	TKSA-600	W&G
Calibration adaptor	TKSE-124	W&G
Calibration adaptor	TKSE-150	W&G
Calibration adaptor	TKSE-600	W&G

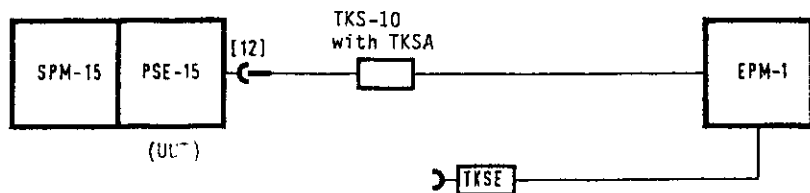


Fig. 8-23 Test set-up (absolute accuracy, balanced)

## Instrument settings:

## PSE-15 (UUT):

Output	[11] : Refer to table for $Z_0$ value
Frequency	[10] : 12 kHz
Send level	[9], [8] : 0 dBm

## EPM-1:

Calibration level : Refer to table

Before the measurement, calibrate the EPM-1 with the test probe adaptor via the calibration adaptor. Connect the PSE-15 [12] to the EPM-1 and compare the display on the EPM-1 with the specified error limit.

$Z_0$ value	Test probe adaptor	Calibration adaptor	EPM-1	Specified error limit (e)	Error of test set-up (m)
124 $\Omega$	TKSA-124	TKSE-124	0 dB, $Z_0 = 0$	$\pm 16$ mB	$\pm 1$ mB
150 $\Omega$	TKSA-150	TKSE-150	0 dB, $Z_0 = 0$		
600 $\Omega$	TKSA-600	TKSE-600	0 dB, $Z_0 = 75\ \Omega$		

Fig. 8-24 Table for verifying the absolute accuracy (balanced)

### 8.9.3 DIVIDER ERROR

Measuring instruments required:

Level meter	SPM-15	W&G
Attenuation set	D 2053	Siemens

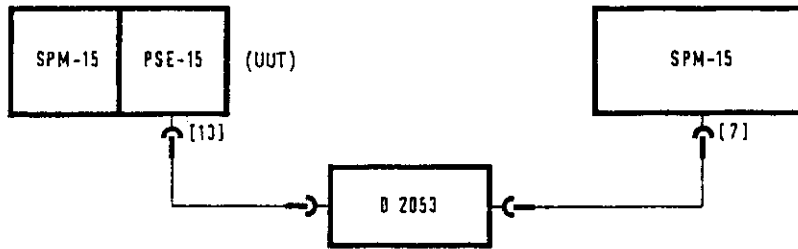


Fig. 8-25 Test set-up (divider test)

Instrument settings:

PSE-15 (UUT):

Send level	[9], [8] : 0 dB
Frequency	[10] : 10 kHz

SPM-15:

Measurement mode	[9] : Selective/25 Hz
Frequency	[10] : 10 kHz

D 2053:

Attenuation	: 60 dB
-------------	---------

Store the level on the SPM-15 as the reference value using the "ABS -> REF" key [2]. Set "ABS-REF" measurement [2]. Reduce the send level of the PSE-15 and the attenuation of the D 2053 in steps of 5 dB each. Compare the display on the SPM-15 with the specified error limit at each setting.

Specified error limit (e):	$\pm 10$ mB
Error of test set-up (m):	$\pm 2$ mB

### 8.9.4 FREQUENCY RESPONSE, COAXIAL OUTPUT

Measuring instruments required:

Milliwatt power meter	EPM-1	W&G
Test probe	TK-10	W&G

Instrument settings:

PSE-15 (UUT):

Send level	[9], [8] : 0 dBm
Frequency	[10] : 10 kHz
AUTO CAL	[1] : Off

EPM-1:

Measuring range : 0 dBm  $\pm$  1 dB

Connect the PSE-15 [13] to the EPM-1. Use the "Calibration" potentiometer to set the display on the EPM-1 to 0 dBm at the reference frequency of  $f = 10$  kHz. Continuously sweep through the frequency range of the PSE-15, comparing the display on the EPM-1 with the table data.

Frequency range	Specified error limit (e)	Error of test set-up (m)
50 ... 200 Hz	0.42 dB	negligible
200 Hz ... 10 MHz	0.12 dB	

Fig. 8-26 Table for verifying the frequency response error (coaxial)

#### 8.9.5 FREQUENCY RESPONSE, BALANCED OUTPUT

Measuring instruments required:

Milliwatt power meter	EPM-1	W&G
Basic balanced test probe	TKS-10	W&G
Test probe adaptor	TKSA-124	W&G
Test probe adaptor	TKSA-150	W&G
Test probe adaptor	TKSA-600	W&G

Instrument settings:

PSE-15 (UUT):

Output [11] : Refer to table for  $Z_0$  value  
Send level [9], [8] : 0 dBm

EPM-1:

Measuring range : 0 dBm  $\pm$  1 dB

Connect the EPM-1 to the PSE-15 [12] via the corresponding test probe adaptor. Use the "Calibration" potentiometer to set the EPM-1 display to 0 dBm at the reference frequency. Continuously sweep through the frequency range of the PSE-15, reading the display on the EPM-1 and comparing it with the table data.

$Z_0$ value	Reference frequency	Frequency range	Test probe adaptor	Specified error limit (e)	Error of test set-up (m)
124 $\Omega$	100 kHz	6 kHz ... 10 MHz	TKSA-124	0.22 dB	negligible
150 $\Omega$			TKSA-150		
600 $\Omega$	10 kHz	50 ... 200 Hz	TKSA-600	0.52 dB	
		200 Hz ... 620 kHz		0.22 dB	

Fig. 8-27 Table for verifying the frequency response error (balanced)



8.10 SPECTRAL PURITY

Measuring instruments required:

Level meter

SPM-15

W&amp;G

Instrument settings:

PSE-15 (UUT):

Send level

[9], [8] : 0 dB

SPM-15:

Measurement mode

[9] : Selective/25 Hz

Mode

ANLG : 20 dB scale

Connect the PSE-15 [13] to the external SPM-15 [7].

At the basic frequency, set the send level of the PSE-15 in such a way that 0 dB is present at the SPM-15.

Tune the SPM-15 according to the table and compare the display with the table data. The sensitivity increase on the SPM-15 should not exceed 50 dB.

Basic frequency	SPM-15	Specified error limit (e)	Error of test set-up (m)
300 Hz	600 Hz 900 Hz	$\geq 40$ dB	$\pm 0.3$ dB
3 MHz	6 MHz 9 MHz		$\pm 0.2$ dB
48 kHz	28 kHz 38 kHz 58 kHz 68 kHz	$\geq 50$ dB	$\pm 0.15$ dB

Fig. 8-28 Table for verifying the spectral purity

8.11 GENERATOR OUTPUTS8.11.1 RETURN LOSS, COAXIAL OUTPUT

Measuring instruments required:

Level meter and

SPM-15 with PSE-15

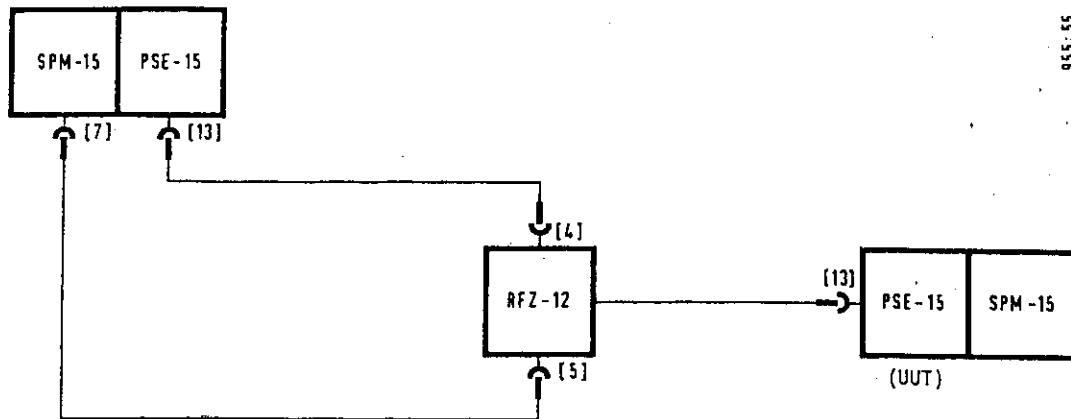
W&amp;G

Level generator

Return loss measuring attachment

RFZ-12

W&amp;G



955-55

Fig. 8-29 Test set-up (return loss, coaxial)

## Instrument settings:

## PSE-15 (UUT):

Send level [9], [8] : Refer to table  
 Frequency [10] : 269 kHz

## SPM-15:

Input [5] :  $Z_0 = \infty$   
 Measurement mode [9] : Selective/25 Hz  
 Frequency [10] : 10 kHz

## PSE-15:

Send level [9] [8] : 0 dB

## RFZ-12:

Z value [3] : 75  $\Omega$   
 Mode [7] : Coaxial

With the input of the RFZ-12 open ( $|r| = 1$ ), carry out a reference measurement and store the level using the "ABS -> REF" key [2]. Connect the RFZ-12 to the PSE-15 (unit under test). Carry out an "ABS-REF" measurement [2] at the UUT send levels stated in the table.

Send level	Specified error limit (e)	Error of test set-up (m)
-20 dB	$\geq 50$ dB	+4.7/-3 dB
-25 dB		
-30 dB		
-50 dB		

Fig. 8-30 Table for verifying the return loss (coaxial)

$Z_0$ value	Frequency	Specified error limit (e)	Error of test set-up (m)
124 $\Omega^*$	4.5 MHz	$\geq 40$ dB ( $\geq 47$ dB)	+3.3/-2.4 dB
124 $\Omega^{**}$	10 MHz	$\geq 40$ dB	+1.3/-1.2 dB
600 $\Omega$	620 kHz		+6/-3.5 dB

Fig. 8-34 Table for verifying the signal balance ratio

\* This characteristic value can only be verified at up to 4.5 MHz with the test set-up specified. For compliance with the characteristic value even at 10 MHz, the signal balance ratio should be not less than 47 dB at 4.5 MHz.

\*\* The signal balance ratio is checked using test instrument 3-954 in the factory.

#### Over-discharging protection

In order to avoid over-discharging of the battery, the comparator (IC 3/2) switches off the converter (IC 1) when the battery voltage drops below the permissible level ( $10,3 \text{ V} \leq U_{\text{Batt}} < 11,3 \text{ V}$ ).

#### Charging circuit ("Charge" switch pressed)

The battery pack (if installed) is charged from the high-end voltage via transistor T 2. T 3 limits the maximum permissible effective charging current to 450 mA with the aid of R 7.

### 9.2.2 INPUT SECTION [955-AF]/[955-AL]

The desired input impedances are implemented in the input section in accordance with the bit configuration set (refer to 4.2.19, input section controller). The low through-connecting impedances required are implemented with the aid of bistable relays. The characteristic of these relays is that they retain their position even when de-energized.

### 9.2.3 PRE-AMPLIFIER [955-M]

The test signal (balanced and coaxial) passes from the input section [955-AF/AL] via Rel. 1 and Rel. 2 to the calibration change-over switch Rel. 3. This is followed by the switchable 20 dB dividers with Rel. 4 and Rel. 5. Diodes G1 1 and G1 2 limit undesired input voltage peaks. The emitter resistance of divider stage T 1 is split, representing a switchable 2 dB test divider with T 3 and T 4.

Amplifier 1 (T 5, T 6, T 7) is of negative-feedback design and has a basic gain of 3 dB. A gain of 13 dB or 23 dB can be activated by means of relays Rel. 6 and Rel. 7 (specified nominal gain 0/10/20 dB). C 23 can be used to align the frequency response of the circuitry (amplifier 1 and amplifier 2). C 25 and C 28 are provided for frequency response corrections at gain = 10 dB and gain = 20 dB.

The downstream amplifier 2 adapts the various dBm levels to the basic gain. For  $Z = 600 \Omega$  or for dBm measurements, the gain is 3 dB. For

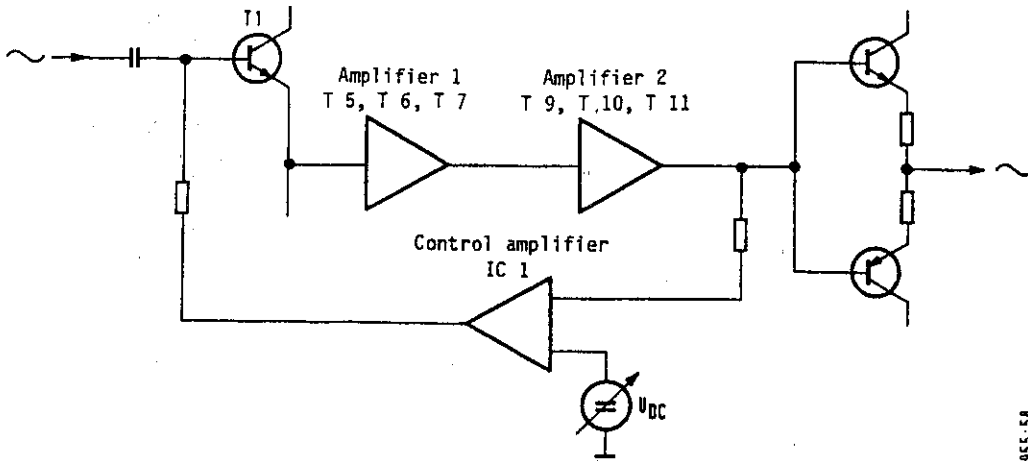
$Z = 150 \Omega$  (dBm), the gain is 9 dB (nom. 6,02 dB)

$Z = 124 \Omega$  (dBm), the gain is 9,85 dB (nom. 6,85 dB)

$Z = 75 \Omega$  (dBm), the gain is 12 dB (nom. 9,03 dB).

The divider stages with T 13/14 and T 15/16 are required for coupling out the test and calibration signal into the wideband and selective branch. Potentiometer P 6 can be used to vary the amplitude of the wideband level by approx.  $\pm 5$  dB.

A superimposed control loop has been implemented with IC 1 for controlling the operating point of the first transistor, in order to allow DC coupling of the entire amplifier chain (lowest test frequency 50 Hz!). The DC operating point can be set with pot. P 5. For troubleshooting purposes, the negative feedback circuit of amplifiers 1 and 2 can be disconnected with switches S 1 and S 2. It is then easy to measure the operating points of the various stages (make DC setting with P 5/voltage values different to those with closed switches!).



955-58

Fig. 9-1 Controller operating mode  
 (With switches S 1 and S 2 open: open-loop gain of amplifier 1 and amplifier 2 approx. 10 dB /  $V_{nom}$ . 0 dB in each case)

Gain $G_{WB}$ [dB]	Code Gate 84H		Code Gate 85H	
	D7	D0	D7	D0
+20	XX0001XX		} Address 85H has no effect on gain	
+10	XX0010XX			
0	XX0000XX			
-10	XX1010XX			
-20	XX1000XX			
-30	XX1110XX			
-40	XX1100XX			
2 dB divider off	XXXXXXXX		XXXX1XXX	
2 dB divider on	XXXXXXXX		XXXX0XXX	
Relay TRI-STATE	XXXXXXXX		XXX1XXXX	
Relay ON	XXXXXXXX		XXX0XXXX	
$g = 6.85$ dB	XXXXXXXX		XXXXX1XX	
$g = 6.02$ dB	XXXXXXXX1		XXXXXXXX	
$g = 9.03$ dB	XXXXXX1X		XXXXXXXX	

Fig. 9-2 Bit configuration for pre-amplifier

9.2.4 10 MHz LOW-PASS FILTER [955-N/0]

The 10 MHz low-pass filter is an 8th order computer-approximated filter. The filter has been implemented in two sections in order to achieve high attenuation values and low mutual coupling.

### 9.2.5 MIXER 1 [955-R]

The input signal (50 Hz ... 10 MHz) is converted to the first IF of 40 MHz here with the aid of the carrier signal (40 MHz ... 50 MHz).

#### Input amplifier

A divider stage is necessary to prevent reactive effects between mixer and low-pass filter. This stage takes the form of T 1 and T 2, which operate as a complementary emitter follower.

#### Mixer

The limitation and distribution in carrier limiter 1 (refer to 9.2.6) create square-wave signals with a rise time of 1 ns at the collectors. Only with such short switching times can the required harmonic ratios be achieved.

The four Schottky diodes selected for the same forward voltage represent a conventional ring mixer. However, it is not supplied from a balance-to-unbalance transformer, but from two current sources T 3, T 4 terminated with resistors, which are clocked with the carrier voltage. Resistors R 11, R 15 thus form part of the output impedance of the signal source. T 6 terminates the mixer with low impedance.

#### Output amplifier

The output amplifiers T 6/T 7 produce a wideband low-value terminating impedance for the mixer, as well as a correct input impedance for the downstream filter, without this having reactive effects on the mixer. The signal supplied by the mixer is passed via the base stage (T 6) and the emitter follower (T 7) to a transformer, from where it is passed to the crystal band-pass filter as the first IF of 40 MHz (refer to 4.2.7). The LC combination (C 9, C 10, L 3) is used for bandwidth limitation on noisy signals.

### 9.2.6 CARRIER LIMITER [955-S]

The carrier signal supplied by the OD-15 (BN 2011) is conditioned in the carrier limiter in two limiter stages (differential amplifiers) in such a way as to minimize the deviations of the carrier signal from the mark-to-space ratio of 1 : 1. Only in this way can the required distortion values be obtained.

### 9.2.7 40 MHz CRYSTAL BAND-PASS FILTER (7) [955-T], [955-U], [955-V], [955-W]

The 40 MHz IF signal is passed via the 40 MHz band-pass filter to mixer 2 for final conversion. The band-pass filter suppresses the image frequency of the first conversion at 40.02 MHz, as well as higher mixing products up to the GHz range.

### 9.2.8 MIXER 2 (8) [955-AC], [955-AD]

Mixer 2 is fed with a constant carrier frequency of 40.01 MHz locked onto the standard frequency of the synthesizer and converts the first IF of 40 MHz to the second IF of 10 kHz.

#### Input amplifier

In the 40 MHz frequency range, the input for the crystal band-pass filter represents an impedance of 400  $\Omega$ . An amplifier stage with negative feedback (T 1, T 2) is used in order to guarantee the low tolerances of the crystal band-pass filter for the input impedance. This stage supplies the signal via O 2 to the two transistor mixers (IC 2/2 and IC 2/1) connected in parallel at low impedance and, consequently, largely free of reactive effects.

Transistor mixer

The transistor mixer is clocked by the carrier frequency of 40.01 MHz. Current control is achieved by the 40 MHz signal. O 1 is used for forced balancing, this improving the  $k_2$  characteristics of the mixer. C 21 and C 23 suppress the upper sideband of the carrier.

The mixer has a balanced output in order to fulfil the  $k_2$  distortion requirements imposed on the mixer. R 38 and R 40 form the 2 k $\Omega$  source impedance for the 10 kHz band-pass filter downstream in the signal path.

Carrier limiter

The carrier limiter consists of two differential amplifiers connected in series (IC 1/1, IC 1/2). It guarantees a fast edge response in the mixer transistors, as well as good intrinsic harmonic ratio separation.

9.2.9 10 kHz BAND-PASS FILTER (9), [955-AB]

The frequency-selective properties of the SPM-15 essentially depend on the selectivity of this band-pass filter  $\Delta f = 3.1$  kHz (O 1 to C 18). The effective noise bandwidth is taken as meaning  $\Delta f = 3.1$  kHz. In view of the steep pass/stop band transition, this also applies for the 3 dB bandwidth. The secondary bandwidth  $\Delta f = 1.74$  kHz (L 12, L 13) ensures correct weighting of a noise level without increasing the selectivity.

The temperature-dependent amplifier (IC 1), via which the 10 kHz IF signal leaves the assembly, compensates for the mean temperature drift of the total gain of the SPM-15.

9.2.10 CALIBRATING MIXER (10), [955-AE]

The calibrating mixer generates a signal matching the current tuning frequency with the aid of the 40 MHz ... 50 MHz carrier frequency and the 40 MHz signal obtained by quadrupling the 10 MHz standard frequency.

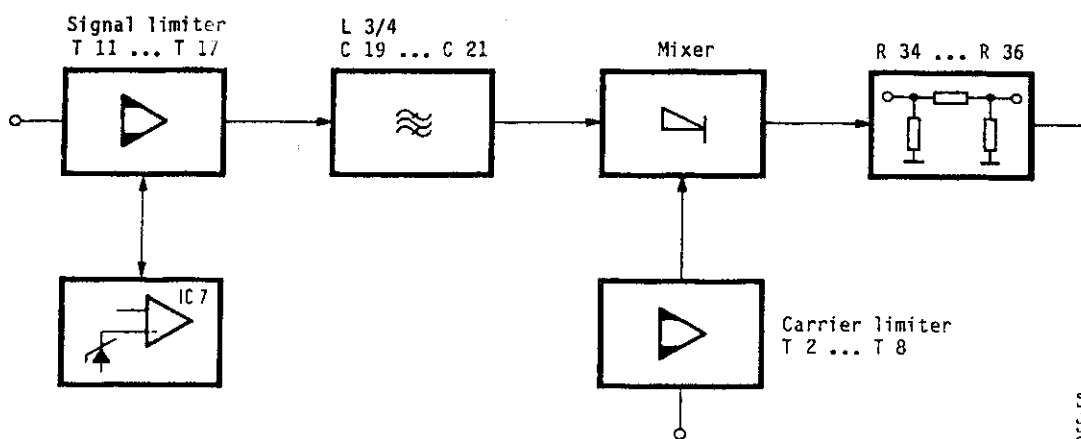


Fig. 9-3 Calibrating mixer for selective operation

The carrier signal is conditioned into a symmetrical square-wave signal with very steep edges in a two-stage carrier limiter (T 2 ... T 8). This signal passes via transformer O 1 to mixer diodes G1 1 ... G1 4. The 40 MHz signal is coupled in via O 2 and converted in the ring mixer with the carrier signal 40.000 ... 50 MHz. The resultant 50 Hz to 10 MHz output signal (lower

sideband) is coupled out to the PSE via C 13 (see below, Signal conditioning with PSE), passes via the attenuator pad R 34 ... R 36 to the output and is then fed into the pre-amplifier as the -40 dB calibrating level.

#### Signal conditioning (without PSE, S 1 and S 2 closed)

The 40 MHz signal is adjusted to a precise level in the signal conditioner. The 40 MHz signal passes from Pt. 5 via T 17 to a two-stage limiter (T 11 ... T 16). The square-wave signal is coupled out via R 77 and fed to a 40 MHz band-pass filter (L 4/C 21, C 20, L 3/C 19), where the fundamental wave is filtered out and fed to the mixer via D 2.

The level is controlled by amplifier IC 7. It compares the constant voltage from the reference element G1 5 with the voltage across the resistor combination (R 118, R 119, R 78, P 1). Consequently, a constant voltage is controlled via the resistor combination by the output of the amplifier (IC 7) keeping the current through the limiter (T 11 ... T 13) constant. However, a constant DC current through the limiter also produces a constant AC current and/or a constant AC voltage at R 77. Consequently, the accuracy of the reference element G1 5 largely determines the accuracy of the calibrating level. P 1 is used for absolute alignment, R 119 compensating for the temperature drift.

#### Signal conditioning (with PSE, S 1 open)

The above description also applies for operation with PSE, except that in this case the calibrating level is varied (except during calibration) by superimposing a DC voltage on the reference voltage (refer to PSE 9.26). This allows variation of the calibrating level by -6.5 dB (-10.5 dB from Series E onwards) and also fine adjustment of the PSE as a result.

#### Output coupling stage (T 9, T 10)

The output coupling stage is used for coupling out the calibrating level for the PSE power stage without reactive effects.

#### Calibrating level for wideband

The clock of approx. ca. 10 kHz generated in IC 1 chops the constant DC voltage from the reference element G1 7 with the aid of switches IC 2/1, IC 2/2. The signal is reduced via the divider chain R 84, P 2, R 85 in such a way that is coupled into the pre-amplifier at a nominal level of -40 dB (effective) via Rel. 1 (for calibration). P 2 is used for fine adjustment of the level.

### 9.2.11 DIVIDER STAGE (11) [955-AA]

The purpose of the divider stage is to pass the control signal of the OD-15 (carrier) to the calibrating mixer and the control output 14 Bu 1 without reactive effects.

### 9.2.12 40.010 MHz GENERATION (12) [955-X], [955-Y], [955-Z]

A frequency of 40.010 MHz is required for converting the first IF of 40 MHz to the second IF of 10 kHz. The 40.010 MHz generator is designed as a phase-locked loop (PLL). Stability reasons prevent the use of a variable-frequency crystal oscillator, since filters with a bandwidth of down to 25 Hz are used at the 10 MHz IF level. The reference frequency used is the standard frequency of 10 MHz, as well as 10 kHz, from the OD-15.

The voltage-controlled crystal oscillator VCO generates a frequency of 13.3367 MHz. The desired carrier signal of 40.010 MHz is obtained by tripling this frequency.

In order to avoid complex scanning at 40 MHz, phase comparison takes place at  $f = 10$  kHz. The quadrupled reference frequency and the 40.010 MHz signal are passed to a ring mixer for this



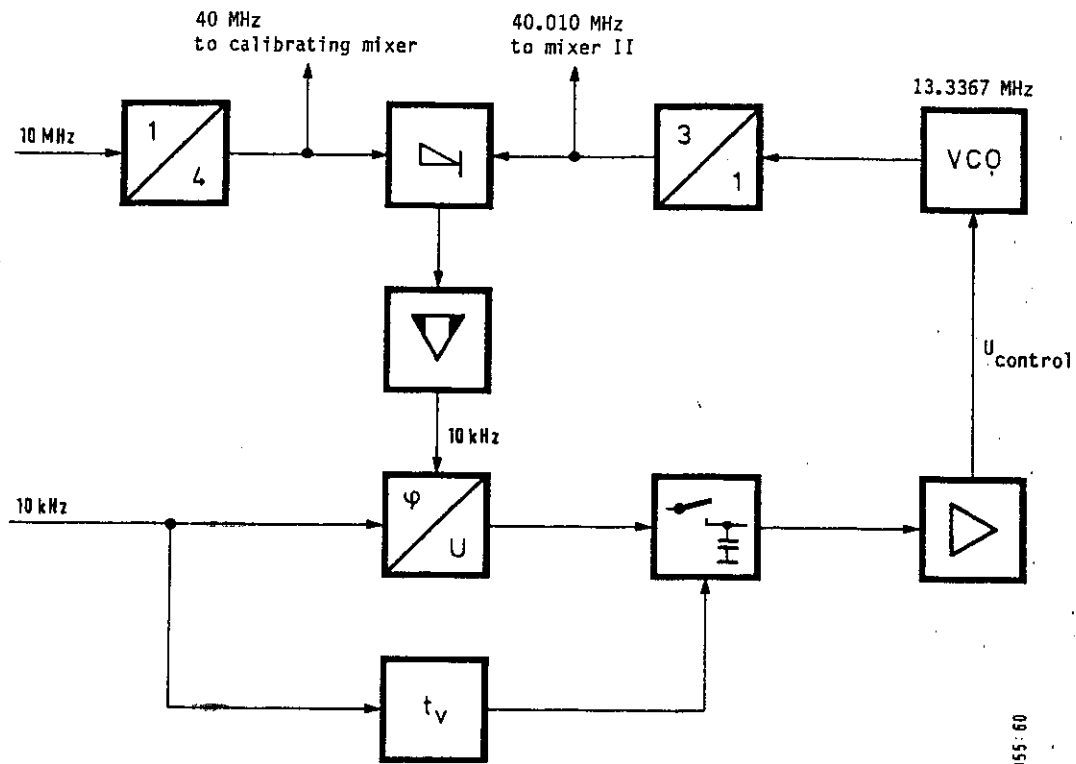


Fig. 9-4 PLL operating mode

purpose. The resultant mixing product of  $f_m = 3 \times f_{VCO} - 4 \times f_{ref} = 10 \text{ kHz}$  is shaped into a square wave by a comparator.

The phase comparator stage boosts the comparator signal as well as the 10 kHz derived from the reference frequency. At the output of this stage is a phase-proportional voltage which, however, has a major 10 kHz interference component. In order to supply the DC amplifier with a control voltage largely free of interference voltage, the phase comparator is followed by an interference suppressor stage with buffer memory (IC 7.3/7.4, IC 6). The downstream DC amplifier (IC 9) matches the control voltage obtained to the VCO.

#### 10 MHz input, quadrupler [955-Z]

The 10 MHz reference signal passes from the synthesizer (OD-15) to amplifier stages IC 1/1 and IC 1/2, where the signal is boosted to such an extent that the harmonic generator stage IC/3 can be supplied. The harmonic generator stage operates on the band-pass filter C 12/L 2, C 14, C 15/L 3, where the 4th harmonic of 10 MHz is selected out. The signal passes from the output coupling stage IC 1/4 to the calibrating mixer and, in attenuated form, via R 34 to mixer IC 4.

#### 40.010 MHz VCO [955-X]

Board [955-X] accommodates the control amplifier IC 9, the voltage-controlled crystal oscillator T 17, a harmonic generator stage T 16 with band-pass filter, as well as two output coupling stages T 14, T 15. The 40.010 MHz carrier frequency is generated by tripling the oscillator frequency of 13.3367 MHz. A crystal oscillating at the fundamental is used in the oscillator circuit, since the dynamic capacity of a crystal operating in harmonic mode would be too small for the required lock-in range. The frequency-determining circuit of the oscillator consists of C 59, 60, 63, 64, 67, G1 11 and Q 1. C 64 is used to compensate for the capacitor and crystal tolerances. Tuning diode G1 11 corrects the oscillating frequency as a function of the control

voltage. The oscillator signal passes from emitter T 17 via limiter diodes G1 9, 10 to the harmonic generator stage T 16. The band-pass filter with L 6/C 54 and L 5/C 51 selects out the 3rd harmonic of 13.3367 MHz. The 40.010 MHz signal passes to mixer II via collector stage T 15. T 14 supplies the signal to the control circuit.

40.01 MHz PLL [955-Y]

This board accommodates the auxiliary mixer IC 4, the comparator IC 5, the phase comparator IC 7 and the interference suppressor IC 6,7.

The signal for the control circuit passes from the VCO via divider stages T 10, T 11 to ring mixer IC 4. In order to generate the minimum possible interference voltage within the instrument (the first IF corresponds to the four-fold reference frequency of 10 MHz), the VCO frequency is used as carrier and the 40 MHz reference frequency as signal. The mixing product, which is exactly 10 kHz in the locked state, is converted into square waves by comparator IC 5. The 10 kHz signal and the differential signal from the comparator feed the phase comparator, which takes the form of two analog switches IC 7.1/7.2. The downstream interference suppressor with buffer memory IC 7.3/7.4, which is essentially a sampling filter, suppresses the 10 kHz spurious signal in the control voltage.

The control signal delay  $t_{v1}/t_{v2}$ , required to prevent a level change from being passed on during a switching phase of the phase comparator, is generated by flip-flop IC 6.1. The holding times  $t_{v1}$  and  $t_{v2}$  for the buffer memory are supplied by the second flip-flop IC 6.2.

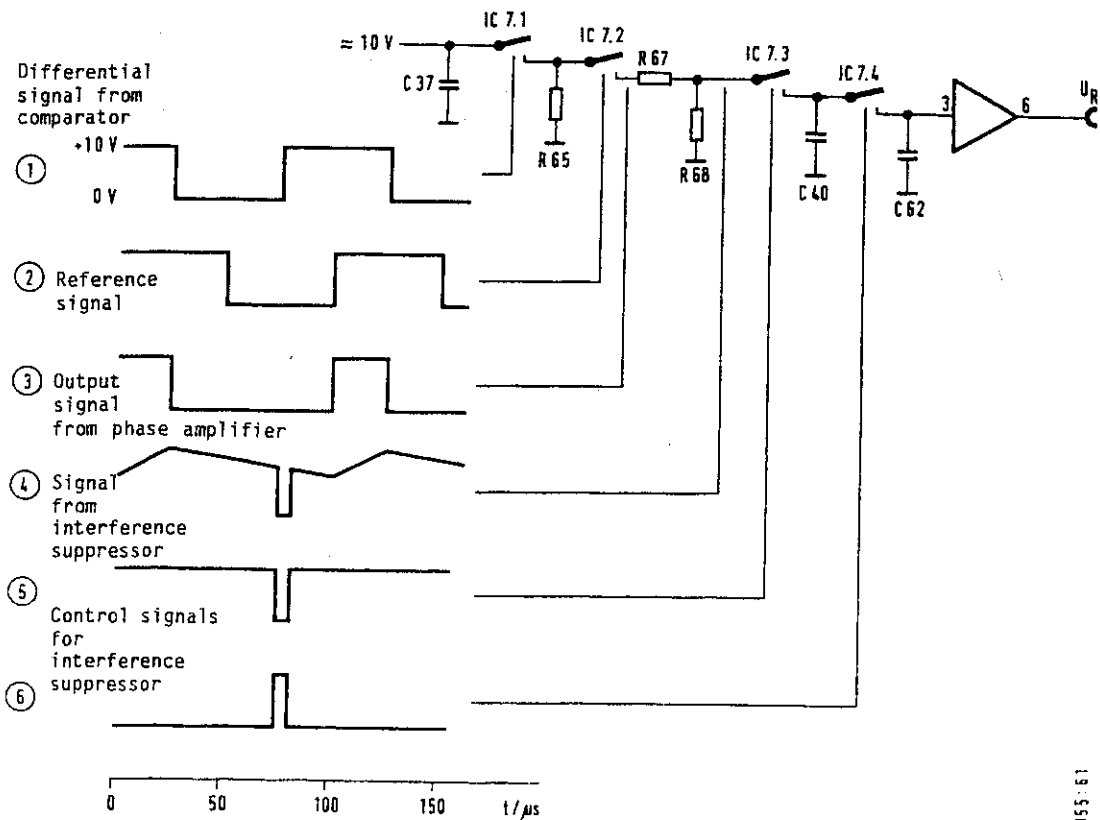


Fig. 9-5 Signals in the phase comparator and interference suppressor with PLL locked

9.2.13 RF CONTROLLER [955-E]

The RF controller contains the latches for storing the data for the pre-amplifier and the 10 kHz band-pass filter (the data are passed to the band-pass filter via the pre-amplifier), as well as the power elements (IC 2, IC 3) for activating the bistable relays in the pre-amplifier.

The relays are triggered via D 4 of Adr. 85H, where D 4 = H => relays TRI-STATE,  
D4 = L => relays assume new positions:

	ADR 84H	ADR 85H
ED0	= H => v = 6.02 dB on	= H => 1.74 kHz on
ED1	= H => v = 9.03 dB on	= H => 3.1 kHz on
ED2	= H => v = 20 dB on	= H => v = 6.85 dB on
ED3	= H => v = 10 dB on	= L! => v = 2 dB on
ED4	= H => a" = 20 dB on	see above
ED5	= H => a' = 20 dB on	X
ED6	= H => calibration	X
ED7	= H => symmetrical	X

Fig. 9-6 Bit assignment on the RF controller

The combinations set for the individual gains are listed in Section 9.2.3. The following additional gains are activated for dBm measurements:

$Z_o$	Activated gains
75 $\Omega$	$g = 9.03$ dB
124 $\Omega$	$g = 6.85$ dB
150 $\Omega$	$g = 6.85$ dB + $g = 6.02$ dB

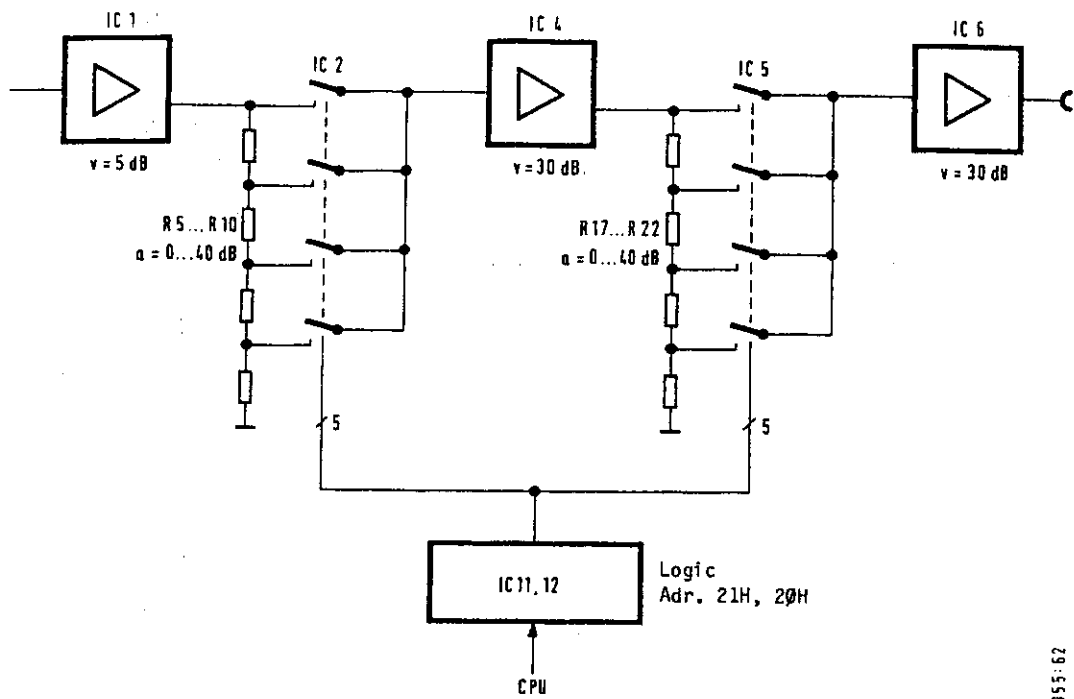
Fig. 9-7 Gains activated for dBm setting

9.2.14 INTERFACE [955-AM1]

The instrument bus lines are re-coded on the interface for the RF controller jack and the external control jack.

9.2.15 IF EVALUATION CIRCUIT (15) [955-J]IF amplifier (15, Page 1)

The IF amplifier represents a multiplying DAC adjustable in 10 dB increments, whose nominal gain can be varied between -13 dB and +67 dB. (A gain of -13 dB is referred to as 0 dB IF gain here and in all descriptions, since a gain of approx. 13 dB is made between mixer 1 and the IF amplifier.) P 1 is used for gain adjustment.



955:62

Fig. 9-8 Principle of the IF selective amplifier

$V_{IF}/dB$	0	10	20	30	40	50	60	70	80
Gain (dB)	-13	-3	+7	+17	+27	+37	+47	+57	+67
Data									
ED0	H	L	L	L	L	L	L	L	L
ED1	L	H	L	L	L	L	L	L	L
ED2	L	L	H	L	L	L	L	L	L
ED3	L	L	L	H	L	L	L	L	L
ED4	L	L	L	L	H	H	H	H	H
ED5	H	H	H	H	H	L	L	L	L
ED6	L	L	L	L	L	H	L	L	L
ED7	L	L	L	L	L	L	H	L	L

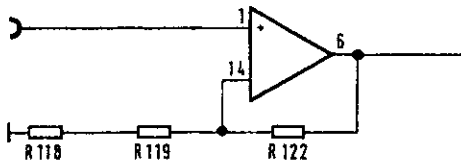
Fig. 9-9 Bit configuration for ADR-20H

V <sub>IF</sub> /dB	0	10	20	30	40	50	60	70	80
Approximate gain (dB)	-13	-3	+7	+17	+27	+37	+47	+57	+67
Data									
ED0	L	L	L	L	L	L	L	H	L
ED1	L	L	L	L	L	L	L	L	H
ED2	X	X	X	X	X	X	X	X	X
ED3	X	X	X	X	X	X	X	X	X
ED4	X	X	X	X	X	X	X	X	X
ED5	X	X	X	X	X	X	X	X	X
ED6	X	X	X	X	X	X	X	X	X
ED7	X	X	X	X	X	X	X	X	X

Fig. 9-10 Bit configuration for ADR-21H

IF WB amplifier, IF output (15, Page 2)

In order to allow "selective" (IF = 10 kHz, switch T 101 "on") or "wideband" (relay contact Rel 102/1-4 closed) rectification of the signals coming from the instrument, these signals are boosted with the aid of the WB operational amplifier IC 105.



955:63

Fig. 9-11 Principle of the IF wideband amplifier

The signal thus amplified feeds the rectifier via divider stage T 109, on the one hand, and is passed, on the other hand, via an output coupling stage (T 105) with 0 dBm/75 Ω\* to the IF output jack Bu 104 [35] on the rear of the instrument. This output is wideband signal in "wideband" mode. C 120 is used for DC decoupling.

\* (for 0 dB meter reading/20 dB scale)

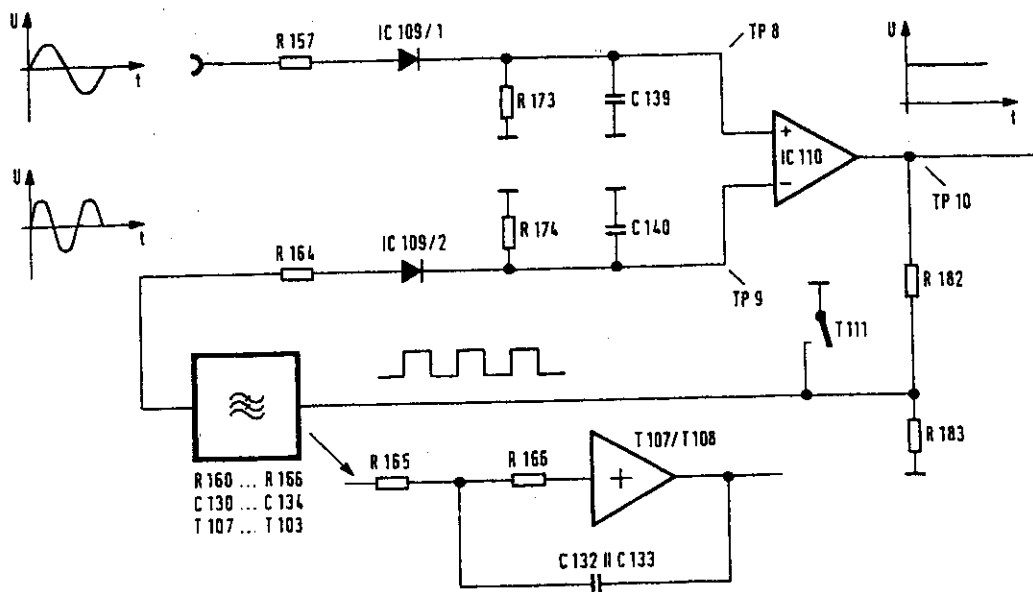
Rectifier (15, Page 2)

Fig. 9-12 Principle of the rectifier

An amplifying wideband rectifier is built up around IC 110. The incoming signal is quasi-rms weighted. Feeding back the chopped DC output voltage and comparing the DC voltage of two identically structured networks largely eliminates the temperature drift of the actual rectifier diodes (IC 109/Pt. 1-2), also improving the linearity.

If a signal is now applied, it passes from the IF WB amplifier and the decoupling stage (T 109) to the RC diode combination (IC 109/1-2, R 173, C 139). TP 6 is charged up to the rms value of the AC voltage signal, TP 10 being charged accordingly to a proportional DC voltage value. T 111 chops the now divided DC voltage at a clock frequency of 32.6 kHz and feeds back the square-wave signal via a low-pass filter to an identically structured second rectifier (IC 109/5-6, R 174, C 140).

The output voltage of IC 110 is then adjusted until the same DC voltages are present at TP 8 and TP 9.

Signal detector

If the AC voltage amplitude at IC 105/8 corresponding to -15 dB on the meter is exceeded, flip-flop IC 107 is triggered via comparator IC 106/1 and amplifier IC 106/2 and the signal detector LED on the meter illuminated via the signal detector line.

DC amplifier (15, Page 3)

The rectified voltage is amplified in IC 201 in such a way that 5.7 V is present at TP 12 for a 0 dB input signal (+20 dB/15 TP 6). IC 207/210 makes up a digitally adjustable amplifier whose gain can be adjusted in mB increments between -1.25 and +1.25 dB.

IC 202 is a switchable amplifier stage with a nominal gain of 0/16 dB. The amplifier stage consisting of IC 211/212 is used to set 0.1 and 1 dB increments in the range between 0 and 11 dB gain.

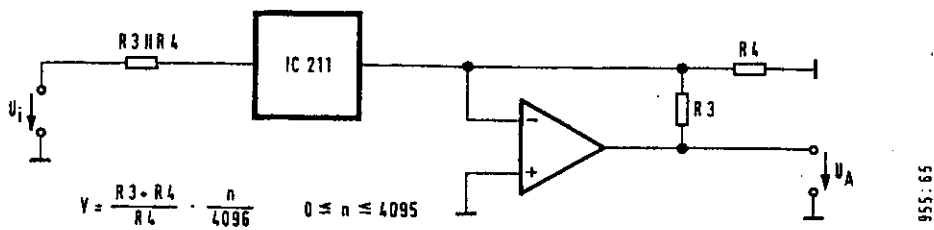


Fig. 9-13 Principle of the 0.1 dB increment amplifier

Logarithmizer

The logarithmizer (IC 225/226) is used to linearize the voltage for the linear scale (+ 1.25 dB) and/or to produce the voltage for the ADC.

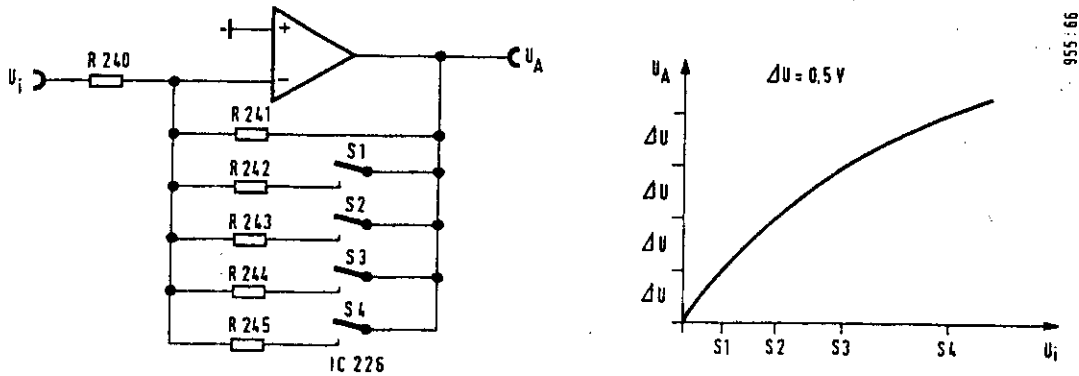


Fig. 9-14 Principle of the logarithmizer

The input voltage is linearized by switches S1 ... S4 being switched on with increasing input voltage (=> increasing output voltage), this causing the output voltage to follow the relationship  $U_A [V] = U_i [dB]$  due to flattening of the straight line. The following applies:  $\Delta U_A$  of 0.1 V  $\approx \Delta U_i$  of 0.1 dB.

Shift/expansion amplifier

In order to condition the voltage for 0 dB (3.97 V/15 TP 15) and make it usable for the expanded display, the voltage is expanded by a factor of 4 in IC 230 ( $V = R 264/R 261 \parallel R 262$ ) and shifted in such a way that 2.5 V are present at the output of IC 230 (Pin 6) for a 0 dB meter reading.

The voltage for the ADC is derived via the voltage divider R 266, R 263. (0 V is present at 15 TP 17 for 0 dB,  $\Delta U = \pm 0.1$  V for  $\pm 0.1$  dB.) Depending on the desired mode, the DC voltage is applied to IC 234 via the analog switches in IC 234.

## 4-bit ADC:

Mode	IC 233/1	IC 233/2	IC 233/3	IC 233/4
Unexpanded	off	on	X	X
Expanded	on	off	X	X
DGTL	X	X	off	on
Instrument off	X	X	off	on
Instrument on	X	X	on	off

During Autoset, the ADC built up around IC 208 provides the CPU with the information on the direction in which the dividers are to be adjusted.

Level on instrument	Voltage at 15 TP 15	Level at IC 209			
		Pin 10	Pin 6	Pin 4	Pin 2
$x < -20$	$x < 0.397$ V	L	L	L	L
$-20 < x < -10$	$0.397$ V $< x < 1.25$ V	L	L	L	H
$-10 < x < -1$	$1.25$ V $< x < 3.54$ V	L	L	H	H
$-1 < x < +1$	$3.54$ V $< x < 4.45$ V	L	H	H	H
$x > +1$	$> 4.45$ V	H	H	H	H

Demodulator

The function of the demodulator is to convert a CF speech channel in single-sideband position, to the suppressed carrier of which the SPM-15 is tuned, from the 10 kHz IF level to the LF-level. Demodulation is possible both from the inverted position (lower sideband) and from the upright position (upper sideband). With an IF level of 0 dBm/75  $\Omega$  (= 0 dB meter reading), the signal is available at the demodulator output (Bu 401) with 0 dB at  $Z_o = Z_{out} = 600 \Omega$ . The signal can be monitored via the built-in loudspeaker.

Mixer section

The IF level is converted by a balanced switching mixer. IC 403/1 amplifies the IF signal by approx. 13.5 dB (level boosting, mixer attenuation compensation). The signal phase is rotated through 180° at switch IC 402/2, but the signal at switch IC 404/1 is in proper phase. The outputs of IC 405/1 alternately close the switches in time with the sub-carrier clock. The mixing products of the mixer are present at C 407. P 401 is used to adjust the total gain. The offset of IC 403/2 is adapted to that of IC 403/1 in order to compensate for the residual carrier, which primarily results from the offset differences between IC 403/1 and IC 403/2.



Low-pass filter, 3.4 kHz

The frequencies resulting from the difference between the two input signals of the mixer are used as the wanted signal. In order to ensure adequate attenuation of all other mixing products, as well as the residual signal and residual carrier, the attenuation requirements for the low-pass filter are 20 dB at 8 kHz and 50 dB at 12 kHz. Since a CF channel has a bandwidth of 0.3 - 3.4 kHz, a pass band of 3.4 kHz is required for the low-pass filter. These requirements are fulfilled by the 5th order Chebyshev low-pass filter (IC 407).

Amplifier stage

An additional 16 dB gain is required in IC 408/1 in order to obtain a level of 0 dB at 0 dBm IF level (Bu 103) at the test output with  $Z_o = Z_{out} = 600 \Omega$ .

Monitoring amplifier

The volume can be adjusted with potentiometer P 403. Transistors T 403 and T 404 are connected downstream of the operational amplifier IC 17 as power output stage. The gain-determining negative feedback (R 437, R 439) is tapped at the output of the transistor stage. The output stage transistors are operated on +5 V (maximum output power at 8  $\Omega$  approx. 0.4 W) in order to minimize the power loss. An AC voltage  $> 5 V_{pp}$  is required at the output of IC 408/2 in order to be able to drive the output stage transistors to full power. IC 408/2 is supplied with  $\pm 12 V$  for this reason.

Carrier frequency generation

Carrier frequencies of 8.15 kHz for the upright position and 11.85 kHz for the inverted position are required for converting 10 kHz (IF centre frequency) to 1.85 kHz. The frequencies required are generated by dividing the frequencies of higher-frequency crystal oscillators. This produces a very good  $k_2$  harmonic ratio, allowing better suppression of undesired mixing products.

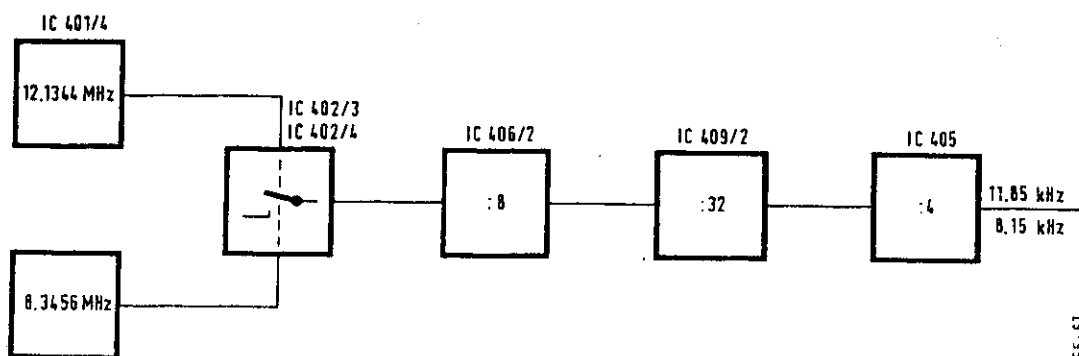


Fig. 9-15 Principle of frequency generation for the demodulator

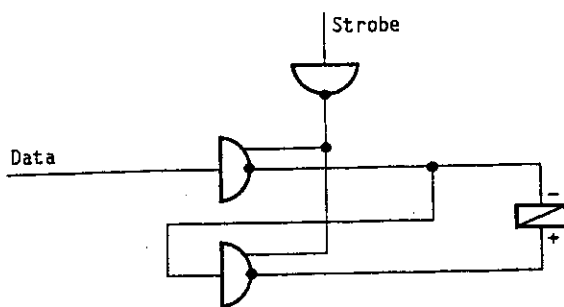
Sections 9.2.16 to 9.2.18 intentionally omitted.

### 9.2.19 DISPLAY LOGIC

#### Input section controller

The input section controller switches the bistable relays in the input section. The data stored at address 41H (refer to Fig. 9-16 for bit configuration) are passed via the power drivers IC 51/52 to the relays in the input section. The relays are activated by IC 51/52 switching to the active state (address 40H, ED4 at LOW). If the relays are not activated, IC 51/52 are set to TRI-STATE.

Principle:



99:556

$R_i$ [ $\Omega$ ]	ADR 41H							
	ED0	ED1	ED2	ED3	ED4	ED5	ED6	ED7
75	L	L	L	L	L	H	X	X
124	H	L	L	L	H	L	X	X
150	H	L	L	L	L	H	X	X
600	L	L	H	H	L	L	X	X
75 $\infty$	L	L	L	L	L	L	X	X
124 $\infty$	L	L	L	L	H	L	X	X
150 $\infty$	L	L	L	L	H	L	X	X
600 $\infty$	L	L	L	H	L	L	X	X

Fig. 9-16 Bit configuration for input section

#### Frequency offset (voltage/frequency converter)

If the frequency offset is not operated, the outputs of the two comparators (IC 92/Pin 1, 7) are at LOW. C 25 is charged via R 65 when the frequency switch is operated. If a value now exceeds or drops below one of the comparator thresholds, the corresponding output switches to HIGH and triggers the related flip-flop (IC 80). The flip-flop is thus triggered via IC 56, triggering a frequency interrupt. At the same time, the frequency counter is started via IC 57. The UP-DOWN information is obtained via IC 80/1. The counter is clocked with the frequency obtained in IC 60. The counter reading can be read out by activating addresses 42H, 43H.

ADC

The DC voltage supplied by the IF evaluation circuit is converted into a 3 1/2-digit BCD value in the ADC (IC 10), although only 2 1/2 digits are evaluated. The data are output in serial form and stored in IC 70/IC 71 after level conversion by IC 75, whereupon they can be loaded in parallel by the computer via addresses 40H/41H.

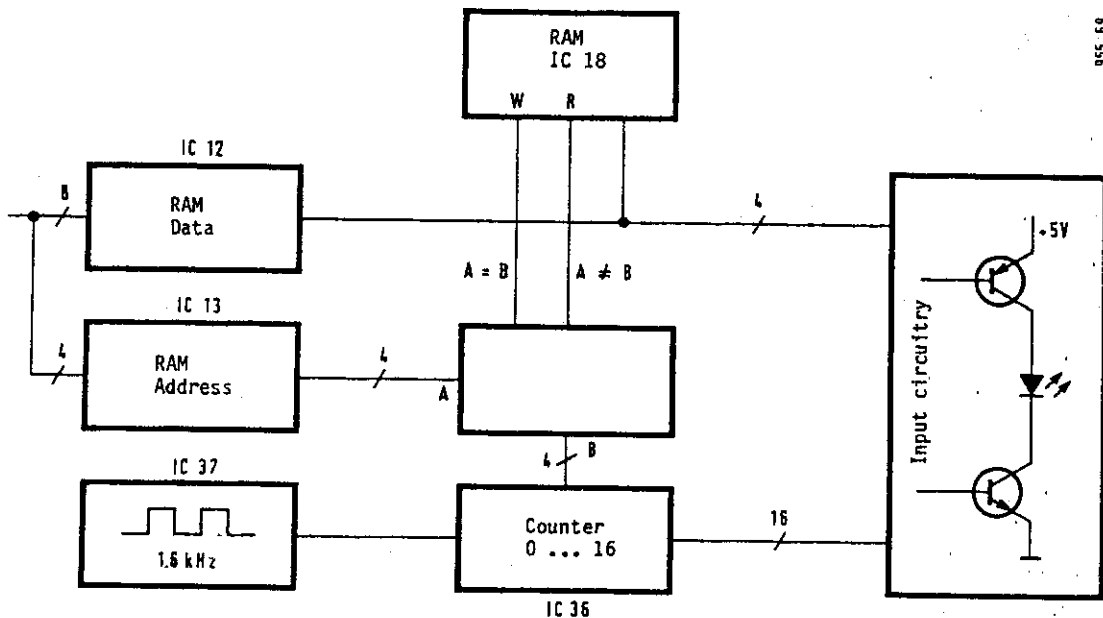
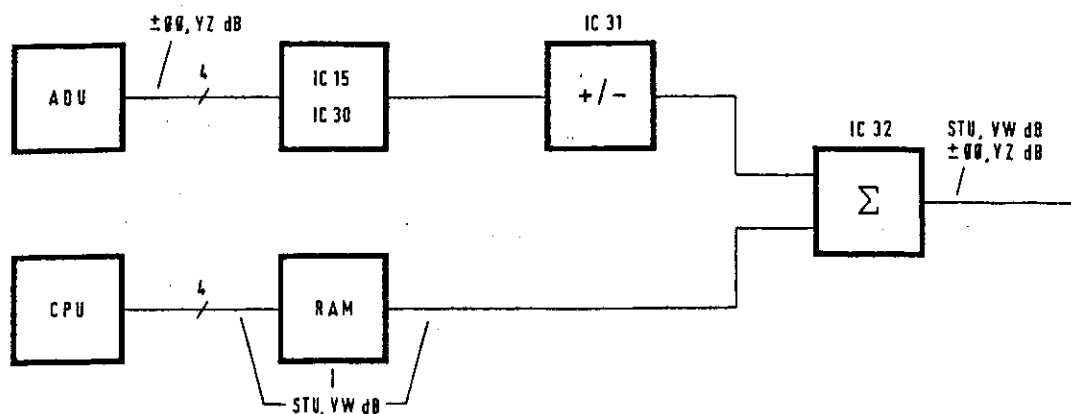
RAM controller

Fig. 9-17 Principle of the RAM controller

The computer stores the data of the LCD-digits and LEDs to be displayed in the RAM. The RAM controller is responsible for the cyclic reading of the data from the RAM and, when necessary, writing new data into the RAM. The clock generated in IC 37 controls counter IC 36. The latter outputs a HEX code between 0 ... 0FH in cyclic form, at the same time controlling the digit drivers on the input circuitry (20 IC 15), the equality circuit IC 17/19 and the address decoder of the RAM. If only the RAM address stored in ADR 45H (IC 13) is identical with that currently output by the counter, the RAM is switched from read to write (IC 18, Pin 17 goes to LOW, Pin 18 to HIGH) via the chain IC 19/16/25, the outputs of IC 12 simultaneously switching from TRI-STATE to active, whereupon new data are written into the RAM. A further precondition for triggering the above operation is that FF IC 16/1 has previously been set by the computer via the DAV (DATA Valid) signal.

Offsetting the level display

Whereas the frequency display and LED activation are affected directly in the data stored in the RAM, the level is offset against the ADC value if output IC 9, Pin 5 "DGTL" is at HIGH. For this purpose, the data DA0 ... DA3, which are intended for the level display, are no longer supplied to the input circuitry via IC 21, but offset in accordance with the following simplified circuit diagram and passed to the input circuitry via IC 33:



955-70

Fig. 9-18 Principle of offsetting for ADC and computer value for "DGTL" = HIGH

The decision as to +/- ADC value is made by the MSB (most significant bit of the ADC) and the bit configuration of D4 ... D7 in IC 9. During normal operation, IC 9 Pin 5 is at LOW, since the entire display value is calculated by the software even in DGTL mode.

#### 9.2.20 INPUT CIRCUITRY (20) [955-B]

##### Keyboard logic

The keyboard logic is a W&G standard circuit. The key columns are enabled by applying LOW levels on the data line in address 42H. If a key is pressed, the output of IC 23/1 goes to L and triggers the key debouncer (IC 21/22). Once the key stops bouncing, the "key" signalling line goes to H and line RST 6.5 goes to HIGH via the OR circuit (IC 12), thus triggering an interrupt on the CPU (circuit diagram 21). G1 1 is necessary, since RST 6.5 interrupts are also possible from the IEC bus interface.

##### Level switch and logic

The level switch consists of three controlled opto-couplers (T 100 ... T 102, G1 100 ... G1 102). If one of the phototransistors receives a pulse, the comparators are triggered (IC 100), two opto-couplers being connected through in each case.

If the rotary switch is operated, the "level switch" line goes to HIGH and triggers an interrupt, this interrupt being stored in IC 101/ED3 (ADR 46H) at the same time. The CPU initiates the corresponding responses (level adjustments) on the basis of the changed bit combination (IC 101, ED0 ... ED3).

Power section for LED display (also refer to 9.2.19: RAM controller)

The data (DA0 ... DA3) supplied by the display logic for the seven-segment displays (IC 70 ... IC 76, IC 80 ... IC 84) are re-coded into 7 segment code data for the individual digits in the seven-segment decoder (IC 60). They pass via IC 61 to the controllable constant current sources (IC 53 ... IC 55). These control the segments of the corresponding displays via the segment power drivers (T 1 ... T 9). The corresponding displays (digits) are selected cyclically via the address decoder IC 15 (controlled by 19 IC 36) and drivers IC 50, 65, 66. The LEDs are activated in the same way, but the data pass from the display logic (DA0 ... DA7) directly via IC 63 to the controllable constant current sources.

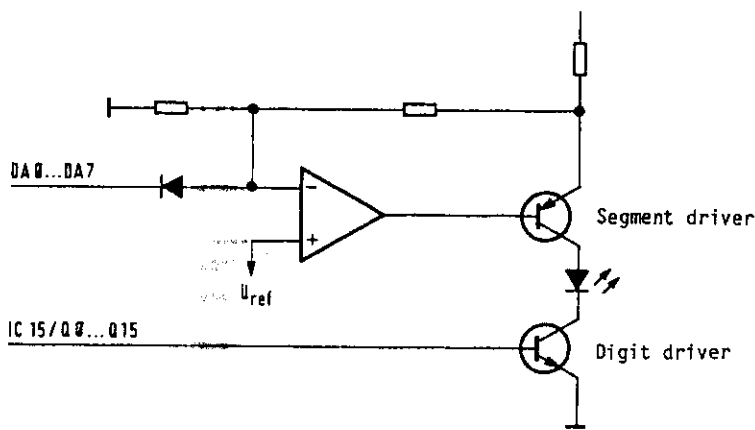


Fig. 9-19 Simplified circuit diagram of the power output stage

DAC

The DAC built up around IC 64 controls the current drawn from the power supply, keeping it constant irrespective of the number of illuminated segments, the overall display thus representing a constant load on the power supply.

9.2.21 CPU BOARD [955-F1]

The CPU board controls the complete instrument.

The CPU board is subdivided into functional groups:

- Voltage monitor
- Computer core
- Instrument bus matching
- 00-15 digital control.

The tasks of the voltage monitor are as follows:

- Controlled power-up of the computer core when the instrument is switched on.
- When the instrument is switched on: to switch off the computer core under program control during operating pauses in ANLG mode.
- When the instrument is switched on: re-activating the computer core by means of a front panel interrupt following a service request.

- Output of a TRAP signal when the instrument is switched off.
- Initialization of the instrument with a "RESET key" via the TRAP signal path.
- Storage of the "line ON/OFF" and "RAM operating voltage good/bad" statuses.

The heart of the voltage monitor is the flip-flop consisting of transistors IC 32/2, IC 32/3. This flip-flop goes into the normal "OFF" position when the operating voltage is applied.

The output of the flip-flop is passed to the computer core as RESET signal and as  $V_{CC}$  ON/OFF signal via a divider stage IC 32/1, IC 34/1, IC 34/2 and two delay stages IC 30/1, IC 30/2.

The flip-flop described can be controlled from the line side by the INHIBIT signal via IC 30/4, IC 30/3, as well as from the front panel and from the "Reset" key via C 4/R 61. The flip-flop can be set to the "ON" state via these signal paths. The computer can also control the flip-flop via IC 19, IC 35, T 2, T 4, the "OFF" status being achievable in this case.

The event "line OFF" is reported to the computer as TRAP via the INHIBIT signal IC 30/4, IC 30/3, IC 29/4, IC 29/3, IC 29/2.

The two flip-flops formed by T 5/T 6 and T 8/T 9 also have a normal position when the operating voltage is applied. They detect a failure of the 5 V operating voltage and/or the RAM operating voltage. They can be polled by the computer via AD4, AD5 and set to the inverted position via T 7.

The computer core consists of the usual components: processor, memory, address decoder, driver stage for "memory-mapped" I/O gates (IC 14) and a circuit for inserting WAIT states for I/O commands (IC 23/1, IC 23/2, IC 26/1).

The computer core is switched off during the operating pauses in ANLG mode in order to reduce the current consumption (important for battery operation). The aforementioned voltage monitor performs this program-controlled de-energization and re-energization. No de-energization takes place in DGTL mode, since a constant exchange of data is necessary in this case.

Instrument bus matching is necessary because all bus signals operate with 10 V CMOS thresholds, as opposed to the 5 V TTL thresholds of the computer core. An 8-bit wide, bidirectional level shifter is inserted in the data bus (IC 10).

The address and control buses pass via unidirectional level shifters IC 4/1, IC 4/2, IC 5, R 19, R 20, R 22, R 23, R 46, R 62.

The RAM IC 2 was installed to allow testing of the instrument bus in a self-test routine.

OD-15 digital control essentially consists of a stationary application of 7 BCD signals, any changes in which must take place synchronously with the operations in the OD-15.

The setting information is first stored in memories IC 43, IC 45, IC 47, IC 49 in byte-serial form. The strobe to IC 49 additionally triggers a transfer circuit (IC 41) which activates memories IC 44, IC 46, IC 48, IC 50. The data change signal from the OD-15 causes byte-parallel transfer of the setting information to the final memories IC 44-IC 50.

Further information can be found in Section 9.3 (General software description), where the various versions are also listed (9.3.11).

9.2.22 10 kHz BAND-PASS FILTER/25 Hz MECH. [955-K]

This 10 kHz band-pass filter is connected downstream of the 3.1 kHz band-pass filter and thus allows measurement of closely adjacent carriers. If the line "b = 25 Hz" is LOW, transistors T 2 and T 7 are connected through, whereas T 1 and T 6 are off, i.e. the filter is bypassed. If "b = 25 Hz" is HIGH, the filter is switched into the signal path. It consists of two mechanical filters. The signal is amplified after the first filter module in order to compensate for the losses in the first filter. R 10/R 14 compensate for the typical temperature response of the overall filter. The signal is again amplified downstream of the second filter module (F1 2) in order to compensate for the losses in the second filter module. The band-pass filter in the feedback path causes selective amplification of the 10 kHz signal.

9.2.23 TRACKING GENERATOR [955-AN], [955-AO], [955-AP], [955-AH], [955-AK], Series A ... D

Filtering, DC converter [955-AP], [955-AH]

A voltage of +15 V is necessary to generate the high output levels. It is obtained in the DC converter module IC 501.

Filter 1, filter 2 [955-AN], [955-AO]

The purpose of the low-pass filter with a cut-off frequency of 12 MHz is to allow the signal supplied by the calibrating mixer to pass unattenuated in the useful frequency band and to attenuate the interference lines coming from the calibrating mixer in the other frequency range.

Amplifier stages [955-AK]

Amplifier stage 1:

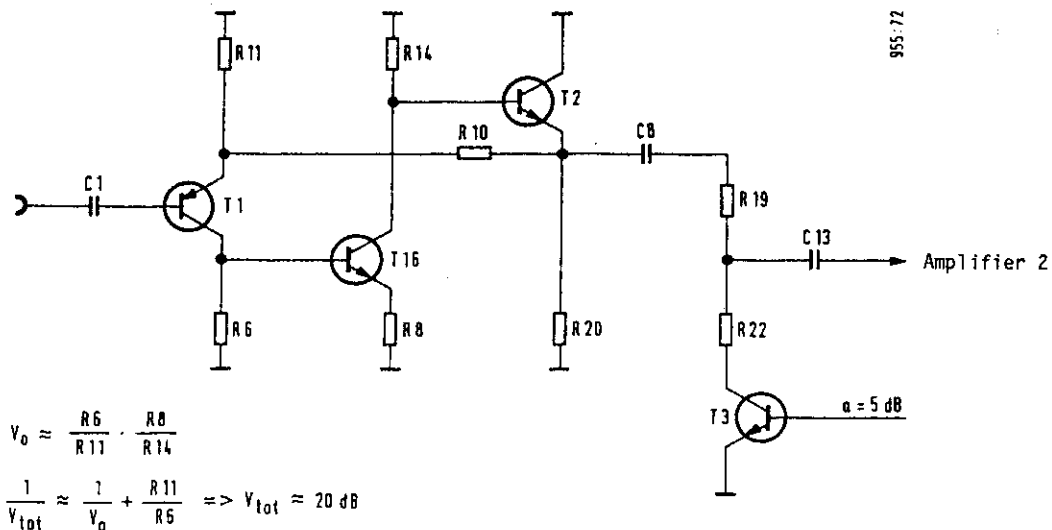
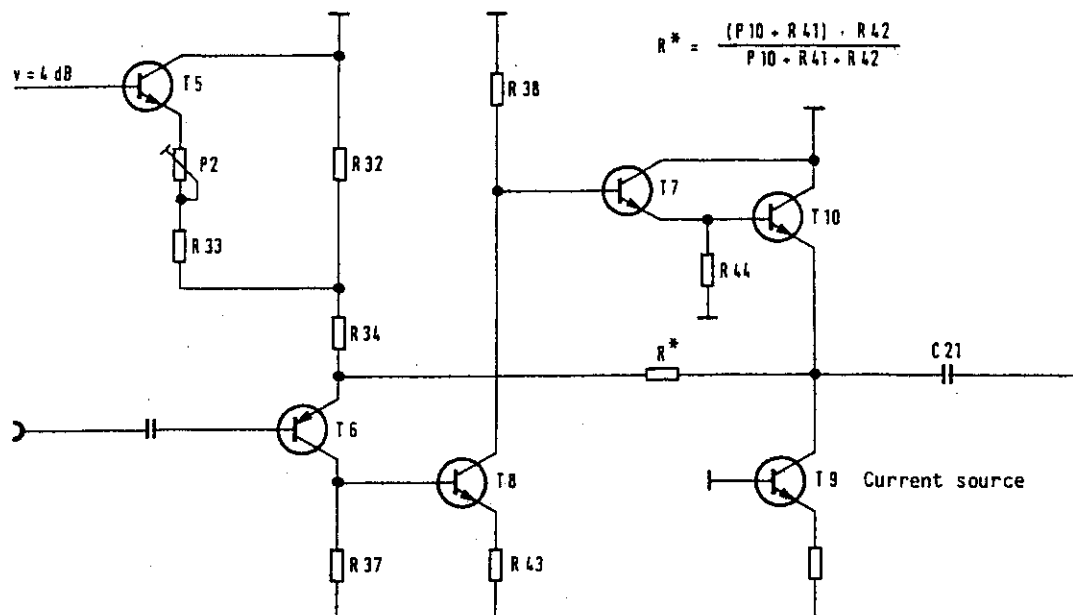


Fig. 9-20 Simplified AC circuit diagram, amplifier stage 1

Amplifier stage 1 is a multi-stage, negative-feedback amplifier. The gain is largely determined by R 10 and R 11. If T 3 is switched on, the output signal is attenuated by 5 dB (R 22/R 19 + R 22).

Amplifier stage 2:



$$V_o \approx \frac{R_{37}}{R_{34} + R_{32}} \cdot \frac{R_{38}}{R_{43}} \quad (v = 4 \text{ dB LOW})$$

$$\frac{1}{V_{tot}} = \frac{1}{V_o} \cdot \frac{R_{32} + R_{34}}{R_{32} + R_{34} + R^*} \Rightarrow V_{tot} \approx 9 \text{ dB}$$

955:73

Fig. 9-21 Simplified AC circuit diagram, amplifier stage 2

Amplifier stage 2 is a negative-feedback, multi-stage amplifier with output coupling stage (T 7, T 10). T 9 forms the constant current source for the output coupling stage. If T 5 is switched on by the line from IC 7 Pin 9, the gain of this stage is increased by 4 dB.



Amplifier stage 3:

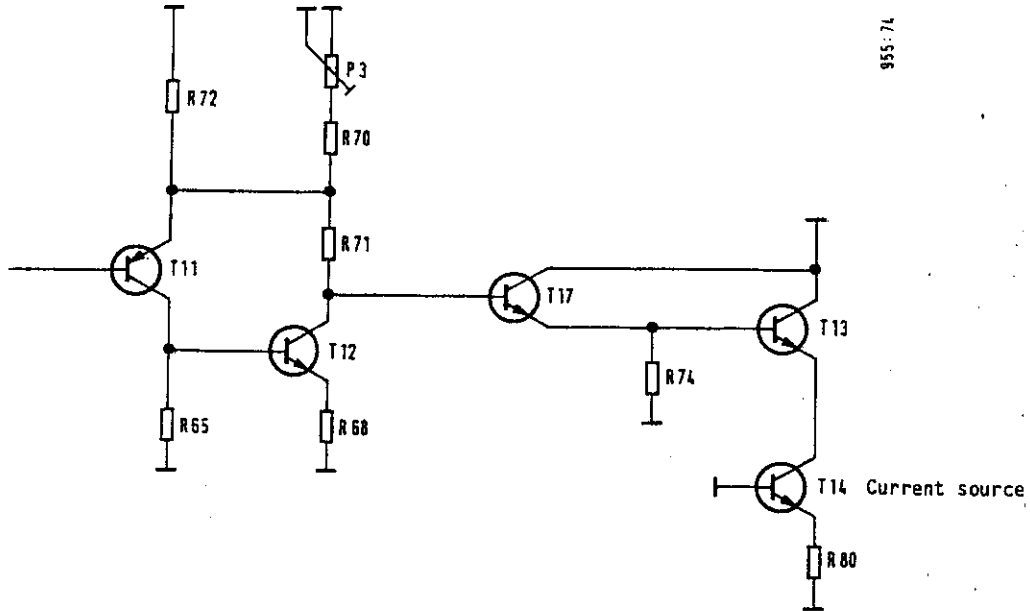


Fig. 9-22 Simplified AC circuit diagram, amplifier stage 3

$$V_o \approx \frac{R_{65}}{R^* \parallel R_{71}} \times \frac{R_{71} + R^*}{R_{68}} \quad V_{St} \approx 1 + \frac{R_{65} \times R_{71}}{(R_{65} + R_{68}) \times R^*} \quad R^* = \frac{(P3 + R_{70}) \times R_{72}}{R_{70} + R_{72} + P3}$$

$$\frac{1}{V_{tot}} = \frac{1}{V_o} + \frac{1}{V_{St}} \Rightarrow V_{tot} \approx 8 \text{ dB}$$

Amplifier stage 3 is also a multi-stage, negative-feedback amplifier with a bootstrapped output stage.

#### Fine level control

A controllable DC voltage (0 ... -1,6 V) must be output to the calibrating mixer via jack Bu 4 to allow fine control of the PSE level. Consequently, the level at Bu 5 is attenuated between 0 dB ... 6,5 dB. The voltage obtained at G1 3 is fed to the D/A converter (IC 4) via IC 6 for this purpose. The voltage is then stepped down by the computer to give the desired output level.

The following applies:  $A \text{ [dB]} = 20 \times \log \left( 1 - 0,5533 \frac{N}{4096} \right)$

### 9.3 GENERAL SOFTWARE DESCRIPTION

#### 9.3.1 PROGRAM SEQUENCE AT POWER-UP

The RAM contents are checked first when the SPM-15 is powered up; if the RAM contents have been lost, the RAM is initialized. After this, all I/O gates are initialized and set according to the current RAM contents. If the IEC BUS option is not installed, the CPU switches itself off after completing initialization.

#### 9.3.2 INPUT METHOD

##### 9.3.2.1 Input method for manual operation

Every input is made on an interrupt basis, although the CPU is first switched on before the interrupt is processed. The input programs perform the following tasks:

- Limit monitoring
- Checking the compatibility with the currently valid instrument status
- Setting and resetting of flags
- Copying the preliminary table contents into the main table

Thereafter, the setting program related to each key group is called up and processed.

Only in the digital program does the system remain in the corresponding processing program. The measurements and settings are updated constantly, the interrupt being permissible at any time.

The system quits all other setting programs after their execution and the computer core is deactivated. If an IEC BUS is present, the system skips to a HALT routine.

##### 9.3.2.2 Input method for IEC BUS operation

In the case of IEC BUS operation, the computer jumps out of the HALT routine; after execution of the general IEC BUS program, the preliminary table is manipulated and the input data checked for validity. Thereafter, an identifier is set for every program in order to convert all changes made in the preliminary table into physical actions, i.e. adjustments in the instrument, after completion of all inputs.

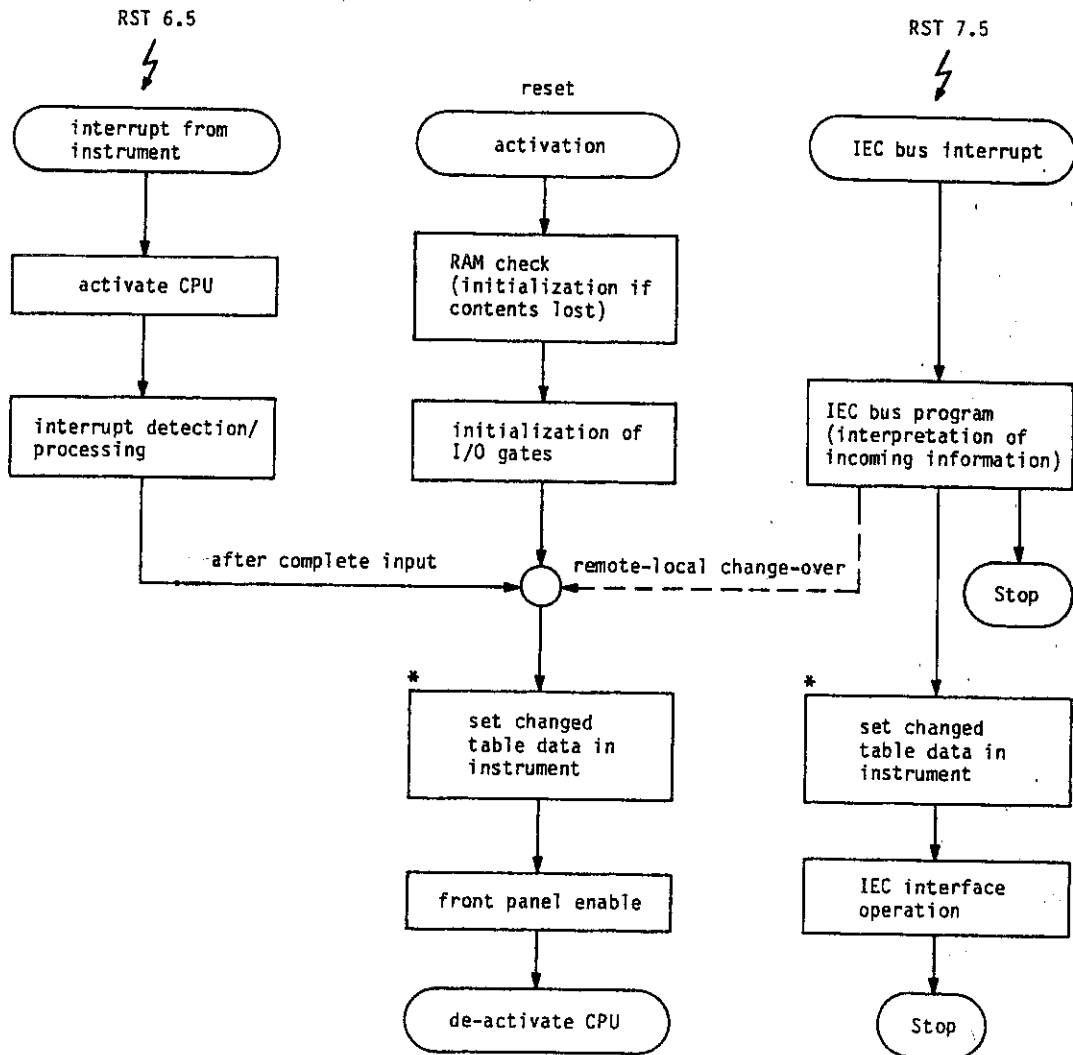


Fig. 9-23 Software, general program sequence

\* Only that program section is executed whose related table data have been changed!

### 9.3.3 MEMORY ASSIGNMENT

#### 9.3.3.1 Memory assignment, CPU [955-F1] (32 K)

Address in hexadecimal	Function
0000 to 7FFF	Program ROM
8000 to 87FF	Data RAM
C000 to C003	Input gates on CPU
8700 to 87FF	Stack

#### 9.3.3.2 Memory assignment, CPU-F1, modified (48 K)

Address in hexadecimal	Function
0000 to BFFF	Program ROM
E000 to FFFF	Data RAM
C000 to C003	Input gates on CPU
E700 to E7FF	Stack

### 9.3.4 I/O ASSIGNMENT

Refer to Section 9.4 for the precise assignments of the individual gates.

Address in hexadecimal	Assembly
READ 26	DC amplifier, 4 bit ADC, for DC level
WRITE 20, 21	IF amplification, 25 Hz filter
WRITE 22	IF amplifier control
WRITE 23, 24	DC amplification, 0.1 dB increments
WRITE 25	Calibrating controller
WRITE 27	Display instrument, 15 dB amplifier
WRITE 40	Frequency control
WRITE 41	Input section
WRITE 42	Keyboard columns
WRITE 44	Data for front panel (display logic)
WRITE 45	Address for RAM on display logic
WRITE 46	Display logic status
WRITE 47	Front panel
READ 40, 41	ADC poll
READ 42, 43	Delta frequency poll
READ 44	Interrupt status poll
READ 45	Keyboard line poll
READ 46	Level switch poll
WRITE 80, 81, 82, 83	Synthesizer data
WRITE 1E, 1D, 1F	PSE activation

9.3.5 ANALOG MEASURING PROGRAMS

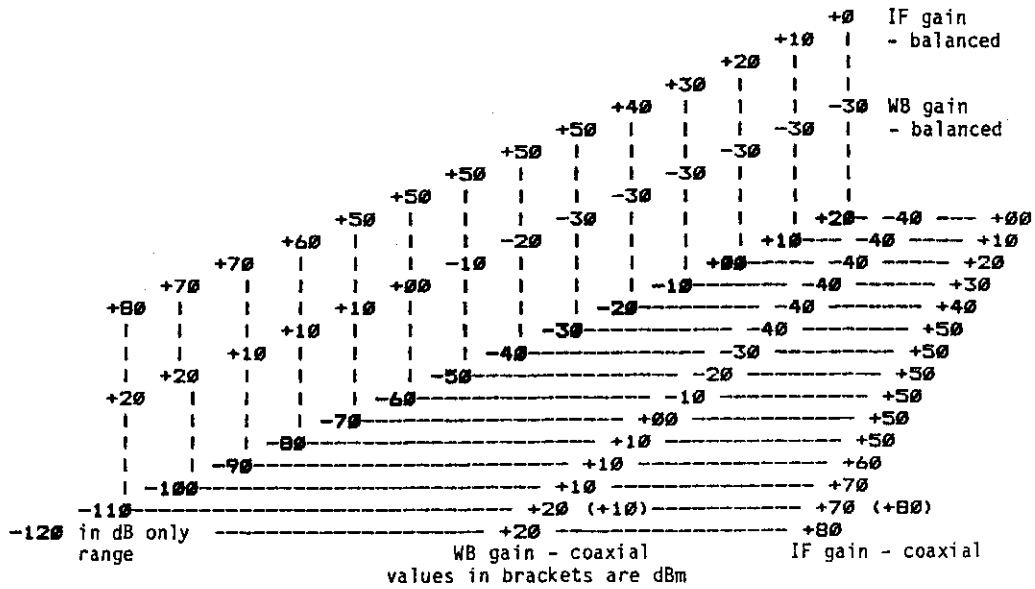
For the analog measuring programs, the instrument is set in accordance with given divider settings, the currently valid measuring range being displayed in the level display in accordance with the selected display type (dB/dBm-ABS/ABS-REF). The display applies for 0 dB display on the instrument.

SELECTIVE LEVEL MEASUREMENT

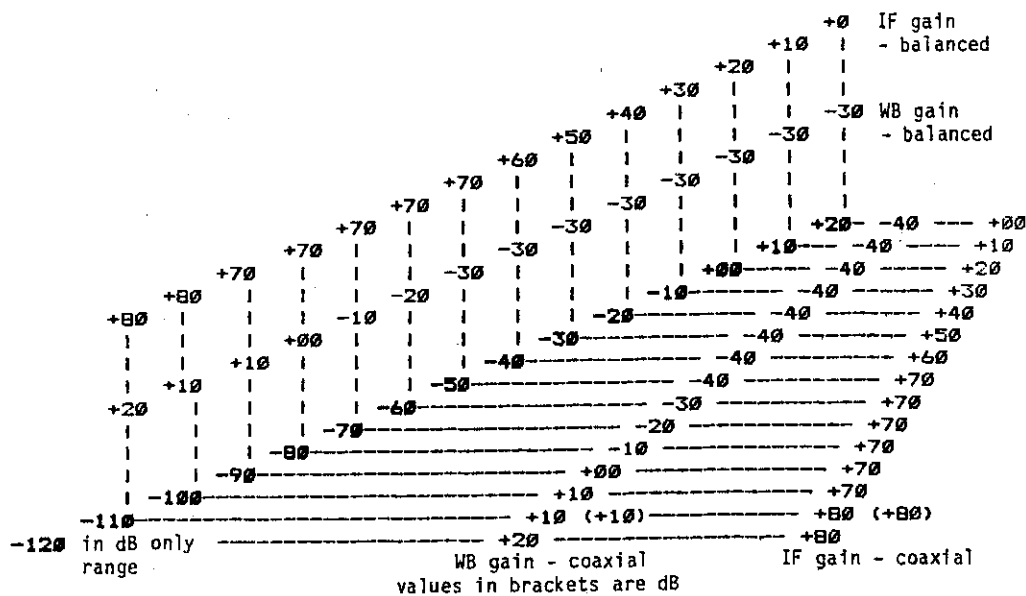
Scale 1 dB, 10 dB, demodulator operation

Mode	Activation
Scale 1 dB	Low-noise
Scale 10 dB	Low-distortion
Demodulator	Normal
Search	Normal

9.3.5.1 Level diagram for selective level measurement and low-noise modulation



9.3.5.2 Level diagram for selective measurement and low-distortion modulation



9.3.5.3 Program sequence for analog selective level measurement and ABS mode

Make program-specific basic settings (e.g. select correct scale)	
Set WB section as per specified measuring program	
Calculate and set IF gain	
Calculate and set DC gain	DC gain = -MB - WB gain - IF gain - 20

9.3.5.4 Program sequence for analog selective level measurement and ABS-REF mode

Make program-specific settings as per preselected mode	
Set WB section as per specified measuring program	
IS 10 dB scale selected?	
Yes	No
IF gain = -MB - WB gain - 30	IF gain = -MB - WB gain - 20
Calculate and set DC gain	

Since the additional signal required for 0 dB display on the meter is supplied by the DC amplifier in the ABS-REF mode and since this only amplifies, the IF gain is set 10 dB lower on the 10 dB scale, since the 1 dB, 0.1 dB and mB values have to set in the DC amplifier for correction.

With the 1 dB scale, the IF is again set normally, since only the 0.1 dB and the mB values have to be set in the DC amplifier for correction.

Example:	MB = -10 dB	10 dB scale	Low-noise modulation
	Reference level = -12.35 dB		Coaxial Input
	WB gain as per table -40 dB		
	IF gain	+20 dB	Calculated from table value -10 dB
	DC gain	+2,35 dB	Calculated from X.YZ value of reference level

Example:	MB = -23 dB	1 dB scale	Low-distortion modulation
	Reference level = -24.67 dB		Coaxial Input
	WB gain as per table -40 dB		
	IF gain as per table +20 dB		
	DC gain	+3.67 dB	Calculated from X.00 value of MB and 0.YZ value of reference level

9.3.6 ANALOG WIDEBAND MEASUREMENT

For analog wideband measurement, the signal present at the input in wideband form is passed directly to the rectifier via the pre-amplifier, meaning that only the wideband dividers and/or amplifiers and the DC amplifier can be changed in this program.

Level diagram for wideband level measurement in dB, 20 dB scale:

Input level	Coaxial		Balanced	
	WB gain	DC gain	WB gain	DC gain
+20	-40	00	-30	00
+10	-30	00	-20	00
+00	-20	00	-10	00
-10	-10	00	+0	00
-20	+00	00	+10	00
-30	+10	00	+19	+1
-40	+19	+1	+19	+11
-50	+19	+1		

### 9.3.7 DIGITAL MEASURING PROGRAM

#### 9.3.7.1 Digital measuring program - Calibration off

In the digital measuring program, the measurement result is displayed in digital form, the analog meter being switched off. Alignment is performed in accordance with the low-noise level diagram. Demodulator operation and searching are not possible.

Alignment program for digital measurement and low-noise modulation
Align WB gain and IF gain as per level diagram (low-noise) until level in window $-10 \text{ dB} \leq X \leq 0 \text{ dB}$
Align DC gain until level in ADC range $-1 \text{ dB} \leq X \leq +1 \text{ dB}$
Take samples at the ADC in accordance with the filter and level present
Form and display mean value

#### 9.3.7.2 Digital program - Calibration on

Alignment program for digital measurement and modulation with linearity check
If $-40 \text{ dB} \leq \text{WB gain} \leq +20 \text{ dB}$
Change WB gain until level on mixer 1 = $-40 \text{ dB}$
If $0 \text{ dB} \leq \text{IF gain} \leq +80 \text{ dB}$
Change IF gain until level on instrument $-20 \text{ dB} \leq X \leq -10 \text{ dB}$
Increase WB gain by 10 dB, reduce IF gain by 10 dB
Check modulation
If pre-amplifier produces distortion
Set WB gain and IF gain to last setting before distortion
Align DC gain until level in ADC range $-1 \text{ dB} \leq X \leq +1 \text{ dB}$
Take samples at the ADC in accordance with the filter and level present
Form and display mean value



9.3.8 "FULL RANGE" SEARCH

Search
If $F_{min} \leq F_{current} \leq F_{max}$
Display software step + frequency until level above specified threshold
Switch on 25 Hz filter
If $F_{min} \leq F_{current} \leq F_{max}$
Display software step + frequency until level above specified threshold
Quit search program

9.3.9 AUTOMATIC LEVEL CALIBRATION

9.3.9.1 Calibration criteria

Irrespective of the setting of the calibration key, calibration is always performed when the line power is switched on. Furthermore, calibration is always performed when the bandwidth changes.

If calibration is activated, i.e. the red LED is off, calibration takes place

- following a frequency change of more than 10%,
- if the wideband gain changes,
- if more than 2 minutes have expired.

In addition to these calibration criteria, calibration takes place immediately after the calibration key is switched on (red LED off).

Individual calibration is possible with remote control via the IEC bus. At the end of this calibration, the red LED above the calibration key lights up.

9.3.9.2 Calibration frequencies

Setting the calibration frequencies				
THEN	If wideband level measurement			ELSE
	Selective level measurement			
THEN	If frequency $\leq$ 2 kHz			ELSE
THEN	If bandwidth = 25 Hz		ELSE	
THEN	If freq. $\leq$ 180 Hz	ELSE	Cal. frq. = 2 kHz	
Cal. frq. = 10 kHz	Cal. frq. = 180 Hz	Cal. frq. = Test frequency		
	Cal. frq. = Test frequency			

### 9.3.9.3 Calibration routine

The set calibration value is

for "dB": 0 dB;

for "dBm", the inaccuracy of the dBm correcting amplifier is also calibrated out, meaning that the mB digit of the correcting amplifier must be subtracted from the calibration level supplied.

For both "analog" and "digital", the deviation is corrected in the calibration controller, i.e. the deviation is not calculated into the result at all for "digital".

Write CAL into level display	
Calculate and set calibrating frequency	
If PSE on	
THEN	ELSE
Attenuate PSE to -55 dB	—
Calculate and set IF gain for calibration	
Switch on calibrating level	
Change calibrating controller until set calibrating level reached	
Set test frequency	
If PSE on	
THEN	ELSE
Return PSE level to correct setting	—
Calculate and set IF gain for measurement	
Switch measuring path through	
If demodulator mode	
THEN	ELSE
Switch demodulator back on	—
Write level into level display again	

9.3.10 CONTINUOUS FREQUENCY ADJUSTMENT

The deviation of the frequency counter from the set value of 5000 is observed and, depending on the selected program, the offset converted into a corresponding frequency change.

If "FINE"		ELSE
THEN		
delta frequency per pulse = 1		
If counter reading < 5000		
THEN	ELSE	—
$F_{new} = F_{old} - \text{counter reading} \times 1$	$F_{new} = F_{old} + \text{counter reading} \times 1$	
If "COARSE"		
THEN		
delta frequency per pulse = 100		—
If counter reading < 5000		
THEN	ELSE	
$F_{new} = F_{old} - \text{counter reading} \times 100$	$F_{new} = F_{old} + \text{counter reading} \times 100$	

9.3.11 SOFTWARE VERSIONS

Series A-D

There are fundamental hardware differences between instruments Series A-D and Series E... which preclude the installation of software from Series E onwards in instruments of Series A-D. However, it is possible to install software corresponding to the software from Series E onwards. The following modification is necessary for this software version (D3...):

Series A: On these instruments, the CPU board [955-F] must be replaced by a new, modified version [955-F1] (48K). IEC bus operation is impossible due to other hardware differences (e.g. weaker power supply)!

Series B-D: On these instruments, the CPU board [955-F1] must be modified (memory expansion 32K -> 48 kB ROM). Special Conversion Instructions are available for this purpose.

Series E...

Series E-L: These instruments can be fitted with the same software version. They have a modified [955-F1] CPU with 48 kB (3 x 16 K) ROM memory capacity.

Series M...: The ROM memory is changed from 3 x 16 kB to 2 x 24 kB from this series onwards.

## 9.4 GATE ASSIGNMENTS

### 9.4.1 GATE ASSIGNMENTS, RECEIVER

READ	A D R : 2 6 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	X	0FH = LEVEL > +1 dB
BIT 3:		07H = -1 dB < LEVEL < +1 dB
BIT 2:		03H = -10 dB < LEVEL < -1 dB
BIT 1:		01H = -20 dB < LEVEL < -10 dB
BIT 0:		00H = LEVEL < -20 dB

WRITE	A D R : 2 0 H	
BIT 7:	IF GAIN	where: 21H = 0 dB
BIT 6:	IF GAIN	22H = 10 dB
BIT 5:	IF GAIN	24H = 20 dB
BIT 4:	IF GAIN	28H = 30 dB
BIT 3:	IF GAIN	30H = 40 dB
BIT 2:	IF GAIN	50H = 50 dB
BIT 1:	IF GAIN	90H = 60 dB
BIT 0:	IF GAIN	10H = 70 dB
		10H = 80 dB

WRITE	A D R : 2 1 H	
BIT 7:	X	where: xxxx xx00B = 0 dB
BIT 6:	X	xxxx xx00B = 10 dB
BIT 5:	X	xxxx xx00B = 20 dB
BIT 4:	X	xxxx xx00B = 30 dB
BIT 3:	25 Hz	xxxx xx00B = 40 dB
BIT 2:	100 Hz	xxxx xx00B = 50 dB
BIT 1:	IF amplifier	xxxx xx00B = 60 dB
BIT 0:	IF amplifier	xxxx xx01B = 70 dB
		xxxx xx10B = 80 dB

WRITE	A D R : 2 2 H	
BIT 7:	Selective = L	
BIT 6:	Send level	
BIT 5:	Wideband	
BIT 4:	Demodulator on	
BIT 3:	L = upper/H = lower sideband	
BIT 2:	X	
BIT 1:	Signal detector on: L = active	
BIT 0:	IF RELAY Change-over relay trip: L = active	

WRITE	A D R : 2 3 H
BIT 7:	X
BIT 6:	X
BIT 5:	X
BIT 4:	X
BIT 3:	Refer to Section 9.4.4
BIT 2:	
BIT 1:	
BIT 0:	

WRITE	A D R : 2 4 H
BIT 7:	
BIT 6:	
BIT 5:	
BIT 4:	Refer to Section 9.4.4
BIT 3:	
BIT 2:	
BIT 1:	
BIT 0:	

WRITE	A D R : 2 5 H
BIT 7:	
BIT 6:	
BIT 5:	
BIT 4:	Refer to Section 9.4.4
BIT 3:	
BIT 2:	
BIT 1:	
BIT 0:	

WRITE	A D R : 2 7 H
BIT 7:	X
BIT 6:	X
BIT 5:	X
BIT 4:	X
BIT 3:	15 dB amplifier
BIT 2:	H = unexpanded scale    L = expanded (1 dB) scale
BIT 1:	Switch off meter
BIT 0:	Store meter reading

WRITE	A D R : 4 0 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	L = Relay active	RELAY INPUT
BIT 3:	X	
BIT 2:	X	
BIT 1:	Read out frequency	
BIT 0:	Set frequency	

## INPUT FIELD, NORMAL VERSION:

WRITE	A D R : 4 1 H	
BIT 7:		
BIT 6:		
BIT 5:	r6	Z = 75 $\Omega$
BIT 4:	r5	RF transformer/AF transformer
BIT 3:	r4	RF transformer/AF transformer
BIT 2:	r3	Z = 600 $\Omega$
BIT 1:	r2	Z = 150 $\Omega$
BIT 0:	r1	Z = 124 $\Omega$

## INPUT FIELD, WECO VERSION:

WRITE	A D R : 4 1 H	
BIT 7:		
BIT 6:		
BIT 5:	r6	Z = 75 $\Omega$ and/or switch RF/AF transformer
BIT 4:	r5	124/0 $\Omega$ and/or coaxial
BIT 3:	r4	600/124 $\Omega$
BIT 2:		
BIT 1:	r2	Z = 135 $\Omega$ and/or Z = 124 $\Omega$
BIT 0:	r1	Z = 600 $\Omega$

WRITE	A D R : 4 2 H	
BIT 7:	Z7	
BIT 6:	Z6	
BIT 5:	Z5	
BIT 4:	Z4	
BIT 3:	Z3	Refer to Section 9.4.5
BIT 2:	Z2	
BIT 1:	Z1	
BIT 0:	Z0	

WRITE	A D R : 4 4 H	
BIT 7:	D7	
BIT 6:	D6	
BIT 5:	D5	
BIT 4:	D4	
BIT 3:	D3	Refer to Section 9.4.6
BIT 2:	D2	
BIT 1:	D1	
BIT 0:	D0	

WRITE	A D R : 4 5 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	X	
BIT 3:	MA3	Refer to Section 9.4.6
BIT 2:	MA2	
BIT 1:	MA1	
BIT 0:	MA0	

WRITE	A D R : 4 6 H	
BIT 7:	IpI = 10 dB	
BIT 6:	p > 0 dB	
BIT 5:	p = 0 dB	
BIT 4:	p < 0 dB	
BIT 3:	ADC enable	
BIT 2:	Wideband	
BIT 1:	DGTL	
BIT 0:	DAV signal	(Note: data valid)

WRITE	A D R : 4 7 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	X	
BIT 3:	Level switch on	
BIT 2:	Reset level switch flip-flop	
BIT 1:	Reset calibrating clock flip-flop	
BIT 0:	Reset dB/dBm flip-flops	

READ	A D R : 4 0 H	
BIT 7:	X	
BIT 6:	Signal detector	H = signal present
BIT 5:	X	
BIT 4:	D A C	L = DATA ACCEPTED
BIT 3:	mB digit	x8 (mB = millibel)
BIT 2:	mB digit	x4
BIT 1:	mB digit	x2
BIT 0:	mB digit	x1

READ	A D R : 4 1 H	
BIT 7:	Level STATUS	dB digit 1 corresponds to H
BIT 6:	Level STATUS	Polarity pos. corresponds H
BIT 5:	Level STATUS	X
BIT 4:	Level STATUS	ADC Out of Range corresponds to H (b4 = 1 and b7 = 0)
BIT 3:	0.1 dB digit	x8
BIT 2:	0.1 dB digit	x4
BIT 1:	0.1 dB digit	x2
BIT 0:	0.1 dB digit	x1

READ	A D R : 4 2 H	
BIT 7:	10 Hz digit	x8
BIT 6:	10 Hz digit	x4
BIT 5:	10 Hz digit	x2
BIT 4:	10 Hz digit	x1
BIT 3:	1 Hz digit	x8
BIT 2:	1 Hz digit	x4
BIT 1:	1 Hz digit	x2
BIT 0:	1 Hz digit	x1

READ	A D R : 4 3 H	
BIT 7:	1 kHz digit	x8
BIT 6:	1 kHz digit	x4
BIT 5:	1 kHz digit	x2
BIT 4:	1 kHz digit	x1
BIT 3:	100 Hz digit	x8
BIT 2:	100 Hz digit	x4
BIT 1:	100 Hz digit	x2
BIT 0:	100 Hz digit	x1



READ	A D R : 4 4 H	
BIT 7:	dB/dBm flag	(Bit for dB = LOW, dBm = HIGH)
BIT 6:	0	
BIT 5:	dB/dBm interrupt	
BIT 4:	Calibrating clock interrupt	
BIT 3:	Key interrupt	
BIT 2:	Level switch interrupt	
BIT 1:	Frequency interrupt	
BIT 0:	Level interrupt	

READ	A D R : 4 5 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	X	
BIT 3:	Col. 3	
BIT 2:	Col. 2	Refer to Section 9.4.5
BIT 1:	Col. 1	
BIT 0:	Col. 0	

READ	A D R : 4 6 H	
BIT 7:	x	
BIT 6:	x	
BIT 5:	<	
BIT 4:	x	
BIT 3:	Data whether level switch operated	
BIT 2:	D3 for level switch direction detection	
BIT 1:	D2 for level switch direction detection	
BIT 0:	D0 for level switch direction detection	

WRITE	A D R : 8 0 H	
BIT 7:	10 Hz digit x8	
BIT 6:	10 Hz digit x4	
BIT 5:	10 Hz digit x2	
BIT 4:	10 Hz digit x1	
BIT 3:	1 Hz digit x8	
BIT 2:	1 Hz digit x4	
BIT 1:	1 Hz digit x2	
BIT 0:	1 Hz digit x1	

WRITE	A D R : 8 1 H	
BIT 7:	1 kHz digit	x8
BIT 6:	1 kHz digit	x4
BIT 5:	1 kHz digit	x2
BIT 4:	1 kHz digit	x1
BIT 3:	100 Hz digit	x8
BIT 2:	100 Hz digit	x4
BIT 1:	100 Hz digit	x2
BIT 0:	100 Hz digit	x1

WRITE	A D R : 8 2 H	
BIT 7:	100 kHz digit	x8
BIT 6:	100 kHz digit	x4
BIT 5:	100 kHz digit	x2
BIT 4:	100 kHz digit	x1
BIT 3:	10 kHz digit	x8
BIT 2:	10 kHz digit	x4
BIT 1:	10 kHz digit	x2
BIT 0:	10 kHz digit	x1

WRITE	A D R : 8 3 H	
BIT 7:	X	
BIT 6:	X	
BIT 5:	X	
BIT 4:	X	
BIT 3:	1 MHz digit	x8
BIT 2:	1 MHz digit	x4
BIT 1:	1 MHz digit	x2
BIT 0:	1 MHz digit	x1

WRITE	A D R : 8 4 H	
BIT 7:	Z = 75 $\Omega$	Rel 1
BIT 6:	Calibrate	Rel 2/Rel 3
BIT 5:	a1 = 20 dB	Rel 4
BIT 4:	a1' = 20 dB	Rel 5
BIT 3:	v1 = 10 dB	Rel 6
BIT 2:	v2 = 20 dB	Rel 7
BIT 1:	v = 9.03 dB	Rel 8
BIT 0:	v = 6.02 dB	Rel 9

WRITE	A D R : 8 5 H		
BIT 7:	X		
BIT 6:	X		
BIT 5:	X		
BIT 4:	RF RELAY		L = Relay active
BIT 3:	a = 2 dB		L = Attenuation on
BIT 2:	v = 6.85 dB, simultaneously switch v = 6.02 dB		
BIT 1:	Bandwidth = 3.1 kHz		
BIT 0:	Bandwidth = 1.74 kHz		

#### 9.4.2 GATE ASSIGNMENTS, TRACKING GENERATOR (PSE)

##### 9.4.2.1 Gate assignments, PSE (Series A ... D)

WRITE	A D R : 1 D H			
BIT 7:	H = PSE on			
BIT 6:	X			
BIT 5:	PSE RELAY			L = PSE Relay active
BIT 4:	H = 0 dB	L = -5 dB		
BIT 3:	H = +4 dB	L = 0 dB		
BIT 2:	H	L	L	H
	0 dB	-10 dB	-20 dB	not perm.
BIT 1:	H	H	L	L
BIT 0:	H = -30 dB	L = 0 dB		

WRITE	A D R : 1 E H			
BIT 7:	D A C	(bit 11)		
BIT 6:	D A C	(bit 10)		
BIT 5:	D A C	(bit 9)		
BIT 4:	D A C	(bit 8)		
BIT 3:	H = 75 $\Omega$ /coaxial			L = balanced
BIT 2:	H = low frequency			L = high frequency
BIT 1:	H = 150 $\Omega$ /RF			L = 124 $\Omega$ /RF
BIT 0:	H = 0 $\Omega$ /AF			L = 600 $\Omega$ /AF

WRITE	A D R : 1 F H	
BIT 7:	D A C	(bit 7)
BIT 6:	D A C	(bit 6)
BIT 5:	D A C	(bit 5)
BIT 4:	D A C	(bit 4)
BIT 3:	D A C	(bit 3)
BIT 2:	D A C	(bit 2)
BIT 1:	D A C	(bit 1)
BIT 0:	D A C	(bit 0)

## 9.4.2.2 Gate assignments, PSE (from Series E onwards), NORMAL VERSION

WRITE	A D R : 1 D H	
BIT 7:	H = PSE on	
BIT 6:	X	
BIT 5:	PSE RELAY	L = PSE Relay active
BIT 4:	H = 0 dB	L = -10 dB
BIT 3:	H = 0 dB	L = -20 dB
BIT 2:	H = 0 dB	L = -25 dB
BIT 1:	H = 0 dB	L = -40 dB
BIT 0:	H = BALANCED	L = COAXIAL

WRITE	A D R : 1 E H	
BIT 7:	D A C (bit 11)	
BIT 6:	D A C (bit 10)	
BIT 5:	D A C (bit 9)	
BIT 4:	D A C (bit 8)	
BIT 3:	H = balanced AF	L = balanced RF
BIT 2:	H = $600 \Omega/R_i = 0$	L = 124/150 (135) $\Omega$
BIT 1:	H = 124 $\Omega$ /RF	L = 150 $\Omega$ /RF (135)
BIT 0:	H = 0 $\Omega$ /AF	L = 600 $\Omega$ /RF

WRITE	A D R : 1 F H	
BIT 7:	D A C (bit 7)	
BIT 6:	D A C (bit 6)	
BIT 5:	D A C (bit 5)	
BIT 4:	D A C (bit 4)	
BIT 3:	D A C (bit 3)	
BIT 2:	D A C (bit 2)	
BIT 1:	D A C (bit 1)	
BIT 0:	D A C (bit 0)	

## 9.4.2.3 Gate assignments, PSE (from Series E onwards), WECD VERSION!

WRITE	A D R : 1 D H	
BIT 7:	H = PSE on	
BIT 6:	X	
BIT 5:	PSE RELAY	L = PSE Relay active
BIT 4:	H = 0 dB	L = -10 dB
BIT 3:	H = 0 dB	L = -20 dB
BIT 2:	H = 0 dB	L = -25 dB
BIT 1:	H = 0 dB	L = -40 dB
BIT 0:	H = BALANCED	L = COAXIAL

WRITE	A D R : 1 E H	
BIT 7:	D A C	(bit 11)
BIT 6:	D A C	(bit 10)
BIT 5:	D A C	(bit 9)
BIT 4:	D A C	(bit 8)
BIT 3:	H = balanced AF	L = balanced RF
BIT 2:	H = 124 $\Omega$ bal.	L = 600, 135 $\Omega$ , $R_f = 0$ and/or 75 $\Omega$ coax
BIT 1:	H = 135 $\Omega$ /AF	L = 600 $\Omega$ /RF
BIT 0:	H = 0 $\Omega$ /AF	L = don't care

WRITE	A D R : 1 F H	
BIT 7:	D A C	(bit 7)
BIT 6:	D A C	(bit 6)
BIT 5:	D A C	(bit 5)
BIT 4:	D A C	(bit 4)
BIT 3:	D A C	(bit 3)
BIT 2:	D A C	(bit 2)
BIT 1:	D A C	(bit 1)
BIT 0:	D A C	(bit 0)

#### 9.4.3 BIT CONFIGURATIONS FOR DC AMPLIFIER

##### 9.4.3.1 ADR 25H - Calibration controller

$$U_A = -1.25 \text{ dB} + n \times 1 \text{ mB}$$

Where n must be stored in ADR 25H as a HEX value

##### 9.4.3.2 ADR 23H, 24H - 0.1 dB amplifier

ADR 23H D0-D4	ADR 24H D0-D7	Gain in dB
02H	89H	-5.0
02H	D9H	-4.0
03H	31H	-3.0
03H	95H	-2.0
04H	05H	-1.0
04H	82H	-0.0
05H	0EH	+1.0
05H	ACH	+2.0
06H	5EH	+3.0
07H	25H	+4.0
08H	04H	+5.0
08H	FEH	+6.0
0AH	17H	+7.0
0BH	53H	+8.0
0CH	D4H	+9.0
0EH	41H	+10.0
0FH	FFH	+11.0

## 9.4.4 KEY ASSIGNMENTS

ADR 45H ---->	D0	D1	D2	D3
ADR 42H				
D0	$Z_{in}$ 600 $\Omega$	150 $\Omega$	124 $\Omega$	75 $\Omega$
D1	SEND LVL	DGTL	ANLG	AUTO CAL
D2	WIDE BAND	SELEC	DEMOC	-
D3	MAN	STEP	AUTO SRCH	OFF
D4	AUS OFF	600/0	124/150	75
D5	LVL DSPL	REF	ABS->REF	-
D6	LOCAL	-	-	-

## 9.4.5 RAM CONTENTS OF THE DISPLAY LOGIC

ADR	D7	D6	D5	D4	D3	D2	D1	D0
0	-	"," lev.	-	-	----- 1 dB digit -----			
1	2)	Sig. Det.	-	-	----- 10 dB digit -----			
2	-	+/-	-	-	----- 100 dB digit -----			
3	Coarse	Fine	-	-	----- 1 Hz digit -----			
4	-	UP mode	-	-	----- 10 Hz digit -----			
5	-	DOWN mode	-	-	----- 100 Hz digit -----			
6	OFF	"," freq.	-	-	----- 1 kHz digit -----			
7	-	-	-	-	----- 10 kHz digit -----			
8	10 dB	-	-	-	----- 100 kHz digit -----			
9	1 dB	-	-	-	----- 1 MHz digit -----			
A	600/ $\infty$	150/ $\infty$	124/ $\infty$	75/ $\infty$	600/z	150/z	124/z	75/z
B	Remote	Local	Demod>	Demod<	3.1 kHz	1.74 kHz	25 Hz	Wideband
C	PSE off	0.1 dB	5 dB	75/z	124/z	150/z	0/z	600/z
				PSE	PSE	PSE	PSE	PSE
D	Auto cal	DGTL	1 dB	10 dB	ABS>REF	ABS-REF	REF	ABS
			1)	1)				
E		dB	-	-	----- 1 mB digit -----			
F		dBm	-	-	----- 0.1 dB digit -----			

1) No longer activated by software from Series C onwards.

2) Segment off for CAL.

## 9.5 MONITOR (MONEX) - FUNCTIONS

### 9.5.1 GENERAL

The software implemented in the SPM-15 allows all functions of the individual assemblies to be addressed (e.g. setting of certain dividers or switching through the calibrating signal). These functions are used either via an external control section MONEX, or via the built-in monitoring mode (depending on Series).

The references to the MONEX made in these Service Instructions apply equally for the external control section MONEX and the built-in monitor mode.

These MONITOR functions, also known as WORIS functions, are as follows:

W: (Write)	Write to memory location
O: (Output)	Output to an output gate
R: (Read)	Read memory location
I: (Input)	Input from an input gate
S: (Start)	Starting a program

A command consists of

- a header W:, O:, R:, I:, S:,
- a 4-digit address field (hex notation),
- a 2-digit data field (hex), depending on command.

Example: "W:3458.5B EX"

Pressing the "EX" (Execute) key writes the value 5BH into memory location 3458H.

### 9.5.2 WITH EXTERNAL CONTROL SECTION "MONEX"

This option can be used with all SPM-15 instruments, irrespective of the Series. The following equipment is required:

- External control section "MONEX"
- MONEX adaptor board for SPM-15
- 26-pole 3M ribbon cable.

The MONEX includes a complete keyboard for the monitor functions, a display field and the necessary hardware. It is connected to the IEC bus interface 21 Bu 1 of the SPM-15.

MONEX-specific keys:

"MON" key:

Initialization of the monitor software. Pressing this key re-initializes the monitor software, thus making it ready for operation.

"CLR" key:

The "CLR" key can be used to delete the last character entered.

### 9.5.3 INTERNAL MONITOR MODE

Series A-D: only with modified CPU board [955-F1] and software version D4

Series E,F: with software versions G...

From Series G onwards: installed as standard

(also refer to Section 9.3.11, Software versions)

The normal instrument keyboard is used for operation. The key assignments in monitor mode are shown in Fig. 9-24 (at the end of the SPM-15 Service Instructions). An oscilloscope is used as display.

Preparation:

Connect the oscilloscope to TP 19 and TP 20 (chassis) of the CPU board (21) [955-F1]. Oscilloscope settings: 5 V/Div.; 0.5 ms; variable triggering.

Entering the monitor program

Press the "AUTO-CAL" and "SEND" keys simultaneously for about 1 s.

In this monitor mode, the digital level display is blanked (apart from the sign), all LEDs (except dB/dBm LED) are extinguished and "Ø----" appears in the frequency display.

All settings selected before entering the program are preserved. Only the analog meter is additionally switched on.

An IEC bus interrupt (RST 7.5) is not permissible.

The start address S:9900 (= basic initialization for "external MONEX") is blocked.

The name "SPM-15" appears on the oscilloscope after setting the triggering.

Notes on operation:

- A CLR key could not be implemented for this internal monitor mode. In the event of incorrect input, press the corresponding function key again and repeat the entry.
- Do not press the dB/dBm switch on the rear in monitor mode. Switch over to normal mode, or with S:9900 or S:9901.
- Stored program loops (as in 9.5.6) can only be terminated by briefly switching the SPM-15 off and back on again. The program is preserved in the RAM, but the monitor mode is exited.
- The input circuitry and display logic are also used in the internal monitor mode. Consequently, unrestricted manipulations in this address range are only possible with the external control section "MONEX".

Exiting:

Press reset key S3 on the CPU board,  
or with "S:9090 EX"

The instrument then assumes the standard settings (basic initialization), the monitor settings thus being cancelled. The instrument undergoes basic initialization when re-energized after being switched off or following a power failure in monitor mode, i.e. the monitor mode is exited.



#### 9.5.4 DESCRIPTION OF THE INDIVIDUAL MONITOR FUNCTIONS

##### "EX" key:

Execution of the command is triggered with the "EX" key.

##### The "W:" command - Write to memory location

**Syntax:** W:xyzt.dd  
 xyzt: Address of the memory location (hexadecimal)  
 dd: Data byte (hexadecimal)

**Effect:** The data byte dd is stored at address xyzt after pressing the "EX" key.  
 Execution of the command is confirmed by the display:  
 "W:xyzt.dd!"

**Abbreviated entry:** The address and the data byte may be entered with less than 4 or 2 digits. In this case, they are padded with leading zeros (e.g. 3 is interpreted as 0003 or 03, respectively).

If a number key (0 ... F) is pressed after operating the "EX" key, the address is automatically increased by one and the number accepted as the first digit of the data byte. The second digit of the data byte is then entered in the usual manner.

If the "EX" key is pressed twice in succession, the address is automatically increased by one and the same data byte stored at this memory location.

If the "." key is pressed after operating the "EX" key, the address remains unchanged. The data field is cleared and ready for entry of the data byte.

##### The "O:" command - Output to an output gate

**Syntax:** O:xy.dd  
 xy: Address of the output gate (hexadecimal)  
 dd: Data byte (hexadecimal)

**Effect:** The data byte dd is output to the gate xy after pressing the "EX" key.  
 Execution of the command is confirmed by the display:  
 "O:xy.dd!"

**Abbreviated entry:** The address and the data byte may be entered with less than two digits. In this case, they are padded with leading zeros (e.g. 3 is interpreted as 03).

If a number key (0 ... F) is pressed after operating the "EX" key, the address is automatically increased and the number accepted as the first digit of the data byte. The second digit of the data byte is then entered in the usual manner.

If the "EX" key is pressed twice in succession, the address is automatically increased by one and the same data byte output to this gate.

If the "." key is pressed after operating the "EX" key, the address remains unchanged. The data field is cleared and ready for entry of the data byte.

The "R:" command - Read memory location

Syntax: R:xyzt  
xyzt: Address of the memory location (hexadecimal)

Effect: The data byte dd is read from the address xyzt after pressing the "EX" key.  
Execution of the command is confirmed by the display:  
"R:xyzt.dd!"  
dd: Data byte (hexadecimal)

Abbreviated entry: The address may be entered with less than 4 digits. In this case, it is padded with leading zeros (e.g. 3 is interpreted as 0003).

If the "EX" key is pressed twice in succession, the address is automatically increased by 1 and its contents read out. If the "." key is pressed after operating the "EX" key, the address remains unchanged. The data field is cleared. The address contents are read out again after pressing the "EX" key.

The "I:" command - Input from an input gate

Syntax: I:xy

Effect: The contents of gate xy are read out after pressing the "EX" key.  
Execution of the command is confirmed by the display:  
"I:xy.dd!"

Abbreviated entry: The address may be entered with less than 2 digits. In this case, it is padded with leading zeros (e.g. 3 is interpreted as 03).

If the "EX" key is pressed twice in succession, the address is automatically increased by 1 and the corresponding gate contents read. If the "." key is pressed after operating the "EX" key, the address remains unchanged. The data field is cleared. The gate contents can be read again by pressing the "EX" key.

The "S:" command - Starting a program

Syntax: S:xyzt  
xyzt: Start address of the program (hexadecimal)

Effect: The program is executed from address xyzt onwards after pressing the "EX" key.  
Execution of the command is confirmed by the display:  
"S:xyzt!"

Abbreviated entry: The address may be entered with less than 4 digits. In this case, it is padded with leading zeros (e.g. 3 is interpreted as 0003).

If the "EX" key is pressed twice in succession, the same program is called up again.

The "W:" function can be used to write a program into the free data area for subsequent starting with the "S:" function.

S:9104 Display of calibrating controller (ESG) setting  
 S:9394 ESG = Centre position (80H) = 0 dB  
 S:9395 ESG = Minimum (00H) = -1.28 dB  
 S:9396 ESG = Old calibration setting / 2  
 S:9397 ESG = Old calibration setting x 2  
 S:9398 ESG = Old calibration setting +1 mB  
 S:9399 ESG = Old calibration setting -1 mB

Demodulator

S:9118 Demod on No frequency offset, IF filter is not changed  
 S:9119 Demod off  
 S:9128 Demod  $\triangleleft$  } No frequency offset  
 S:9129 Demod  $\triangleleft$  }

Display, evaluation of measurement result

S:9117 Instrument "on"  
 S:9116 Display storage "on"  
 S:9121 Display storage "off"  
 S:9126 20 dB scale "on"  
 S:9127 1 dB scale "on"  
 S:9132 Enable ADC  
 S:9133 Inhibit ADC  
 S:9134 Enable adder  
 S:9135 Inhibit adder

Tracking generator

Calibrating mixer level  
 Attenuation of calibrating mixer level  
 $x = 1 \text{ dB digit/Y} = 0.1 \text{ dB digit}$   
 S:95XY 0 dB to 6.9 dB for Series A ... D  
 S:96XY 0 dB to 10.5 dB from Series E onwards  
 $X = A \text{ for } 10 \text{ dB, e.g. S:95A3 for } 10.3 \text{ dB}$

PSE amplifier

	Series A ... D	from Series E onwards
S:9580	Connect 0 dB send path through	All dividers off
S:9581	10 dB divider on	10 dB divider on
S:9582	20 dB divider on	20 dB divider on
S:9583	30 dB divider on	25 dB divider on
S:9584	+4 dB amplifier on	40 dB divider on
S:9585	5 dB divider on	-----
S:9590	Tracking generator on	
S:9591	Tracking generator off	

## Output Z value

S:9592 Coaxial output/75  $\Omega$   
 S:9593 Balanced output  
 S:9594 124  $\Omega$   
 S:9595 150  $\Omega$  (135  $\Omega$ )  
 S:9596 600  $\Omega$   
 S:9597  $R_i = 0 \Omega$

Miscellaneous

S:9130 Signal detector "on"  
 S:9131 Signal detector "off"  
 S:9150 Display of absolute level =  $-20 \text{ dB} - V_{RF} - V_{IF} - V_{DC}$   
 S:9900 Instrument working in "dB"  
 S:9901 Instrument working in "dBm"  
 S:9902 "dBm/dBrnC" -> "dBm/dB" (from Series E onwards: dB mode of dBrnC instruments)

9.5.6 PROGRAM EXAMPLE: CYCLIC ACTIVATION OF AN ADDRESS

In this example, address 84 is to be activated cyclically. The program is as follows:

Address	Code	Machine language	Meaning
E300	XRI00	EE00	Accumulator linkage
E302	CMA	2FH	Accumulator complement
E303	OUT 84H	D384H	Read accumulator contents to <u>address 84</u>
E305	EI	FBH	Allow interrupt 1)
E306	JMP E300H	C300E3H	Skip to program start

applies for modified [955-F1] CPU (3 x 16 kB EPROM)

normal CPU [955-F1] (2 x 16 kB): from address 8300 onwards

old CPU [955-F]: (2 x 8 kB): from address 6300 onwards

The entries are made in the following manner:

## a) Write in program

W: E300.AF Ex  
 W: E301.00 Ex  
 W: E302.2F Ex  
 W: E303.D3 Ex  
 W: E304.84 Ex  
 W: E305.FB Ex 1)  
 W: E306.C3 Ex  
 W: E307.00 Ex  
 W: E308.E3 Ex

## b) Read program (check)

R: E300 Ex to R: E308 Ex

## c) Start program

S: E300 Ex

## 1) In internal monitor mode:

- E304.00: Do not allow interrupt, program aborted otherwise.
- Abort test by briefly switching the SPM-15 off and on.

## 9.6 IEC BUS INTERFACE (OPTION)

SPM-15 instruments from Series B onwards can be operated with an IEC bus interface. This is not possible for instruments of Series A due to hardware differences (e.g. weaker power supply). The simplified block circuit diagram of the interface of the SPM-15 is shown in Fig. 9-25. It essentially consists of two blocks: The level adaptor of the instrument-internal bus for the bus of the interface board and the actual interface board (IEC 625 board). Reading the brochure "Interface bus IEC 625" (BN 6390/00.38) will make it easier to understand the following description.

For the microprocessor, the IEC bus interface is nothing more than a collection of input and output gates.

Data exchange between the IEC bus and the instrument takes place via these gates and is controlled by the IEC bus program. The EPROMs in which this program is stored are located not on the IEC bus interface board, but in the instrument itself.

The actual interface logic is accommodated in an IEC bus interface module. It is connected, on the one hand, via the necessary driver and receiver circuits to the interface to the IEC bus and, on the other hand, via the level adaptor to the internal instrument bus. This interface logic handles the greater part of the interface tasks independently, i.e. without using the instrument-internal microprocessor. For example, it participates independently in the IEC bus handshake cycle and decodes all messages transmitted on the IEC bus. The interface statuses assumed on the basis of these messages are written into the corresponding input gates.

A further input gate acts as transfer register for listener data, these being the data transmitted from the IEC bus to the instrument, as long as the instrument is addressed as listener (e.g. when transmitting setting parameters for the instrument).

The output gates serve

- to accommodate control commands by which the microprocessor can influence the behaviour of the interface logic (in addition to numerous other possibilities, it can, for example, stop the handshake cycle or send a Service Request signal (SRQ) via the IEC bus;
- as transfer register for data which must be transmitted from the instrument to the IEC bus, e.g. talker data and status information. Talker bytes are those data transmitted by the instrument to the IEC bus as long as the instrument is operating as talker, e.g. when the measuring result is transmitted.

The status byte is the response of the instruments to a serial poll and contains the current instrument status. The instrument address can be set on the address switch.

The "PP switch" can be used to determine that data line from the IEC bus on which the instrument is to transmit its Request Service signal (RQS) when the controller requests its status by means of a parallel poll.

### 9.6.1 CIRCUITRY DESCRIPTION

A more detailed description can be found in the brochure "Interface bus IEC-625" (BN 6390/00.38).

#### 9.6.1.1 IEC bus adaptor

The IEC bus adaptor is required in order to convert the data required for the IEC bus board from the instrument bus level of approx. 10 V to the interface bus level of 5 V and to boost the incoming data of the interface board to the level of the instrument bus.

IC 3 and IC 4/1 convert the incoming addresses from the instrument bus to the level required by the interface board.

The bidirectional level converter IC 5 is controlled via the logic built up around IC 1/1, IC 2/1, IC 2/2 and IC 1/4.

9.6.2 IEC BUS SOFTWARE DESCRIPTION

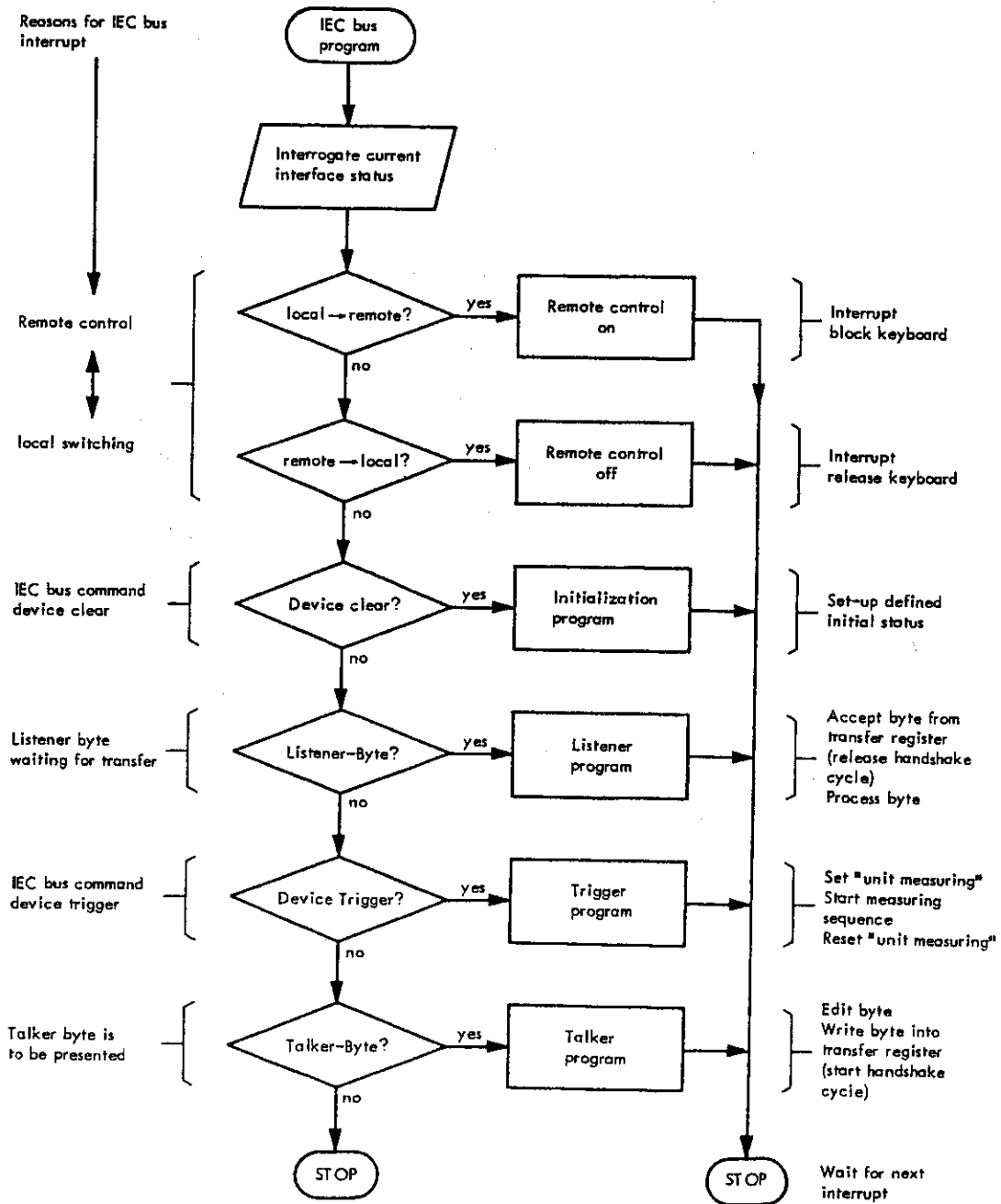
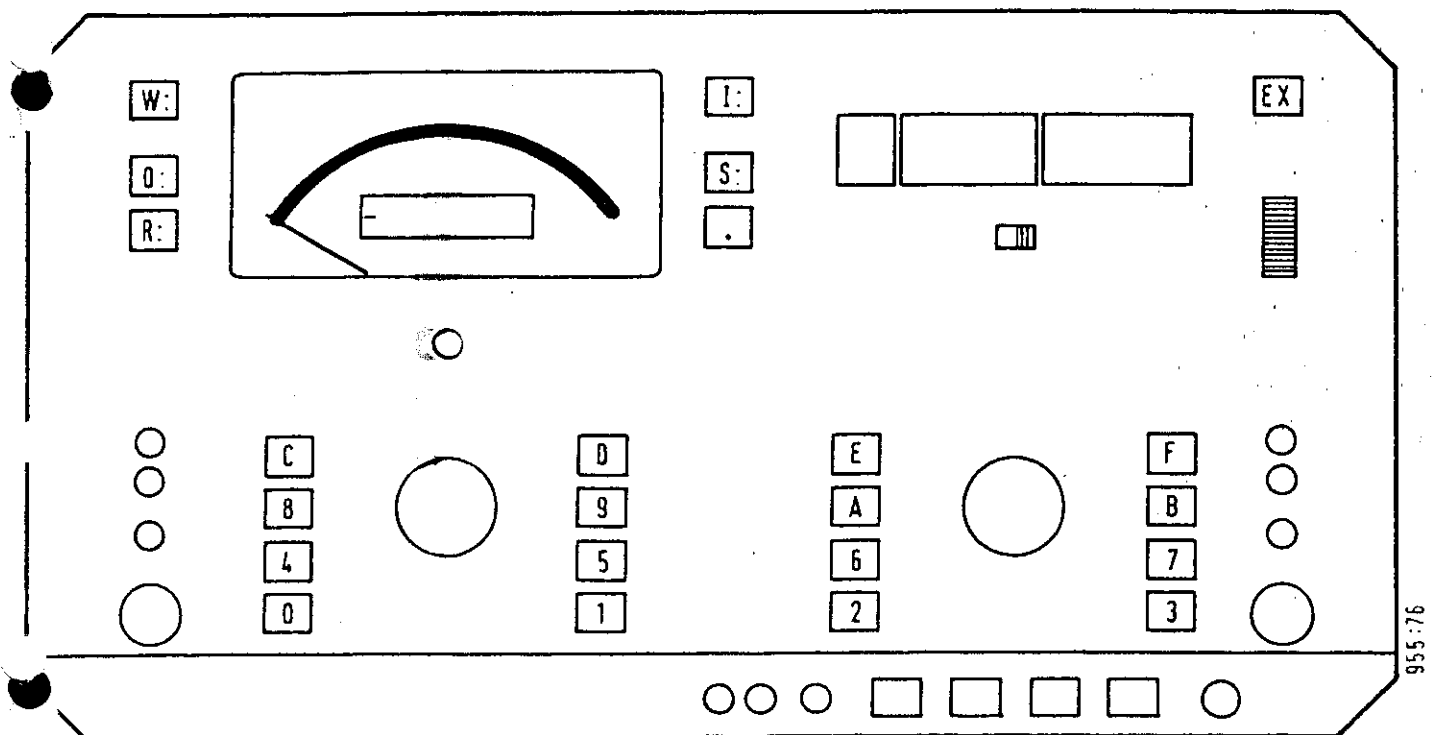


Fig. 9-26 Structure of the IEC bus program

- When the IEC bus reaches a status where operation by the instrument-internal microprocessor is necessary, the IEC bus interface sends an interrupt signal to the instrument. This interrupt then causes the microprocessor to execute the IEC bus program. This is always the case when:
- the instrument is to be switched over from manual control (Local) to remote control (Remote) or from remote control to manual control;
  - a listener byte has been transmitted via the IEC bus. The interface logic has then written this byte into the transfer register for listener bytes and stopped the handshake cycle. The handshake cycle remains interrupted until the microprocessor reads this byte (whereupon NDAC = false). NRFD = false is sent after processing and storage of the listener byte;
  - the instrument must provide a new talker byte. When the new talker byte is written into the corresponding output gate, the handshake cycle is started (DAV = true, i.e. data valid);
  - the instrument is to be triggered for a measurement by the IEC bus command "Device Trigger" (GET = Group Execute Trigger). The interface logic has then stopped the handshake cycle. It remains interrupted until the microprocessor has started the measurement and then re-enables the handshake cycle (NDAC = false and NRFD = false);
  - the instrument is to be set to a defined starting status by the IEC bus command "Device Clear" (DCL or SDC = Selected Device Clear). Again, the interface logic has stopped the handshake cycle. It remains interrupted until the microprocessor has set the instrument to the starting status and then re-enables the handshake cycle (NDAC = false and NRFD = false).

If the CLR jumper is fitted on the IEC bus interface board, the IEC bus signal IFC (Interface Clear) causes initialization of the instrument. This means that the instrument can always be initialized via the IEC bus, even in the event of a possible interlock. (Important for instruments in unmanned stations where an interlock caused by other malfunctions cannot be eliminated by switching the line voltage off and back on.)



95576

Fig. 9-24 Key assignments in monitor mode



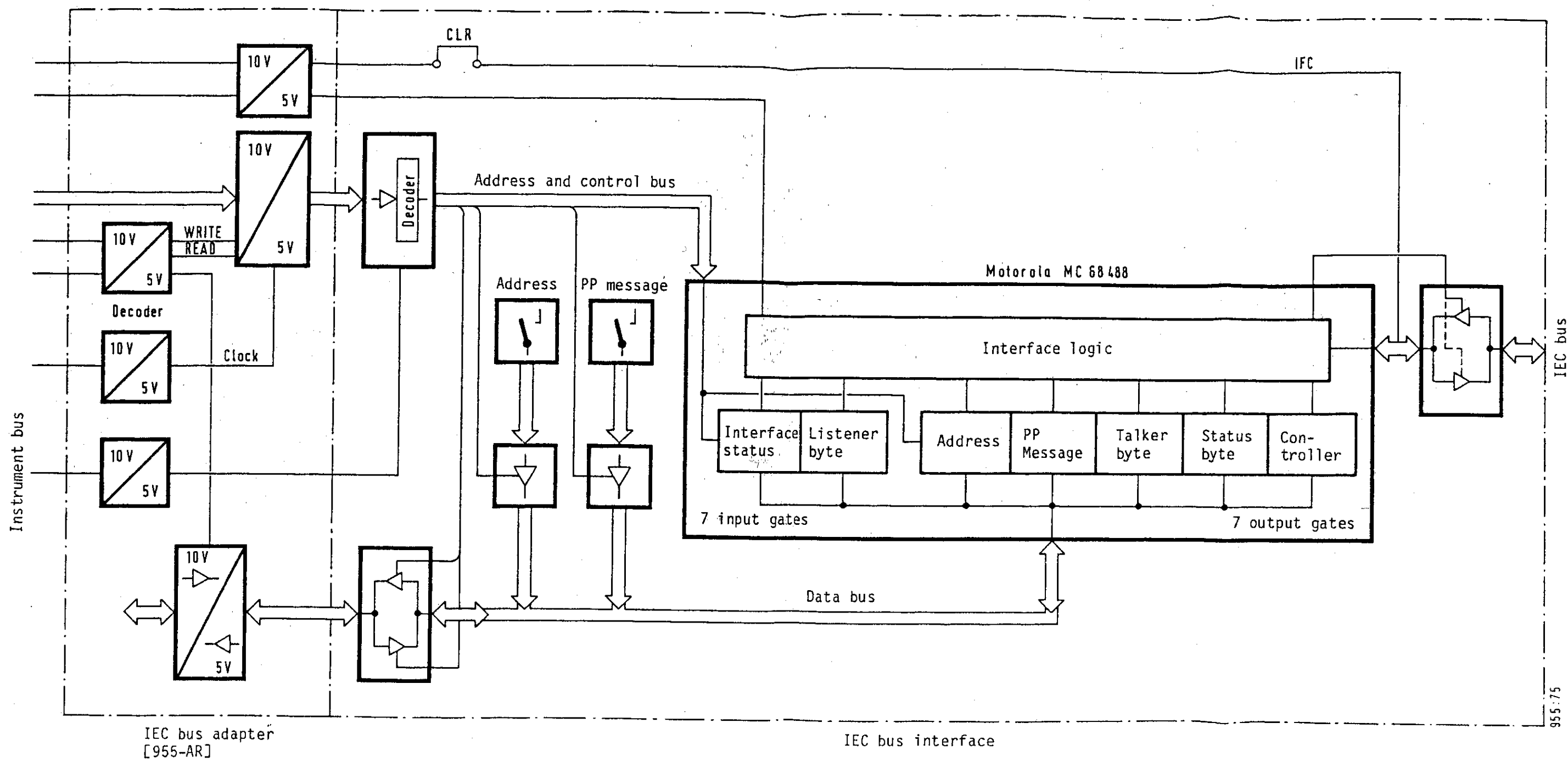


Fig. 9-25 Block circuit diagram of the IEC bus interface BN 955

## 6 INTRODUCTION

### 6.1 INTRODUCTION TO SERVICING

See part 1, SPM-15/PS-15

### 6.2 TEST EQUIPMENT

A list of recommended test equipment is given below. Equivalent instruments from other manufacturers can also be used.

Instrument	Requirements	Recommended type	Manufacturer	Used in section
Oscilloscope	$f \geq 100$ MHz	PM 6673/03	Philips	7.5
Frequency counter	$f \geq 60$ MHz, $\Delta f \leq 1 \times 10^{-7}$			7.5
Digital voltmeter	Resolution 1 mV			7.5
Power supply	Range $\geq 15$ V Variable output			7.5
Level generator	0 to 12 V	PS-15/PS-19	W&G	7.6
Signature analyzer	1 to 10 MHz +10 dB hp compatible	5004 A/5005 A	hp	7.4

Figure 6.2-1 Test equipment

## 7 HINWEISE ZUR FEHLERSUCHE UND REPARATUR

### 7.1 SICHERHEITSMASSNAHMEN

(siehe Teil I, SPM-15/PS-15)

### 7.2 LAGE DER BAUGRUPPEN, ABGLEICHELEMENTE, TESTPUNKTE

Eine Liste der Baugruppen ist in Kapitel 7.7.1 Bild 7.7-2 zu finden.

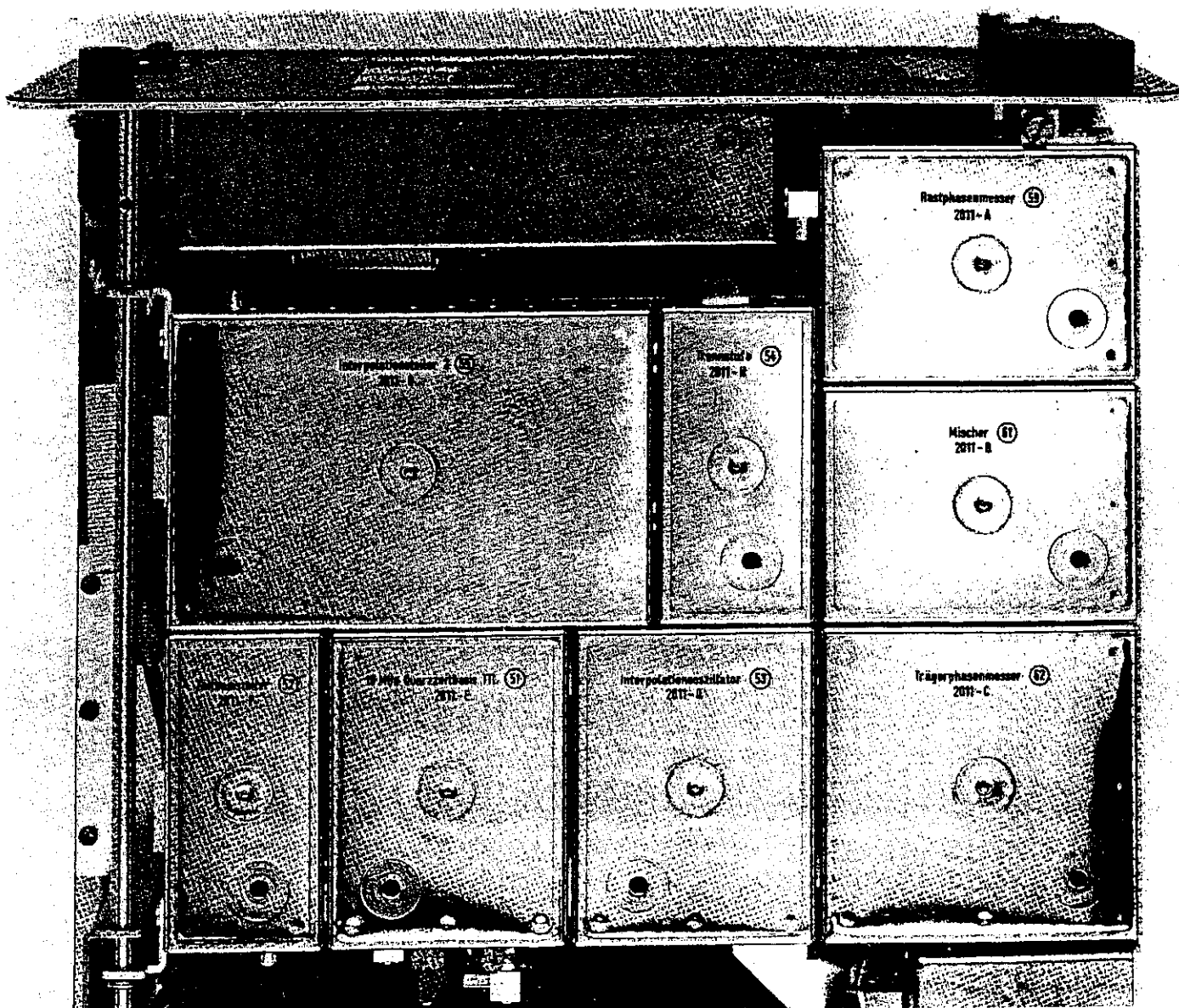


Bild 7.2-1 OD-15, äußerer Teil, mit Deckel

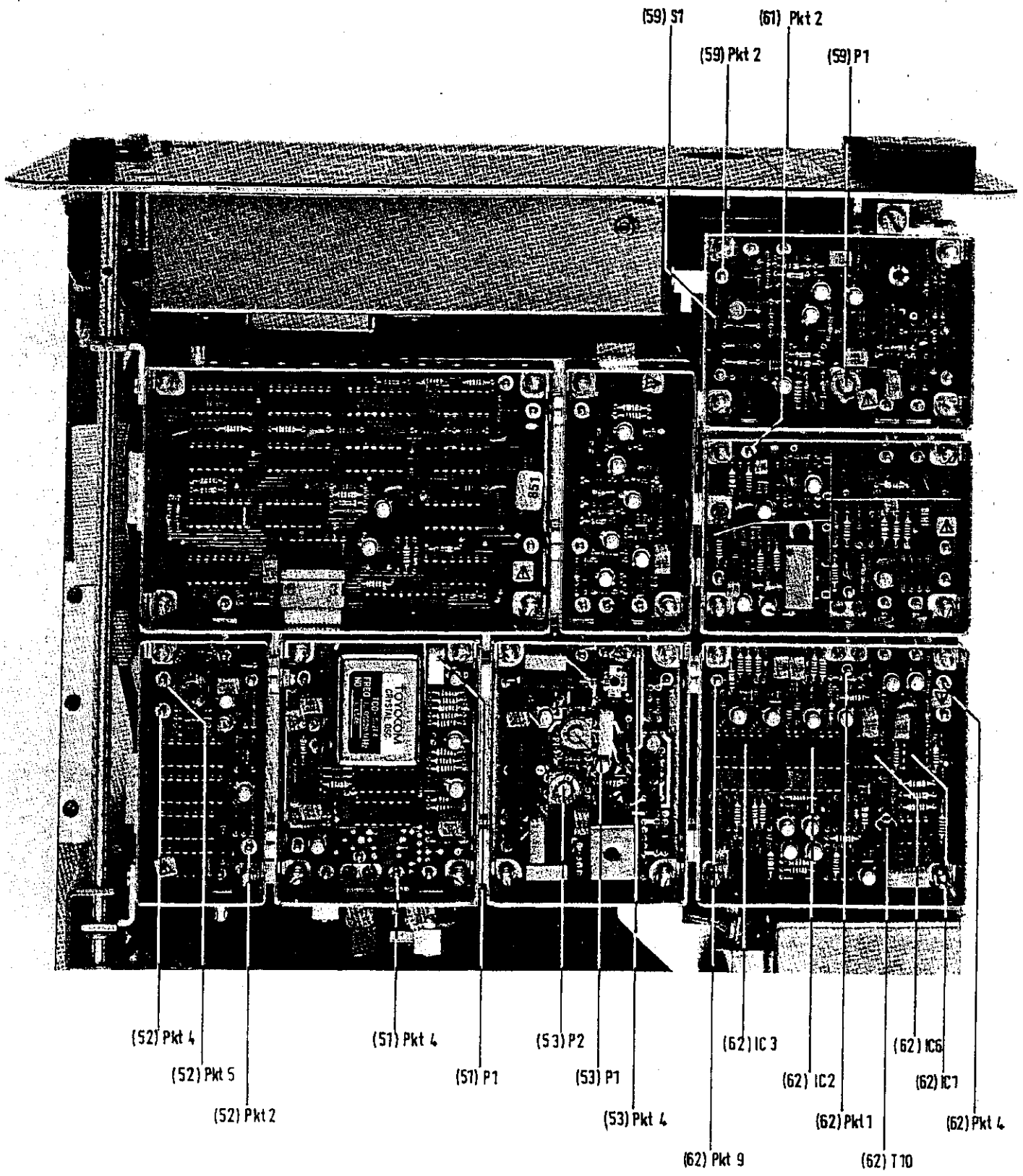


Bild 7.2-2 OD-15, äußerer Teil, ohne Deckel

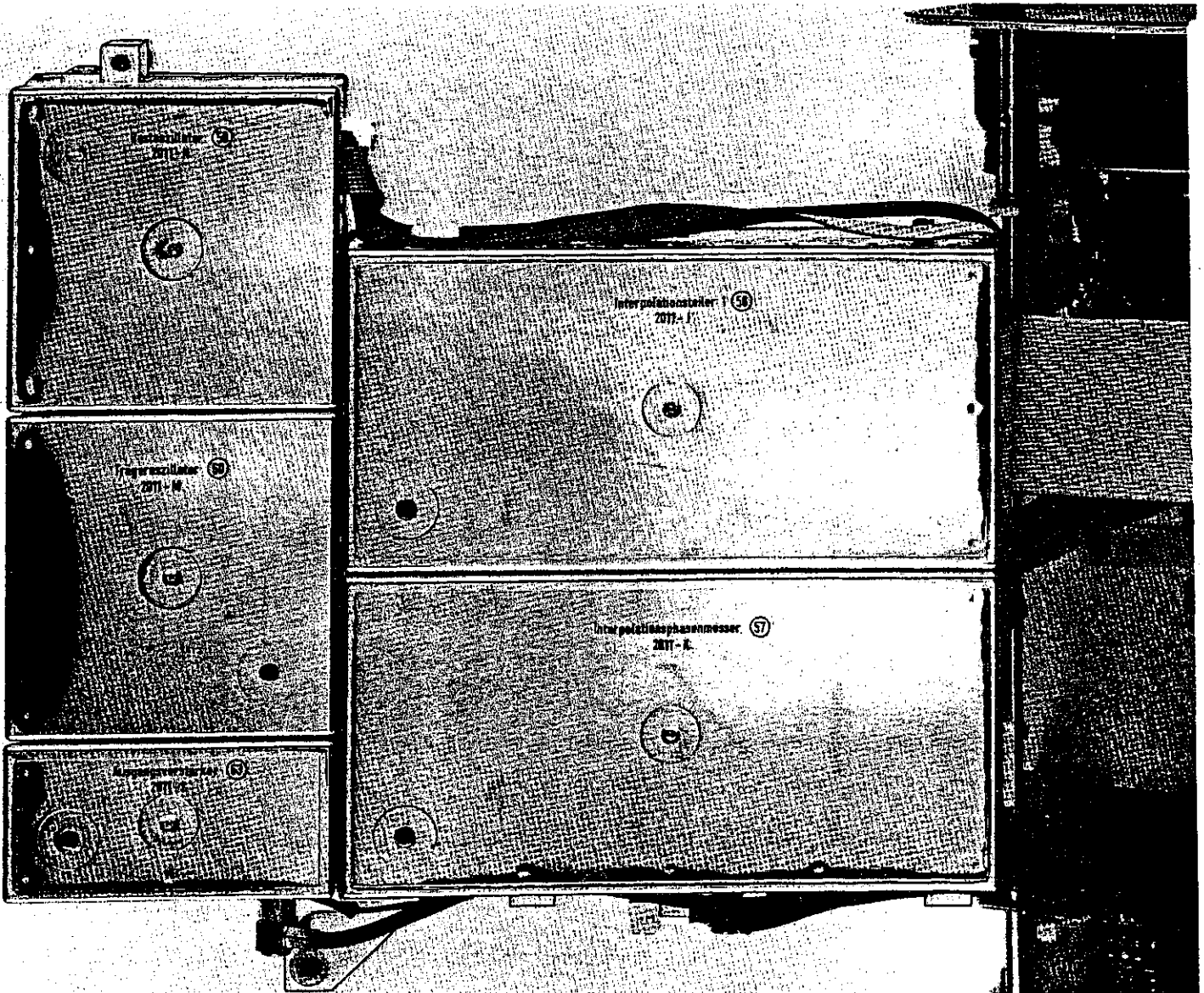


Bild 7.2-3 OD-15, innerer Teil, mit Deckel

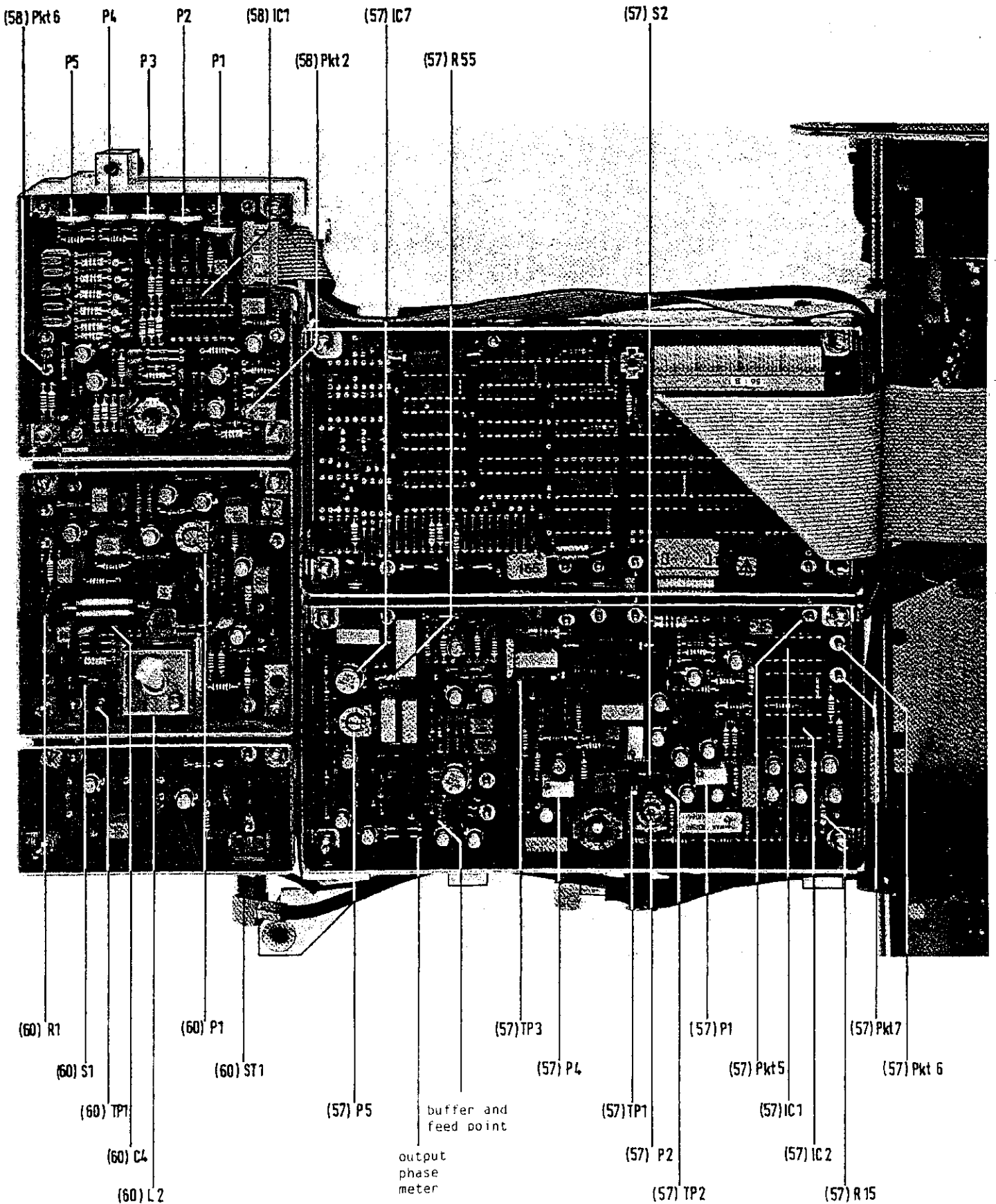


Bild 7.2-4 00-15, innerer Teil, ohne Deckel

### 7.3 TROUBLESHOOTING

#### 7.3.1 FAULT LOCATION

The OD-15 provides a carrier signal of fixed level, the frequency of which depends on the frequency setting of the SPM-15 and the PS-15.

The frequencies are related as follows:

$$f_c = f_s + 40 \text{ MHz}$$

where  $f_c$  = carrier frequency    40.0 MHz to 49.999999 MHz  
 $f_s$  = set frequency            0 MHz to 9.999999 MHz

The level is fixed at -15 dB into 75  $\Omega$ .

There are no other ways in which the frequency is dependent on other instrument settings. If the above relationships are not present, the fault lies either

- in the control circuits: see 7.4
- or in the OD-15 itself: see 7.5 and 7.6.

#### 7.4 TROUBLESHOOTING THE CONTROL CIRCUITS

A stimulus program is provided in the SPM-15/PS-15 software for testing the synthesiser control circuits (socket b/c on the CPU board).

The stimulus program is described in part 1 (SPM-15/PS-15) in the section on checking the CPU.

For details of troubleshooting procedures, see section 7.4.1.9 (program controlled synthesiser stimulus) in part 1.

The complete CPU should be checked if an error is found.

Information on signature analysis is found in section 7.4.1.3 of part 1.

#### 7.5 TROUBLESHOOTING THE OD-15 SYNTHESISER

##### 7.5.1 PROCEDURE

It is assumed that the control circuits are functioning correctly (see 7.4).

The OD-15 can be split up into functional groups, making a systematic troubleshooting procedure easier. Section 7.5.2 describes a good/bad check for the individual modules. We recommend that the tests be carried out in the order given. Section 7.5.2 is divided up as follows:

- a) power supply check
- b) timebase check
- c) interpolation section check
- d) locking section check
- e) carrier circuit check

Details of how to troubleshoot the various control loops are given in section 7.5.3, which is divided as follows:

- troubleshooting the interpolation loop 7.5.3.1
- troubleshooting the locking loop 7.5.3.2
- troubleshooting the carrier loop 7.5.3.3

Figures 7.5-2 and 7.5-3 show the individual signal conditions for correct operation.

### 7.5.2 CHECKING THE MODULES

<p><b>a) Supply voltage check</b>            Measure the voltages present at the following connectors (reference ground):</p> <table style="width: 100%; border: none;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">(56) b pin 16: +5 V</td> <td style="border-right: 1px solid black; padding: 2px;">(58) c pins 1, 2, 14: +5 V</td> <td style="padding: 2px;">(51) pin 4: +5 V</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">b pin 19: +12 V</td> <td style="border-right: 1px solid black; padding: 2px;">c pins 9, 10: +12 V</td> <td></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">b pin 20: -12 V</td> <td style="border-right: 1px solid black; padding: 2px;">c pins 11, 12: -12 V</td> <td></td> </tr> </table> <p>If there is an error, check that the mains power unit is working properly and check if the load on the power supply unit is too high.</p>		(56) b pin 16: +5 V	(58) c pins 1, 2, 14: +5 V	(51) pin 4: +5 V	b pin 19: +12 V	c pins 9, 10: +12 V		b pin 20: -12 V	c pins 11, 12: -12 V	
(56) b pin 16: +5 V	(58) c pins 1, 2, 14: +5 V	(51) pin 4: +5 V								
b pin 19: +12 V	c pins 9, 10: +12 V									
b pin 20: -12 V	c pins 11, 12: -12 V									
<p><b>b) Timebase check</b></p> <p>1 MHz at (52) pin 2                      at (59) pin 2</p> <p>10 kHz at (52) pin 4 / (57) pin 7                      at (52) pin 5 / (57) pin 6</p>										
good	bad									
—      -> troubleshoot modules (51) and (52)										
<p><b>c) Interpolation section check</b></p> <table style="width: 100%; border: none;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">SPM/PS setting:</td> <td style="padding: 2px;">f at 62 pin 9</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">0 to 1.999999 MHz</td> <td style="padding: 2px;">4 MHz to 5.999999 MHz</td> </tr> </table> <p>Check at the following frequencies:</p> <table style="width: 100%; border: none;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">n x 111111 Hz</td> <td style="padding: 2px;">4 MHz + (n x 111111 Hz)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">1 MHz + n x 111111 Hz</td> <td style="padding: 2px;">5 MHz + (n x 111111 Hz)</td> </tr> </table> <p style="text-align: center;">n = 0 to 9</p>		SPM/PS setting:	f at 62 pin 9	0 to 1.999999 MHz	4 MHz to 5.999999 MHz	n x 111111 Hz	4 MHz + (n x 111111 Hz)	1 MHz + n x 111111 Hz	5 MHz + (n x 111111 Hz)	
SPM/PS setting:	f at 62 pin 9									
0 to 1.999999 MHz	4 MHz to 5.999999 MHz									
n x 111111 Hz	4 MHz + (n x 111111 Hz)									
1 MHz + n x 111111 Hz	5 MHz + (n x 111111 Hz)									
good	bad									
—      -> troubleshoot interpolation section (modules 53 to 57)										



d) <u>Check locking section</u>	
SPM/PS setting:	f at 61 pin 2   V at 62 pin 4
1/3/5/7/9 MHz	36/38/40/42/44 MHz   0/1/2/3/4 V
good	bad
—	-> troubleshoot locking section (modules 58 and 59)
e) <u>Check carrier circuits</u>	
It is assumed that the interpolation section and the locking section are functioning correctly.	
SPM/PS setting	f at 63 ST 1
0 to 9.999999 MHz	40 MHz to 49.999999 MHz
Check at the following frequencies:	
$n \times 1.111111 \text{ MHz}$	$40 \text{ MHz} + n \times 1.111111 \text{ MHz}$
$n = 0 \text{ to } 9$	
good	bad
—	-> troubleshoot carrier circuit and output amplifier (modules 60 to 63)

### 7.5.3 TROUBLESHOOTING THE INDIVIDUAL FUNCTIONAL GROUPS

#### 7.5.3.1 Troubleshooting the interpolation loop (53) to (59)

Is there a systematic error between the set and measured values of the frequency with respect to a particular digit and its value?	
no	yes
—	Error is in the control signal processing in the interpolation divider 1 or 2 -> see table of settings, figure 7.5-3
Open the control loop in the interpolation phase meter circuit: disconnect b from 57 R 65 and feed a d.c. voltage between -4 and +4 V into b.	
Does the interpolation oscillator and the complete divider chain as far as the interpolation divider 1 track the control voltage?	
Relationships: Series A +4 V -> 6 MHz    Series B +3 V -> 6 MHz -4 V -> 4 MHz                    -3 V -> 4 MHz	
yes	no
—	Fault is in the divider chain or the oscillator

Does the output of the phase meter circuit react in the opposite sense to the control voltage?	
yes	no
—	Does the digital section of the phase meter respond to the control signal? Relationships: f > 10 kHz                      57 IC 1/4 pin 11 -> LOW f < 10 kHz                        57 IC 2/4 pin 11 -> LOW  (f is the input signal frequency at (57) pin 5)
	yes
Fault is in analog section of the phase meter                      Fault is in digital section of the phase meter	
Check the switching between the time constants in the phase meter. Signals at 57 TP 3 as shown in figure 7.5-2.	

7.5.3.2 Troubleshooting the locking loop (58), (59)

Control check					
SPM/PS setting	Selected frequency $f_n$	IC 1 pin 2	4	6	10 12
1 MHz	36 MHz	L	H	H	H H
3 MHz	38 MHz	H	L	H	H H
5 MHz	40 MHz	H	H	L	H H
7 MHz	42 MHz	H	H	H	L H
9 MHz	44 MHz	H	H	H	H L
good					bad
—	-> troubleshoot the control section				

Control loop function check  
 Open the control loop by removing wire link 58 a-b.  
 The selected crystal will freely oscillate.  
 Connect a voltage source of range  $\pm 12$  V (referred to ground) to 58 pin b.

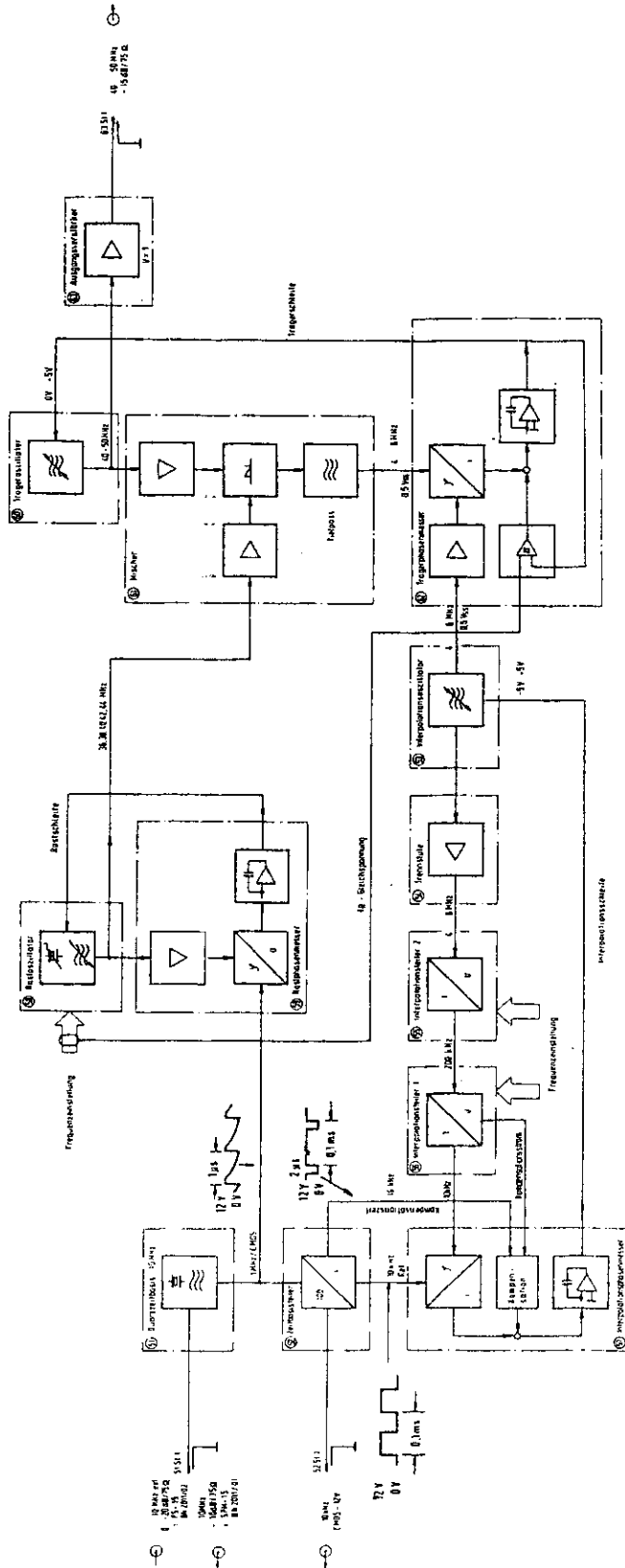
58 pin b	frequency at 58 pin 2	Voltage at 58 pin a
+12 V	$f_n + 400$ to 800 Hz	-12 V
-12 V	$f_n - 400$ to 1500 Hz	+12 V
good		bad
58 pin 2 bad: troubleshoot the oscillator (58) 58 pin b bad: troubleshoot the locking phase meter (59)		

Check the pulling range function  
 Proceed as outlined in 7.7.11

7.5.3.3 Troubleshooting the carrier loop (60) to (63)

Check: Interpolation frequency at 62 pin 9 correct? Locking frequency at 61 pin 2 correct? $f_R$ d.c. voltage at 62 pin 4 correct? "PD-block" input signal at 62 pins c6, c8 at LOW?	
Open the carrier oscillator control loop Set 60 S1 to T and feed in signal via 60 TP 1 Also disable the comparators in the carrier phase meter: Ground pin 1 of 62 IC 1/1 Feed +1 V into pin 3 of 62 IC 6/2	
Check: does the carrier oscillator and the output amplifier and mixer track the input signal? Relationship: 0 V      40 MHz 5 V      50 MHz	
Does the output of the phase meter respond in the opposite sense to the control voltage?	
yes	no
Does the digital section of the phase meter respond to the control voltage? Relationships: $f > f_{int}$ 62 IC 2/4 pin 3 -> HIGH $f < f_{int}$ 62 IC 3/4 pin 3 -> HIGH (f is the frequency of the input signal at (62) pin 1)	
yes	no
Fault is in digital section of the phase meter	
Check the control of the "switch" 62 T 10 Gate voltage = 0 V, -> switch ON	

7.5.3.4 Signals



Amplificateur de sortie  
Réglage de la fréquence  
de réglage  
Phase-mètre d'interpolation  
Bande d'interpolation  
Diviseur d'interpolation  
Compensation  
Compensation  
Compensation  
Compensation  
Mélangeur  
Base de temps à quartz  
Oscillateur verrouillé  
Oscillateur de verrouillage  
Oscillateur de verrouillage  
Filtre passe-bas  
Séparateur  
Oscillateur de porteuse  
Niveau de porteuse  
Oscillateur de porteuse  
Diviseur de base de temps

OUTPUT AMPLIFIER  
CARRIER SETTING  
FREQUENCY SETTING  
INTERPOLATION PHASE METER  
INTERPOLATION LOOP  
INTERPOLATION LOOP  
COMPENSATION  
COMPENSATION  
COMPENSATION  
COMPENSATION  
MIXER  
CRYSTAL TIME BASE  
LOCKING OSCILLATOR  
LOCKING OSCILLATOR  
LOCKING OSCILLATOR  
LOW PASS FILTER  
BUFFER STAGE  
CARRIER OSCILLATOR  
CARRIER PHASE METER  
CARRIER PHASE METER  
TIME BASE DIVIDER

Ausgangsverstärker  
Frequenzstellung  
Regelung  
Interpolationsphasenmesser  
Interpolationschleife  
Interpolationschleife  
Kompensation  
Kompensation  
Kompensation  
Kompensation  
Mischer  
Quarzzeitbasis  
Astabilisator  
Astabilisator  
Astabilisator  
Tiefpass  
Trennstufe  
Trägeroszillator  
Trägerphasenmesser  
Trägerphasenmesser  
Antenne

Figure 7.5-1 OD-15 block diagram


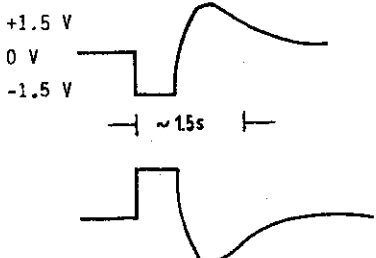
Signal source	Signal shape	Conditions
Interpolation oscillator, output 5	0.6 V <sub>pk-pk</sub> sinewave mid point at 1.4 V	dependent on f setting
Buffer stage, output 5	3-4 V 0 V 	dependent on f setting
Locking oscillator, output 2	0.6 V <sub>pk</sub> sinewave mid point at 0 V	dependent on f setting
Carrier oscillator, output 2	0.3 V <sub>pk</sub> sinewave mid point at 4.5 V	dependent on f setting
57 TP 3	+1.5 V 0 V -1.5 V 	f = 0 MHz -> 2.0 MHz  f = 2.0 MHz -> 0 MHz

Figure 7.5-2 OD-15 signal shapes

Setting table for the bit rate multiplier in interpolation divider 1/2

signal activity at	for setting of					
	u x 1 Hz	u x 10 Hz	u x 100 Hz	u x 1 kHz	u x 10 kHz	u x 100 kHz
56 IC 23/1 pin 1	x					
56 IC 16/3 pin 12	x					
56 IC 20/2 pin 13		x				
56 IC 2/3 pin 8/2	x	x				
56 IC 20/1 pin 1			x			
56 IC 2/2 pin 11/12	x	x	x			
56 IC 5/2 pin 13				x		
56 IC 2/1 pin 4/5	x	x	x	x		
56 IC 5/1 pin 1					x	
56 IC 1/1 pin 9	x	x	x	x	x	
55 IC 9 pin 13						x

Figure 7.5-3 Setting table for interpolation divider 1/2

## 7.6 FURTHER TROUBLESHOOTING

### 7.6.1 EXTERNAL CONTROL

There are two versions of the OD-15, which differ in their crystal timebases and the possibility of external control.

BN	Type of control	Used in
2011/01	controlling	SPM-15
2011/02	controlled	PS-15

As well as the signals detailed in 7.5, the following signals must also be present in the crystal timebase (circuit diagram 51) for correct operation.

Crystal timebase, BN 2011/01 (board [2011-P]):

Signal source	Signal shape	Requirements
output 5	0.6 V <sub>pk</sub> sinewave mid point at 0 V f = 10 MHz	none
output 3	TTL/f = 10 MHz	none

Crystal timebase, BN 2011/02 (board [2011-E]):

An external control signal (f = 10 MHz, 0 dB, 75 Ω) input to input 3 switches the internal oscillator Q1 off (voltage across R8 = 0 V) and determines the signal at the output pin 6/1/5.

## 7.7 ADJUSTMENT PROCEDURE

### 7.7.1 OVERVIEW

List of adjustment components:

Trimmer	Adjustment	Section
51 P 1	Absolute frequency, crystal timebase	7.7.2
53 P 1	Interpolation signal amplitude	7.7.3
53 P 2	Interpolation oscillator setting range	7.7.4
57 P 5	Offset voltage, 57 IC 7	7.7.5
57 P 4	Offset voltage, 57 IC 6	7.7.6
57 P 2	Frequency weighting	7.7.7
57 P 1	Phase slope	7.7.8
57 P 3	Subharmonic compensation	7.7.9
59 P 1	Offset voltage, 59 IC 1	7.7.10
58 P 1 - P 5	Pulling range, locking oscillator	7.7.11
60 L 2	Carrier oscillator setting range	7.7.12
60 P 1	Carrier signal amplitude	7.7.13

Figure 7.7-1 List of all adjustment components

Adjustments to be made after replacing modules:

Module	Series	Name	Shown in circuit diagram no.	Adjustment and check as in
2011-A		Locking phase meter	59	7.7.10
2011-B		Mixer	61	
2011-C		Carrier phase meter	62	
2011-D	A	Interpolation osc.	53	7.7.3,
2011-D1	B...			7.7.4, 7.7.8,
				7.7.7, 7.7.9,
2011-E		PS-15 crystal timebase	51	7.7.2
2011-F		Timebase divider	52	
2011-G		Interpolation divider 2	55	
2011-H		Buffer stage	54	
2011-J		Interpolation divider 1	56	
2011-K	A	Interpolation phase	57	7.7.5
2011-K1	B...	meter		7.7.6, 7.7.8,
				7.7.7, 7.7.9
2011-L		Output amplifier	63	
2011-M		Carrier oscillator	60	7.7.12, 7.7.13
2011-N		Locking oscillator	58	7.7.11
2011-P		SPM-15 crystal timebase	51	7.7.2

Figure 7.7-2 Adjustments after replacing modules

#### 7.7.2 ABSOLUTE FREQUENCY, CRYSTAL TIMEBASE (51 P 1)

Setting: 9.999999 MHz  
 Measure: Carrier signal frequency  
 Output (63) pin 3  
 Nominal value 59.999999 MHz

#### 7.7.3 INTERPOLATION SIGNAL AMPLITUDE

Frequency setting: any  
 Measure: Output signal amplitude at (53) pin 4  
 using oscilloscope  
 Nominal value  $V_{pk-pk} = 2.4$  V

#### 7.7.4 INTERPOLATION OSCILLATOR SETTING RANGE (53 P 2)

Frequency setting: 1 MHz  
 Measure: control voltage to oscillator, connection b of 57 R 65  
 using DVM  
 Nominal value =  $0$  V  $\pm$  50 mV (note: long time constant)

7.7.5 OFFSET VOLTAGE, 57 IC 7 (57 P 5)

Preliminary setting: open S 2

Measure: voltage on 57 IC 7 pin 6/57 R 55 using a DVM  
 Nominal value:  $0 \text{ V} \pm 100 \text{ mV}$ , no drift (the test point should be earthed briefly prior to measuring)

7.7.6 OFFSET VOLTAGE, 57 IC 6 (57 P 4)

Preliminary setting: open S 2

make adjustment 7.7.5

Measure: voltage at 57 TP 3 using a DVM  
 Nominal value:  $0 \text{ V} \pm 3 \text{ mV}$

7.7.7 FREQUENCY WEIGHTING (57 P 2)

Preliminary setting: close S 2

set frequency to 0 MHz

measure the voltage at 57 TP 1 with a DVM,  $V_0 =$  (e.g.)  $-1.402 \text{ V}$ 

set frequency to 1.999999 MHz

measure the voltage at 57 TP 1,  $V_2 =$  (e.g.)  $+1.363 \text{ V}$ 

calculate the adjustment value:

$$V^* = 3 V_0 - 2 V_2$$

$$\text{e.g. } = 3 \times -1.402 \text{ V} - 2 \times 1.363 \text{ V} = -6.932 \text{ V}$$

Measure: voltage at 57 TP 2

Nominal value  $V^* \pm 5 \text{ mV}$ 7.7.8 PHASE SLOPE (57 P 1)

Preliminary setting: set frequency to 0 MHz

measure  $V_a$  at 57 R 65 connector b using a DVMe.g.  $V_a = -4.08 \text{ V}$ 

set frequency to 1.999999 MHz

measure  $V_b$  at 57 R 65, e.g.  $V_b = +4.20 \text{ V}$ calculate the adjustment value  $V^{**} = 0.42 (V_b - V_a)$ e.g.  $V^{**} = 0.42 \times (4.20 \text{ V} - (-4.08 \text{ V})) = 3.48 \text{ V}$ 

Measure: voltage across 57 R 15

at 1.999999 MHz

Nominal value:  $V^{**} \pm 3 \text{ mV}$ 7.7.9 SUBHARMONIC COMPENSATION (57 P 3)

Frequency setting: 20 Hz

Measure: signal at 57 TP 3 using an oscilloscope  
 Nominal conditions: adjust for minimum level of the 20 Hz noise signal



7.7.10 OFFSET VOLTAGE 59 IC 1 (59 P 1)

Preliminary setting: connect pin 3 of 59 IC 1 to ground  
 Measure: voltage at the output (59) pin 5 using a DVM.  
 Nominal value: alternates between +12 and -12 V

7.7.11 PULLING RANGE, LOCKING OSCILLATOR (58 P 1 to 58 P 5)

Preliminary setting: open 59 S 1 and input an external sync. signal (from PS-15)  
 with  $f = 1$  MHz, settable in 1 Hz steps (level +10 dB into 75  $\Omega$ )  
 Measure: voltage at wire link 58 a-b using an oscilloscope  
 Required behaviour: when the sync. signal frequency is changed, the control voltage to be measured changes within the range  $\pm 12$  V. At the limits of the control range, spikes of amplitude 24 V should be observed with no intermediate forms.

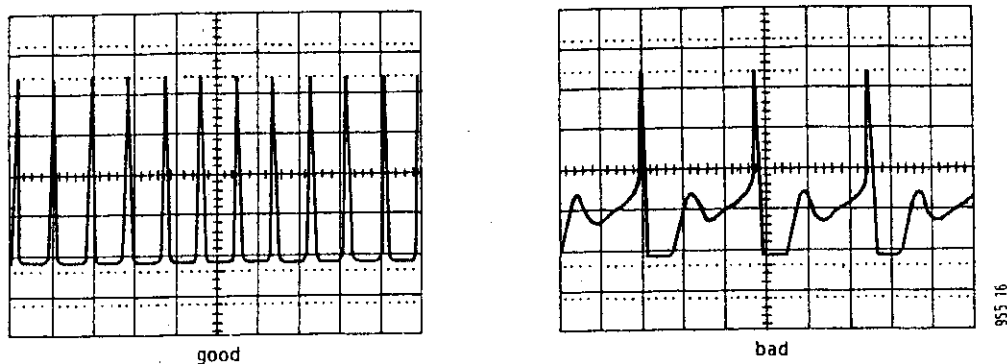


Figure 7.7-3 Control voltage, locking oscillator

The setting range for the sync. signal should be  $1 \text{ MHz} \pm \geq 15 \text{ Hz}$  before the spikes appear. This should be set for all the crystals using the appropriate potentiometer. A shift and match of all adjustment ranges can be carried out with the core of 58 0 1, but this requires that the adjustment be rechecked for all the crystals.

7.7.12 CARRIER OSCILLATOR SETTING RANGE (60 L 2)

## - Setting linearity

Preliminary setting: set frequency to 0 MHz  
 Measure: the setting voltage at 60 S 1. It should be between 0.2 and 0.5 V. This should be set using the core of 60 L 2.  
 Across the entire range from 0 to 10 MHz, a slope of 2 MHz/V should be achievable for the relationship frequency to setting voltage.

60 C 4 should be increased in value if the slope is degressive (15 pF, 18 pF)



60 C 4 should be decreased in value if the slope is progressive (10 pF, 8.2 pF)



555

- Absolute position of the setting

Using the core of 60 L 2 set the setting voltage to 0.52 V at a frequency  $f = 0$  MHz

If necessary, 60 R 1 can be changed to match the setting range:

R 1 smaller  $\rightarrow$  setting voltage bigger

R 1 bigger  $\rightarrow$  setting voltage smaller

Sensitivity: 530  $\Omega$ /0.1 V

7.7.13 CARRIER SIGNAL\*AMPLITUDE (60 P 1)

Frequency setting: any

Measure:  $\rightarrow$  output signal amplitude at 63 R 3 using an oscilloscope

$\rightarrow$  Nominal value:  $V_{pk-pk} = 0.8$  V

## 8 SPECIFICATION CHECK

---

The OD-15 for the SPM-15 has two outputs:

10 MHz standard frequency to [33] = 51 Bu 3

Carrier frequency 40 to 50 MHz to [34] = 11 Bu 1

The frequency accuracy and level tolerances can be easily checked:

[33]: 10 MHz  $\pm$  10 Hz, 0 dBm/75  $\Omega$   $\pm$  2 dB

[34]: 40 MHz  $\pm$  40 Hz when tuned to 0 Hz

49.999999 MHz  $\pm$  50 Hz when tuned to 9999.999 kHz

40 to 50 MHz: -6 dBm/75  $\Omega$   $\pm$  2 dB

equivalent to  $V_{pk-pk}$  of 4 V  $\pm$  0.5 V into a 75  $\Omega$  termination

The OD-15 for the PS-15 does not have any external outputs. The frequency accuracy is determined at the same time as that of the PS-15, see section 8 of PS-15 service manual.

## 9 CIRCUIT DESCRIPTION AND FUNCTION

---

### 9.1 INSTRUMENT FUNCTION

The OD-15 decade control oscillator is a subassembly which is fitted to the SPM-15 and PS-15. It generates the carrier frequency signal, which is sinusoidal and has a level of -15 dB into 75  $\Omega$  and a frequency range of 40 to 50 MHz.

There are four main groups in the instrument:

1. Standard frequency generator and processor
2. Locking loop
3. Interpolation loop
4. Carrier loop

#### 9.1.1 STANDARD FREQUENCY GENERATOR AND PROCESSOR

The quartz controlled timebase (51) generates the 10 MHz standard frequency and a 1 MHz reference frequency for the locking phase meter (59) and the timebase divider (52). The timebase divider provides a 10 kHz reference for the interpolation phase meter.

An externally generated standard frequency can be used instead of the internal oscillator for version BN 2011/02 if required.

#### 9.1.2 LOCKING LOOP

The locking oscillator (58) provides one of five fixed frequencies, 36, 38, 40, 42 or 44 MHz, depending on the instrument setting. Together with the interpolation frequency, they form the actual carrier frequency. The locking phase meter (58) regulates the set frequency by means of the 1 MHz reference frequency.

#### 9.1.3 INTERPOLATION LOOP

The interpolation oscillator (53) can be set between 4 and 6.1 MHz with the aid of the interpolation dividers 1 (56) and 2 (55). It is regulated via the interpolation phase meter (57). The oscillator and the dividers are isolated from each other by the buffer stage. The interpolation frequency is fed to the carrier phase meter (62) as a comparison frequency. To improve the tuning characteristics of both the transmitter and the receiver, the interpolation exchange occurs at 6.1 MHz when the frequency is increased and at 4.0 MHz when the frequency is decreased. This results in a tuning hysteresis of 100 kHz.

#### 9.1.4 CARRIER LOOP

The carrier oscillator (60) delivers a carrier signal of frequency 40 to 50 MHz. This is converted with the locking frequency in the mixer (61). The product is compared with the interpolation frequency in the carrier phase meter (62), and the carrier oscillator is controlled on the basis of this comparison. The output amplifier (63) produces a carrier signal at -15 dB into 75  $\Omega$ .

## 9.2 CIRCUIT DESCRIPTIONS: MODULES AND OPTIONS

### 9.2.1 10 MHZ QUARTZ CONTROLLED TIMEBASE TTL (51)

#### 9.2.1.1 10 MHz quartz controlled timebase TTL for SPM-15 [2011-P]

The standard frequency of 10 MHz is generated by crystal Q1 and divided down to 1 MHz by IC 2. The 10 MHz standard frequency is passed to the output via T 2 and O1. Output level is -10 dB/75  $\Omega$ .

#### 9.2.1.2 10 MHz quartz controlled timebase TTL for PS-15 [2011-E]

The standard frequency of 10 MHz is generated by crystal Q1 and divided down to 1 MHz by IC 4. If an external source is used for the standard frequency (0 to -20 dB), the internal source is disabled via T 5 and T 1. T 2, T 3 and T 4 serve to amplify and condition the input signal.

### 9.2.2 TIMEBASE DIVIDER (52) [2011-F]

The divider serves to divide the 1 MHz reference frequency down to 10 kHz and provide this output at various duty cycles. Counters IC 1/1 and IC 1/2 divide the 1 MHz signal from pkt. 2 down to 10 kHz (pin 5, IC 1); flip flops IC 2/1 through to 2/4 act as pulse shapers. The monostable IC 4 sets the duty cycle to 1:1 (50%) and T 1 to T 3 condition and buffer the pulses.

### 9.2.3 INTERPOLATION OSCILLATOR (53) [2011-D, D1]

The interpolation oscillator, which is a Meissner circuit with differential stage, has a frequency range of 4 to 6.1 MHz. Varicap diodes G1 1 and 2 (from series 8: G1 1, 2, 5 and 6) are reverse biased via pkt. 3 and P2 and form with the primary of transformer O1 the resonant circuit which determines the oscillator frequency. The frequency is set with the aid of the control voltage present at pkt. 1. Part of the primary-side a.c. voltage is tapped off on the secondary side, amplified by T 1 and T 2 and then fed back. The output signal is rectified by diodes G1 3 and G1 4. The resultant d.c. voltage is used to control the amplitude of the output signal via T 4. T 3 and T 5 amplify and buffer the output signal.

### 9.2.4 BUFFER STAGE (54) [2011-H]

The buffer stage is used to decouple the interpolation divider 2 from the interpolation oscillator and to generate steep negative-going edges. T 1, T 2 and T 3 are buffers, T 4 drives the switching transistor T 5.

### 9.2.5 INTERPOLATION DIVIDER 2 (55) [2011-G]

The interpolation divider circuit 2 is explained with the help of the detailed block diagram, figure 9.2-5.

Circuit diagrams and corresponding components:

1. Pulse blanking circuit 1		IC 1, IC 5/1, IC 14
2. Pulse blanking circuit 2		IC 2, IC 5/2
Switchable divider 4/5:1		IC 3/1 to IC 4
Fixed divider 5:1	} bit rate	IC 10/1 to IC 11/1
Fixed divider 2:1		IC 11/2
Selector for BCD control		IC 8/1, IC 8/2, IC 7/1, IC 7/2, IC 9
	} multiplier	

Main function of the pulse blanking circuit:

In the passive state, the input signal (pin 1, 55 IC 1) is passed unchanged to the output (pin 3, 55 IC 5). When active (triggered by a single edge on pin 13, IC 1), one cycle is blanked out of the input signal.

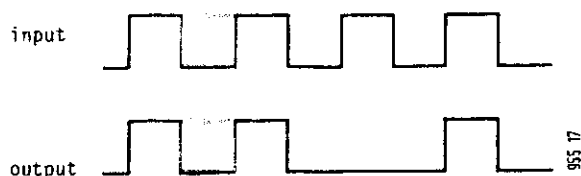


Figure 9.2-1 Pulse blanking circuit signals

Function of the interpolation divider 2 within the interpolation loop:

A 10 kHz signal is produced from the 4 to 6.1 MHz interpolation frequency according to a fixed relationship. This signal is compared with a 10 kHz reference.

The fixed relationship is dependent on the synthesiser control signal only. Once in equilibrium, the interpolation frequency, all intermediate signals and the 10 kHz signal are constant, due to the action of the regulating loop.

Intermediate signal frequencies:

Pulse blanking circuit 1 output	$4/5 \text{ MHz} + u \times 100 \text{ kHz}$	} dependent on drive signal
	$u = 0, \dots, 9$	
Pulse blanking circuit 2 output	4/5 MHz	
Switchable divider 4/5:1 output	1 MHz	
Interpolation divider 2 output	200 kHz	

Function of the bit rate multiplier in interpolation divider 2:

The following relationship exists between the input and output signals of the bit rate multiplier:

$$f_o = \frac{M1}{10} \times f_i = \frac{M1}{10} \times 1 \text{ MHz}$$

$$= M1 \times 100 \text{ kHz, where } M1 = 0 \text{ to } 9$$

$f_o$  = output frequency (pin 13, IC 9)

$f_i$  = input frequency (pin 3, IC 10)

M1 = control signal (pins 4, 6, 11, 13, 14, IC 6).

The output from the bit rate multiplier acts as a harmonic blanking signal for the pulse blanking circuit 2. One cycle of the incoming signal is blanked each time a harmonic blanking pulse is received.

Example:

Total modulation 100 kHz  
 => interpolation frequency 4.1 MHz  
 Pulse blanking circuit 1 passive  
 Bit rate multiplier control M1 = 1  
 => pulse blanking circuit 2 control = 100 kHz

The bit rate multiplier and the pulse blanking circuit therefore influence the interpolation frequency as follows:

100 000 pulses/s ( $\approx$  100 kHz) are blanked out of the incoming signal (4.1 MHz  $\approx$  4 100 000 pulses/s) leaving a signal with 4 000 000 pulses/s (4 MHz).

### 9.2.6 INTERPOLATION DIVIDER 1 (56) [2011-J]

The interpolation divider circuit 1 is explained with the help of the detailed block diagram, figure 9.2-5. Three functional groups can be distinguished:

Fixed divider 20:1	IC 12, IC 15/1
Subharmonic blanking pulse generation	IC 19/3, IC 19/4, IC 21/3, IC 23/1, IC 23/2, IC 22, IC 17/2 IC 16/4 and related components
Analog phase sweep interference compensation signal generation	G1 1 to G1 13, R2 to R9

20:1 divider function:

In the steady state, the output signal from the interpolation divider 2 is 200 kHz. A 10 kHz signal (data exchange) is produced from this by division and used as the reference frequency which is fed to the interpolation phase meter.

Subharmonic blanking pulse generation function:

The heart of this group is a bit rate multiplier circuit which is used more than once. The circuit is described in 9.2.5. The input frequency is 10 kHz, this signal being composed from signals drawn from the synchronisation bus (figures 9.2-3 and 9.2-4).

The output signal (pin 3, IC 16 and associated components) has a frequency of  $M \times 1$  kHz, where  $M = 0$  to 9, determined by the control signal. Through recursive use of the 10:1 divider it is possible to modify the effect of the bit rate multiplier for the individual digits.

$$\begin{aligned}
 \text{1 Hz digit: } f_0 &= \frac{M6}{10^4} \times f_i = \frac{M6}{10^4} \times 10 \text{ kHz} \\
 &= M6 \times 1 \text{ Hz}
 \end{aligned}$$

The output signal from the complete pulse generation (pin 9, IC 1) is fed to the interpolation divider 2 as a subharmonic blanking pulse from the pulse blanking circuit 1. It results in the reduction of the 1st intermediate signal to an integer multiple of 100 kHz.

Pulses which result from the 10 kHz control signal are evidently also harmonics.

Subharmonic compensation circuit function:

When the 1 Hz - 1 kHz digits are triggered, i.e. when real subharmonic blanking pulses are present, the interpolation phase meter registers a deviation of the actual signal from the nominal signal as shown in figure 9.2-2.

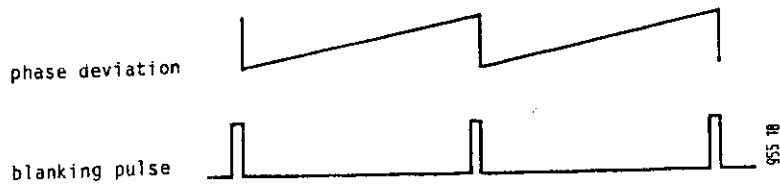


Figure 9.2-2 Subharmonic blanking pulses

The same ramp appears at the counter outputs ( $Q_1 - Q_3$ ) of the 10:1 divider so that, after D/A conversion, the signal can be used to correct the incorrect phase sweep in the interpolation phase meter.



Synchronisation bus signals:

- Gate circuit for processing the control signal

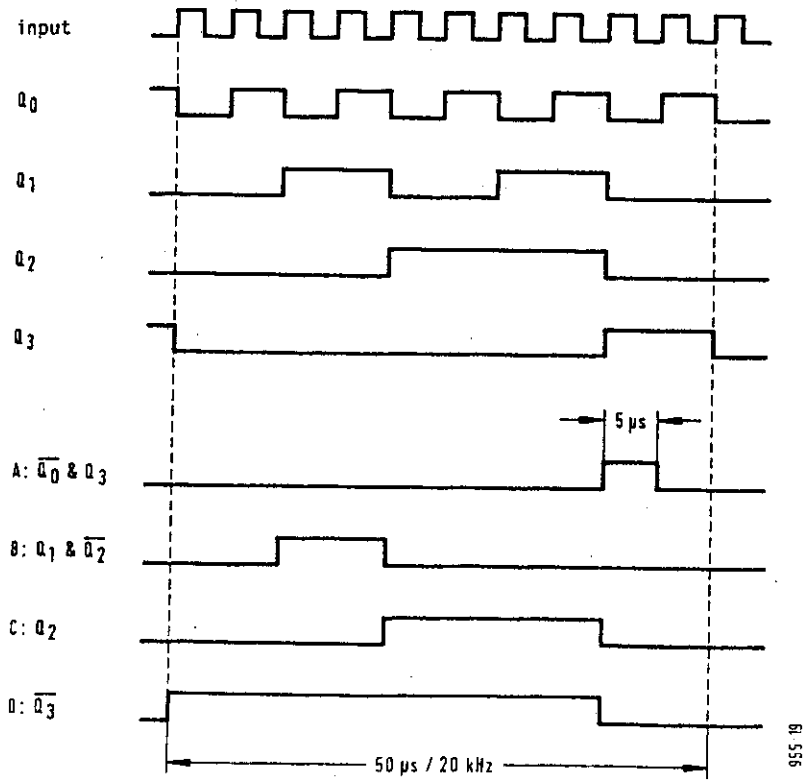
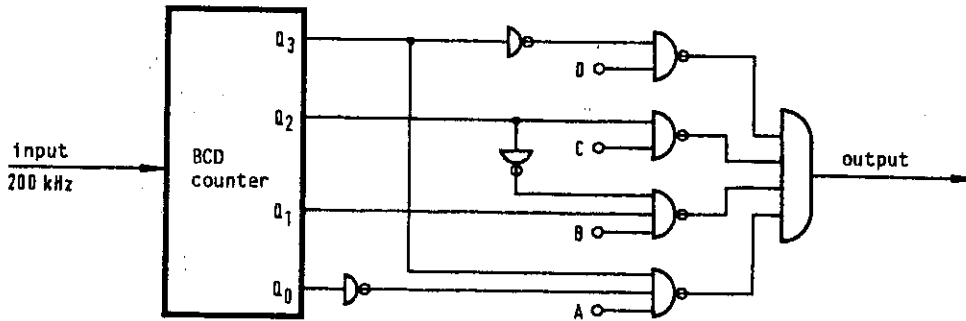


Figure 9.2-3 Control signal processing, interpolation divider 1

10:1 divider control (56 IC 8, 14, 18, 22)

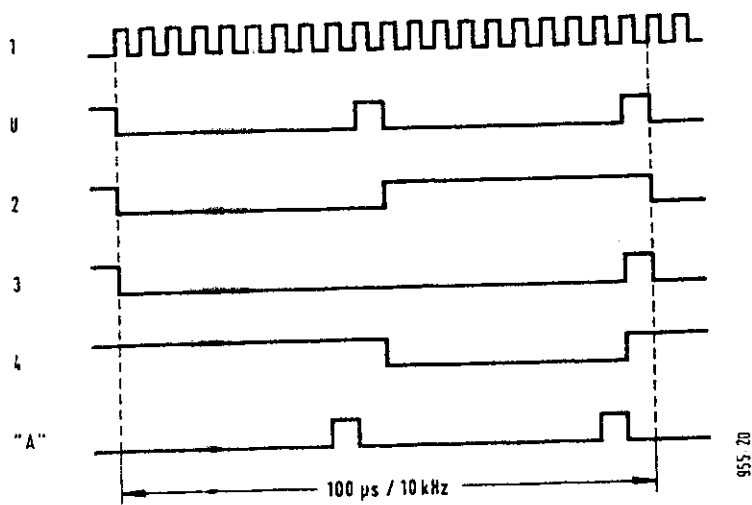
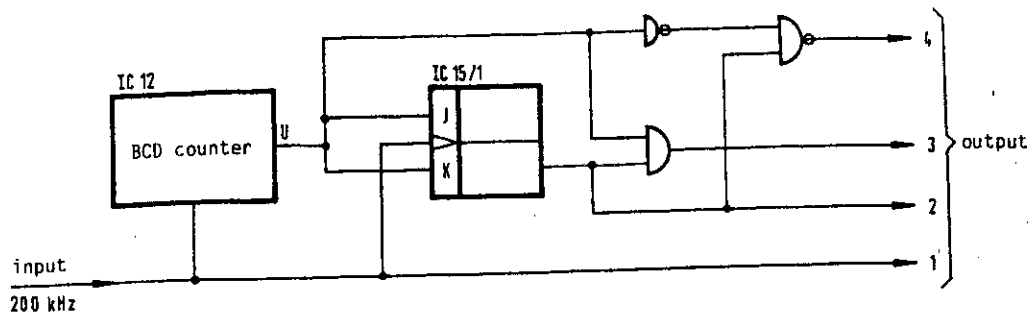


Figure 9.2-4 10:1 divider control

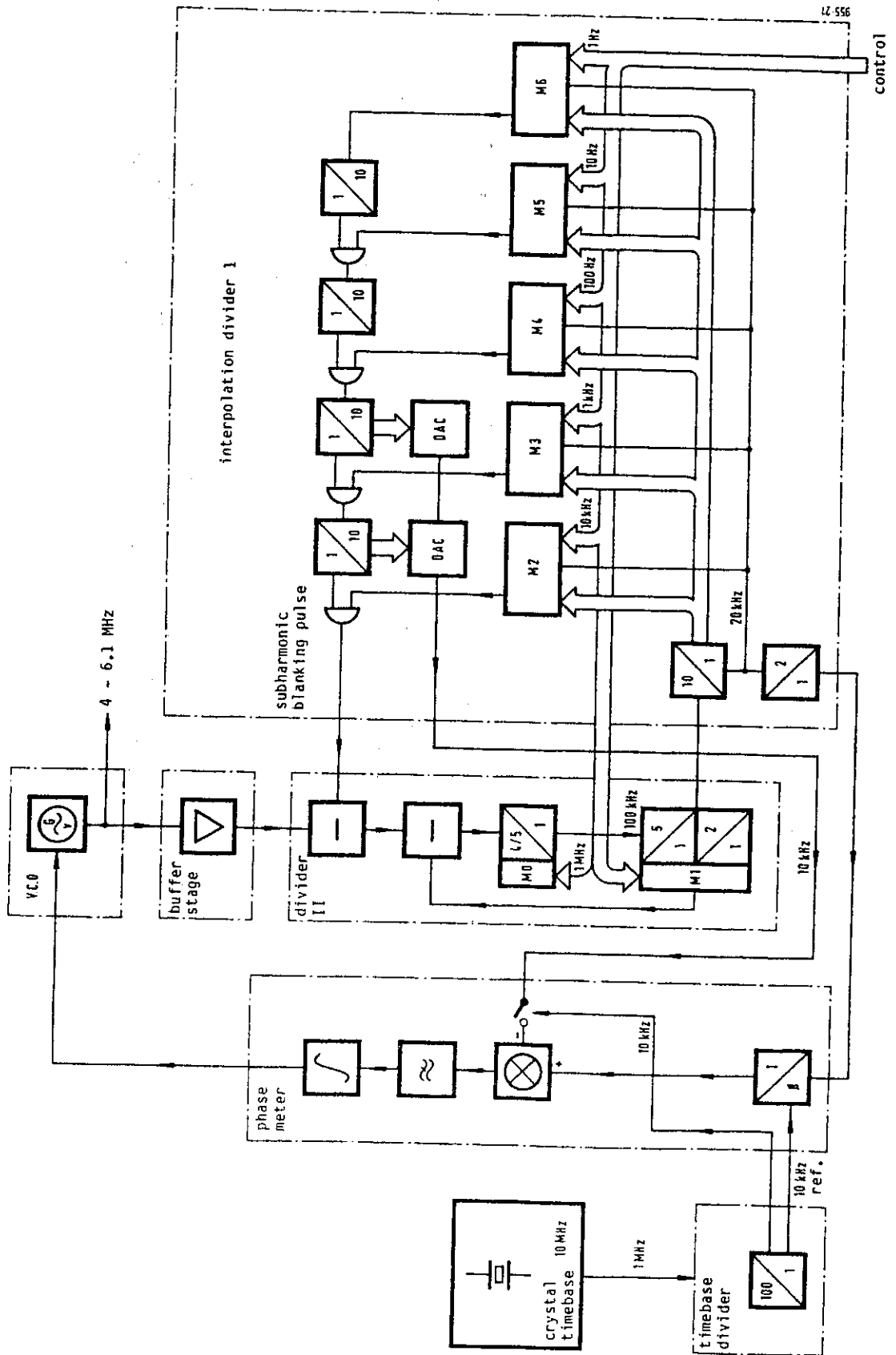


Figure 9.2-5 OD-15 block diagram

### 9.2.7 INTERPOLATION PHASE METER (57) [2011-K, K1]

Figure 9.2-6 shows the main functional groups of the interpolation phase meter. The digital phase meter is a commonly used circuit, which is described, for example, in the application notes for Motorola IC type MC 4044.

The constant current stage which follows the digital phase meter eliminates the effects of variations in operating voltage and the output tolerance of the phase meter. This also makes it possible to make the characteristics of the constant current stage dependent on the set frequency. This is necessary, since different dividers are used for different frequencies, and this would lead to a variation in the loop gain if the gain of the constant current stage were fixed.

A further stage adds a compensation current (proportional to the control signal of interpolation divider 1) to the phase signal.

A 10 kHz stop band filter is used to suppress the 10 kHz intrinsic noise signal of the phase meter itself.

The signal path to the carrier oscillator must fulfil two contradictory requirements:

- high attenuation at low frequencies (carrier sidebands),
- rapid response to new settings.

This problem has been solved by splitting the signal path. The upper fast path (IC 6) is provided with a threshold circuit which is high impedance in the steady state. The lower slow path (IC 7) is always active, but is bypassed by the upper path during reprogramming.

The integrator in the control loop (IC 8) has both a constant current and a limiter stage.

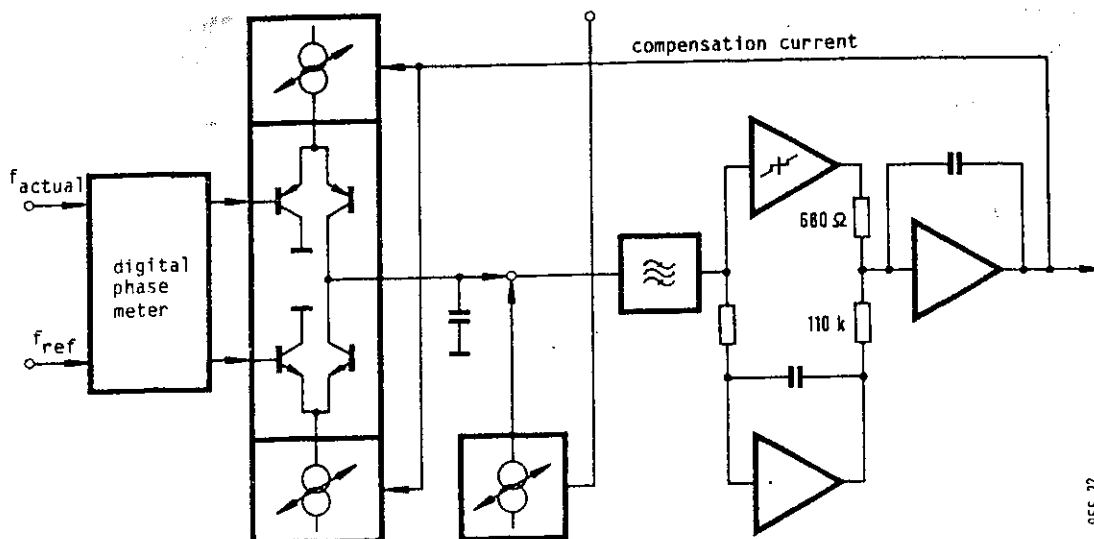


Figure 9.2-6 Interpolation phase meter

The window comparator IC 6 checks that the output voltage from the phase meter is within the d.c. range set by the frequency setting. If the voltage is outside this range, IC 6 regulates the phase meter until the output is within the range. IC 1/1 operates as a voltage follower, IC 1/2 being used to generate the upper limit value for the comparator.

#### 9.2.13 OUTPUT AMPLIFIER (63) [2011-L]

The output amplifier brings the level of the carrier signal up to -15 dB into 75  $\Omega$ .

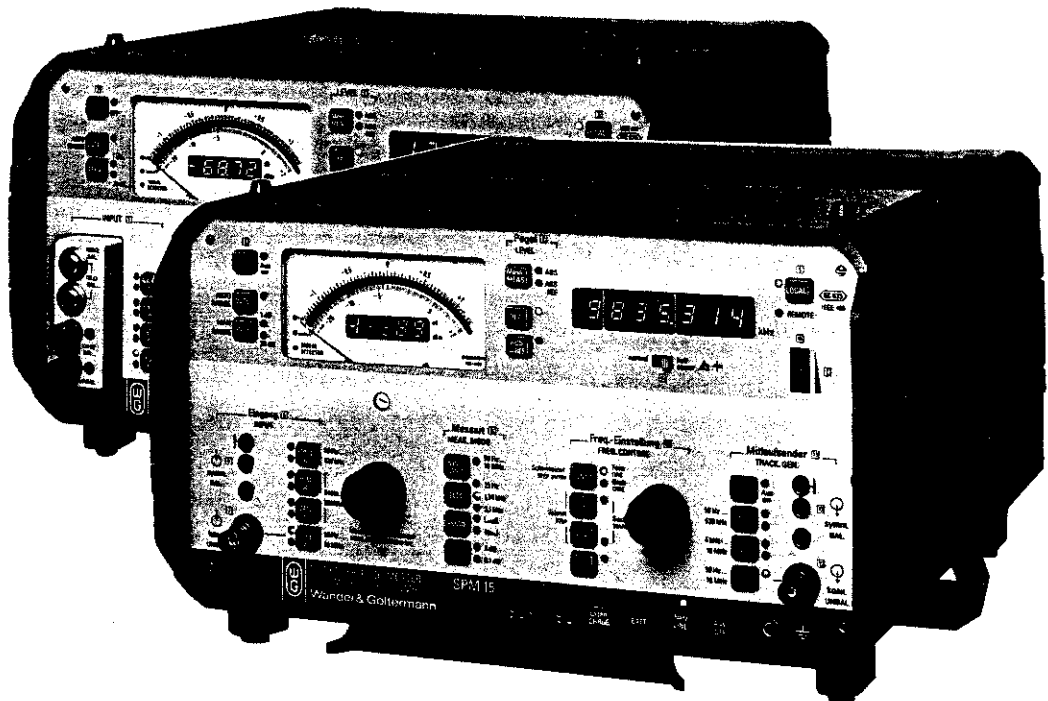
#### 9.2.14 DIGITAL CONTROL

The digital control circuit for the OD-15 is located on the CPU board of the SPM-15/PS-15, circuit diagram no. (21). ICs 43, 45, 47 and 49 are used to convert the byte serial information into parallel data signals.

Valid data exchange can only take place synchronously with the generator operation. This is accomplished with ICs 41, 44, 46, 48 and 50 which use a 10 kHz synchronisation signal fed in at pkt. b14.

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Anhang  
Appendix  
Annexe



**Selektiver Pegelmesser**  
**Selective Level Meter**  
**Mesureur de niveau sélectif**

**SPM-15**

BN 0955/00.87



SELEKTIVER PEGELMESSER für den Frequenzbereich 50 Hz bis 10 MHz mit Sendeteil	SPM-15
SELECTIVE LEVEL METER for the frequency range 50 Hz to 10 MHz with send section.	SPM-15
MESUREUR DE NIVEAU SELECTIF pour la gamme de fréquence 50 Hz à 10 MHz avec section générateur	SPM-15
Anhang/Appendix/Annexe Serie/series/séries	BN 955/01/02 M...

Best.-Nr. / Order No. / 0955/00.87  
Numero de commande

Ausgabe / 3517/5.87 ( ersetzt / replaces / 3351 )  
Edition ( replace )

I.7.84 Ja/sl  
0.24.5.87

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**Wandel & Goltermann**

Elektronische Meßtechnik

1	Selektiver Pegelmesser SPM-15	BN 955/01/02	Serie M ...
1.1	Synthesizer OD-15	BN 2011/01	Serie M
2	<u>Optionen:</u>		
2.1	Batteriezusatz BAZ-15, wiederaufladbar	BN 955/00.01	Serie H
2.2	Mitlaufsender PSE-15	BN 955/00.02	Serie N
2.3	Interface <IEC 625>-Karte	BN 955/00.03	Serie G
2.4	Zusatzfilter 100 Hz	BN 955/00.06	Serie B
2.5	Ausgangsfeld zum PSE-15 für Grundgerät 955/01	BN 955/00.21	Serie B
2.6	Ausgangsfeld zum PSE-15 für Grundgerät 955/02	BN 955/00.22	Serie C
2.7	Geräuschmessung in dB <sub>BrnC</sub>	BN 955/00.23	-

1	Selective Level Meter SPM-15	BN 955/01/02	series M ...
1.1	Synthesizer OD-15	BN 2011/01	series M
2	<u>Options:</u>		
2.1	Battery Pack BAZ-15; rechargeable	BN 955/00.01	series H
2.2	Tracking Generator PSE-15	BN 955/00.02	series N
2.3	Interface <IEC 625> Card	BN 955/00.03	series G
2.4	100 Hz auxiliary filter	BN 955/00.06	series B
2.5	Output section for PSE-15 mainframe 955/01	BN 955/00.21	series B
2.6	Output section for PSE-15 mainframe 955/02	BN 955/00.22	series C
2.7	Noise measurements in dB <sub>BrnC</sub>	BN 955/00.23	-



1	Mesureur de niveau sélectif SPM-15	BN 955/01/02	séries M ...
1.1	Synthétiseur OD-15	BN 2011/01	série M
2	<u>Options:</u>		
2.1	Auxiliaire batterie BAZ-15, rechargeable	BN 955/00.01	série H
2.2	Générateur suiveur PSE-15	BN 955/00.02	série N
2.3	Carte Interface <IEC 625>	BN 955/00.03	série G
2.4	Filtre auxiliaire 100 Hz	BN 955/00.06	série B
2.5	Section sortie pour PSE-15 pour appareil de base 955/01	BN 955/00.21	série B
2.6	Section sortie pour PSE-15 pour appareil de base 955/02	BN 955/00.22	série C
2.7	Mesure de bruit en dBrnC	BN 955/00.23	-

## Anmerkungen zu den Stromlaufplänen und den Schalteillisten

## Notes for Circuit Diagram and the Parts Lists

## Notes sur les schémas de principe et les listes de composants

### Abkürzungsbeispiele

④ = Stromlaufplan 4  
 [820-B] = Leiterplatte B  
 Pkt. 6 = Anschlußpunkt 6  
 TP 203 = Testpunkt 203

### Farbkennzeichnung

bl = blau  
 blk = blank  
 br = braun  
 fl = farblos  
 ge = gelb  
 gn = grün  
 gr = grau  
 rs = rosa  
 rt = rot  
 Schirm = Schirm  
 sw = schwarz  
 vio = violett  
 ws = weiß  
 gr/r = grau/rot  
 geschirmte Leitung  
 blanker Draht  
 BS = Bestückungsseite  
 NBS = nicht bestückte Seite

Alle angegebenen Spannungen sind mit einem Instrument 100 k $\Omega$ /V gegen 0 V gemessen.

Relais in Ruhstellung dargestellt

Sollten die Werte bestimmter Bauelemente in den Stromlaufplänen und Schalteillisten differieren, so sind stets die Angaben in den Schalteillisten als verbindlich anzusehen.

### Bestellangaben

Bei Ersatzteilbestellungen unbedingt beachten:

Die genaue Bezeichnung der Schalteilliste zu entnehmen.

Bauelemente mit BV bzw. WN sind im Werk anzufordern.

Neben der Bestellnummer (BN) ist die Gerätenummer mit Serienindex, die Positionsnummer des Bauelements und die Sachnummer anzugeben.

Beispiel: PM-20 BN 881/01  
 Nr. 0001 A

Schaltbild-Nr. 2 T 2  
 Sach-Nr. 0001-0015.836  
 Positions-Nr.

### Baugruppenverbindungen

Da die Stromlaufpläne für jede Baugruppe getrennt gezeichnet sind, müssen alle Zuleitungen zu anderen Baugruppen deutlich erkennbar sein. Die nachstehende Skizze erläutert die hier angewandten Verfahren zur Kennzeichnung.

#### Verfahren 1

Beim Anschlußpunkt einer Baugruppe steht die Adresse der anderen Anschlußpunkte, mit denen er verbunden ist.

#### Verfahren 2

Beim Anschlußpunkt steht nur eine Signalbezeichnung ohne Adresse. Dann sind alle Anschlußpunkte anderer Baugruppen mit der gleichen Signalbezeichnung untereinander verbunden.

### Abbreviations examples

Circuit diagram 4  
 Circuit board B  
 Connection point 6  
 Test point 203

### Colour coding

blue  
 bare wire  
 brown  
 transparent  
 yellow  
 green  
 grey  
 pink  
 red  
 screening  
 black  
 violet  
 white  
 grey/red  
 Screened lead  
 Bare wire  
 Component side  
 Soldering side

All voltage ratings measured with respect to 0 V with 100 k $\Omega$ /V meter.

Relays shown in rest position

If the values of individual components listed in the circuit diagrams and component lists should differ from another, those values given in the component lists are valid.

### Ordering information

When ordering spare parts, the following instructions must be followed without fail:

The exact designation of the component shall be taken from the "Parts Lists".

Components prefixed with BV or WN should be ordered from the manufacturer, W&G.

Next to the order number (BN) the serial number of that particular instrument along with the position number of the component and the item number shall be given.

Exemple: PM-20 BN 881/01  
 No. 0001 A

Circuit diagram 2 T 2  
 Position No.  
 Item number 0001-0015.836

### Connections between subassemblies

Because of each subassembly having been drawn separately, all the interconnections with the other subassemblies must be clearly identifiable. The following sketch explains the method used here for identifying the connections.

#### Method 1

At a connection point of a subassembly, there are located the addresses of the other connection points with which it is connected.

#### Method 2

At the connection point, there is only located a signal designation without address. Then, all similarly designated connection points of other subassemblies are interconnected.

### Exemples d'abréviations

Schéma 4  
 Platine B  
 Point de raccordement 6  
 Point test 203

### Code des couleurs

bleu  
 nu  
 brun  
 transparent  
 jaune  
 vert  
 gris  
 rose  
 rouge  
 blindage  
 noir  
 violet  
 blanc  
 gris/rouge  
 Conducteur blindé  
 Fil nu  
 Côté composants  
 Côté soudure

Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 k $\Omega$ /V.

Les relais sont représentés en position repos

Lorsque les valeurs de certains composants diffèrent entre les schémas de principes et les listes de composants, les valeurs des listes de composants sont seules valables.

### Données pour la commande

Pour la commande de composants de rechange il faut absolument observer:

La désignation exacte du composant qui est à prendre dans la liste des composants.

Les composants BV ou WN sont à réclamer à l'usine.

Outre le numéro de commande (BN) le numéro de l'appareil avec son index de série et le numéro de position du composant et numéro d'objet sont à donner.

Exemple: PM-20 BN 881/01  
 N° 0001 A

N° de schéma 2 T 2  
 N° de position  
 N° d'objet 0001-0015.836

### Raccordement des modules

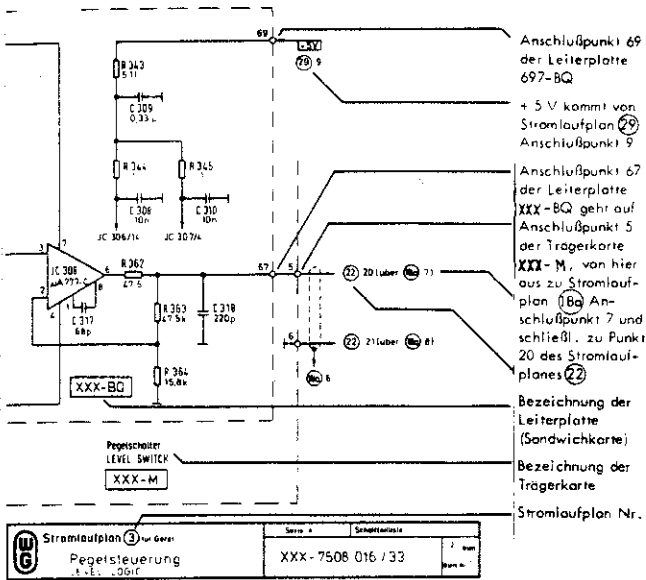
Les schémas de principe des modules étant représentés séparément les liaisons entre les différents modules doivent être facilement reconnues. Le schéma suivant indique le système d'identification utilisé.

#### Système 1

Le point de raccordement du module comporte l'adresse de l'autre point de raccordement auquel il est relié.

#### Système 2

Le point de raccordement ne comporte qu'une indication de signal sans adresse. Tous les points de raccordement des autres modules comportant la même indication de signal sont alors reliés ensemble.



Anschlußpunkt 69 der Leiterplatte 697-BQ  
 + 5 V kommt von Stromlaufplan (29) Anschlußpunkt 9  
 Connection point 69 of printed circuit board (p.c.b.) 697-BQ  
 +5 V coming from circuit diagram (29) connection point 9  
 Anschlußpunkt 67 der Leiterplatte XXX-BQ geht auf Anschlußpunkt 5 der Trägerkarte XXX-M, von hier aus zu Stromlaufplan (18a) Anschlußpunkt 7 und schließlich zu Punkt 20 des Stromlaufplans (22)  
 Connection point 67 of the p.c.b. XXX-BQ going to connection point 5 of mother board XXX-M, and from this point, to circuit diagram (18a) connection point 7, finally going to point 20 of circuit diagram (22)  
 Bezeichnung der Leiterplatte (Sandwichkarte)  
 Designation of p.c.b. (sandwich card)  
 Bezeichnung der Trägerkarte  
 Designation of mother board  
 Stromlaufplan Nr.  
 Circuit diagram No.

Point 69 du circuit imprimé 697-BQ  
 le +5 V arrive du schéma (29) point 9  
 le point 67 du circuit imprimé XXX-BQ va au point 5 de la carte support XXX-M, de là au schéma (18a) point 7 et pour terminer au point 20 du schéma (22)  
 Désignation du circuit imprimé (carte sandwich)  
 Désignation de carte support  
 N° du schéma de principe

Stromlaufplan (29) für Gerät	Seite 4	Schaltplanseite	2 von 2
Pegelsteuerung	XXX-7508 016 / 33		

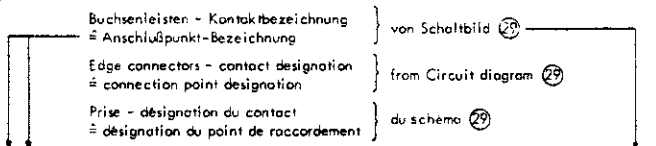
**Bezeichnung der Anschlußpunkte**  
 (30) 21: Anschlußpunkt 21 von Schaltbild (30)  
 (30) S 3010/a/5: Kontakt a/5 von Schalter 10 in Schaltbild (30)  
 Beispiel: Der Anschlußpunkt M des Schaltbildes (29) mit der Signalbezeichnung "Null-Verschiebung (0,4)" ist mit 2 weiteren Anschlußpunkten der gleichen Signalbezeichnung verbunden.  
 1) Kontakt a/5 von Schalter 10 in Schaltbild (30) (Verbindung läuft ganz oder teilweise außerhalb des Steckkartenträgers)  
 2) bBW/7 von Schaltbild (31) (Verbindung läuft innerhalb des Steckkartenträgers)

Bei Steckkartentechnik mit einem Steckkartenträger gibt eine Liste Auskunft über die Anschlußpunkte mit gleicher Signalbezeichnung.

**Designation of connection points**  
 (30) 21: connection point 21 from circuit diagram (30)  
 (30) S 3010/a/5: contact a/5 from switch 10 in circuit diagram (30)  
 Example: Connection point M of circuit diagram (29) having the signal designation "zero offset (0,4)" is connected to two other connection points of the same signal designation.  
 1) Contact a/5 from switch 10 in circuit diagram (30) (connection passes completely, or partially, outside of the mother board)  
 2) bBW/7 from circuit diagram (31) (connection stays within the mother board)

With plug-in p.c.b. technology using plug-in mother boards, a list provides information concerning the connection points having the same signal designation.

**Désignation des points de raccordement**  
 (30) 21: point de raccordement 21 du schéma (30)  
 (30) S 3010/a/5: contact a/5 du commutateur 10 du schéma (30)  
 Exemple: Le point de raccordement M du schéma (29) avec l'indication de signal "décalage du zéro (0,4)" est relié à deux autres points de raccordement avec la même indication de signal.  
 1) Contact a/5 du commutateur 10 du schéma (30) (la liaison passe entièrement ou en partie hors de la carte support)  
 2) bBW/7 du schéma (31) (la liaison passe dans la carte support)



Signalbezeichnung	außerhalb Prüfbereich	Anschlußpunkte innerhalb Prüfbereich	1	11	12	11	außerhalb Prüfbereich	Anschlußpunkte außerhalb Prüfbereich	Signalbezeichnung	Leiste
+ 12 V		Stromversorgung stebe 81.16	136	V	16	18	Stromversorgung stebe 81.16		+ 12 V	(29)
0		Erde	135	U	17	17	K (31) Ba 3101 / 4		0	376-CG
4 x 10 <sup>-2</sup>		(31) Ba 3101 / 2	2	1	16	16	(31) Ba 3101 / 8	xxx	(30) 19	BI.33
2 <sup>2</sup> x 0,01 a	(30) 18	xxx	(31) bBW / 3	2	33	15	(31) bBW / 1	xxx	(30) 17	
2 <sup>0</sup> x 0,01 a	(30) 16	xxx	(31) bBW / 8	2	32	14	(18) B / 8, (19) C / 8, (20) A / 8, (22) B / 8		Bereicht (Signal)	
1 x 10 <sup>-2</sup>		(31) Ba 3101 / 1	2	3	13	12	(31) Ba 3101 / 2		2 x 10 <sup>-2</sup>	
Null - Verschiebung (0,2)	(30) S 3010 / a / 3	xxx	(31) bBW / 6	2	30	M	(31) bBW / 5	xxx	(30) S 3010 / a / 2	Null - Verschiebung (0,2)
Null - Verschiebung (0,4)	(30) S 3010 / a / 5	xxx	(31) bBW / 7	2	25	M	(31) bBW / 4	xxx	(30) S 3010 / a / 4	Null - Verschiebung (0,4)
Null - Verschiebung (0,6)	(30) S 3010 / a / 7	xxx	(31) bBW / 8	2	28	L	(31) bBW / 3	xxx	(30) S 3010 / a / 6	Null - Verschiebung (0,6)
Null - Verschiebung (0,8)	(30) S 3010 / a / 5	xxx	(31) bBW / 9	2	27	K	(31) bBW / 2	xxx	(30) S 3010 / a / 8	Null - Verschiebung (0,8)
Null (hoch)		Stromversorgung stebe 81.16	28	J	8	8	Stromversorgung stebe 81.16		Null (hoch)	
Verschiebung 2 <sup>0</sup>	(19) E / 8, (22) B / 3, (23) U / 7		4	25	M	7	(31) bBW / 1	xxx	(30) S 3010 / a / 10	Null - Verschiebung (0,9)
Verschiebung 2 <sup>2</sup>	(19) E / 5		2	24	F	6	(19) E / 4		Verschiebung 2 <sup>2</sup>	
Verschiebung 2 <sup>1</sup>	(22) B / 4		2	23	E	5	(19) E / 10		Verschiebung 2 <sup>1</sup>	
Verschiebung 2 <sup>0</sup>	(20) 21	xxx	(31) bBW/11, (19) E/9	2	22	G	4	(22) B / 4	Verschiebung 2 <sup>0</sup>	
Verschiebung 2 <sup>1</sup>		(22) B / 6		2	21	C	3	(20) A / 6, (21) G / 6	Verschiebung 2 <sup>1</sup>	
2 <sup>2</sup> A, 0,01 a	(20) A / 8, (21) G / 8		2	20	B	2	(20) A / 4, (21) G / 4		2 <sup>2</sup> x 0,01 a	
+ 5 V		Stromversorgung stebe 81.16	19	A	1	1	(20) A / 8, (21) G / 8		5 <sup>0</sup> x 0,01 a	

Anschlußpunkte mit gleicher Signalbezeichnung für diese Buchsenreihe  
 Connection points with the same signal designation for this connector row of contacts  
 Points de raccordement avec même indication de signal pour cette rangée de prises


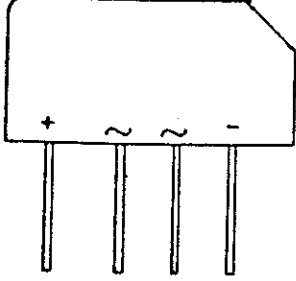
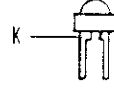
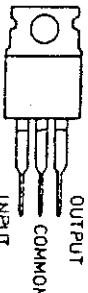
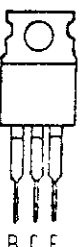
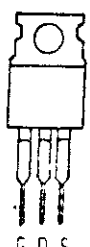
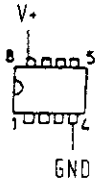
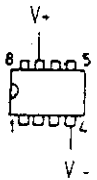
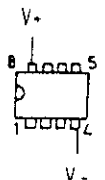
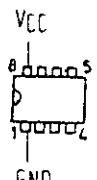
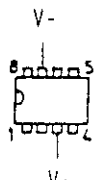
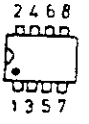
außerhalb Prüfbereich xxx innerhalb Prüfbereich  
 außerhalb Prüfbereich ≡ diese Anschlußpunkte sind durch Leitungen verbunden, die teilweise oder ganz außerhalb des Steckkartenträgers verlaufen.

outside of test region xxx within test region  
 outside of test region ≡ these connection points are connected by lines which partially, or completely, pass outside of the mother board.

hors gamme de contrôle xxx dans la gamme de contrôle  
 hors gamme de contrôle ≡ ces points de raccordement sont reliés par des conducteurs qui passent en partie ou entièrement hors de la carte support.

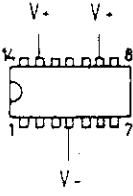
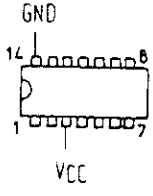
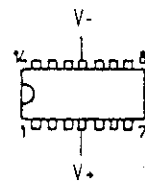
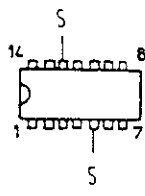
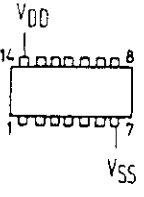
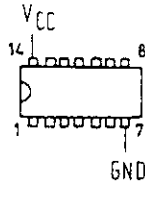
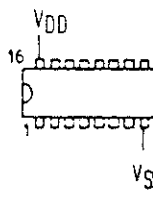
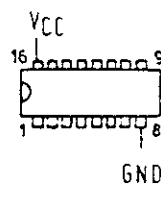
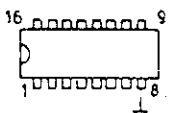
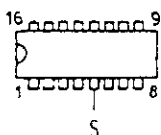
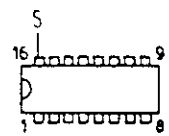
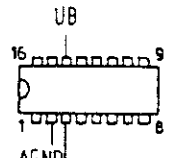
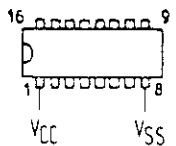
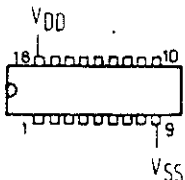
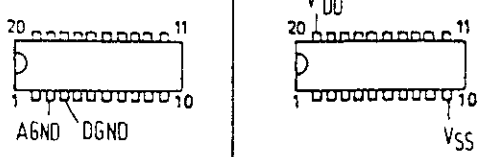
# ELEKTRODENKENNZEICHNUNG ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

Solern nicht anders vermerkt, alle Anschlußpläne von oben gesehen  
Unless otherwise noted, all connection plans are seen from above  
Sans autres indications tous les schemas de raccordement sont vus de dessus

 <p>1N 4007 1N 4448 1N 4572 A 1N 4573 A BB 329 HP 5082-2800 HP 5082-2811 ZPD 3 ZPD 5,1 ZPD 5,6 ZPD 7,5 ZPD 10 ZTE 1,5 ZTE 2 ZY 33</p>	 <p>B 80 C 3700 / 2700</p>	 <p>CQX 43N</p>		
 <p><math>\mu</math>A 7805 AH</p>	 <p>B 0X 33 B</p>	 <p>BUZ 10</p>		
 <p>LM 393 N</p>	 <p><math>\mu</math>A 741HC <math>\mu</math>A 776TC LF 356 H TL 061 TL 082 ICL 7615 NE 5534 AN</p>	 <p>TL 062</p>	 <p>ICM 7555</p>	 <p>TAA 2761</p>
 <p>IE 500 SRA-1</p>	<p>Serie A ...</p> <p>Bv. 955 - 9480.004/4</p> <p>4 Bl. / 2 Bl. 1</p>			

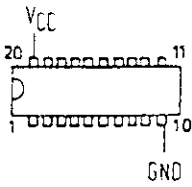
# ELEKTRODENKENNZEICHNUNG ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

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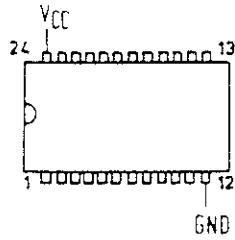
 <p> <math>\mu</math>A 747 PC TDA 1078 NE 5539N         </p>	 <p>LM 339</p>	 <p>TL 064</p>	 <p>CA 3102 E</p>				
 <p>           CD 4047 MC 14 001 MC 14 011 MC 14 013 MC 14 066 MC 14 075 MC 14 077 MC 14 081 MC 14 561         </p>	 <p>           SN 74 LS 00 SN 74 LS 02 SN 74 LS 04 SN 74 LS 08 SN 74 LS 74 SN 74 LS 393         </p>	 <p>           HEF 40098 MC 14027 MC 14028 MC 14042 MC 14056 MC 14060 MC 14503 MC 14516 MC 14520 MC 14538 MC 14572         </p>	 <p>           SN 74 LS 138 SN 74 LS 368         </p>				
 <p>ULN 2003 ANS 11</p>	 <p>CA 3083</p>	 <p>CA 3096</p>	 <p>AD 7524 JN</p>				
 <p>           MC 14049 MC 14050         </p>	 <p>CDP 1824 E</p>	 <p>           AD 7545 KN HEF 40373         </p> <table border="1" data-bbox="782 1926 1300 2049"> <tr> <td colspan="2">Serie A</td> </tr> <tr> <td>Bv. 955-9480.004/4</td> <td>4 BI BI. 2</td> </tr> </table>		Serie A		Bv. 955-9480.004/4	4 BI BI. 2
Serie A							
Bv. 955-9480.004/4	4 BI BI. 2						

ELEKTRODENKENNZEICHNUNG  
ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

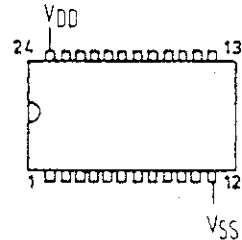
sofern nicht anders vermerkt alle Anschlussschemas von oben gesehen  
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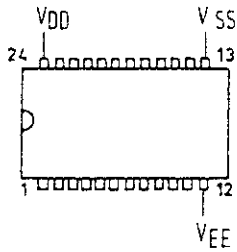
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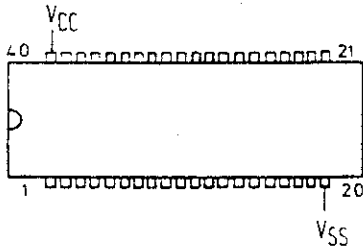
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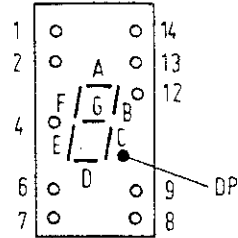
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MC 14433 P

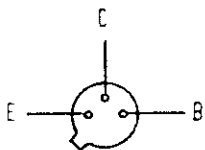


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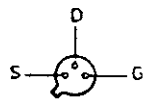


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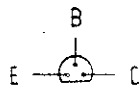
Von unten gesehen / Seen from below / Vus de dessous



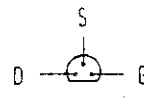
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2 N 3227  
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BCY 59 D  
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BC 327-25



BF 245 A

Serie A...

Bv. 955 - 9480.004 / 4

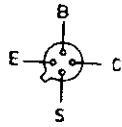
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4 Bl.  
Bl. 3

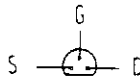
ELEKTRODENKENNZEICHNUNG  
ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

Solern nicht anders vermerkt, alle Anschlußschemas von oben gesehen  
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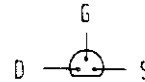
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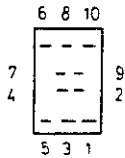
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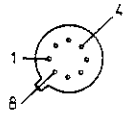
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BS 250 (ZVP1304 A)



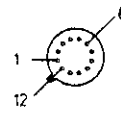
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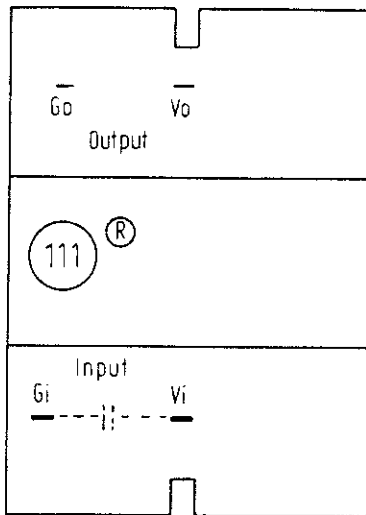
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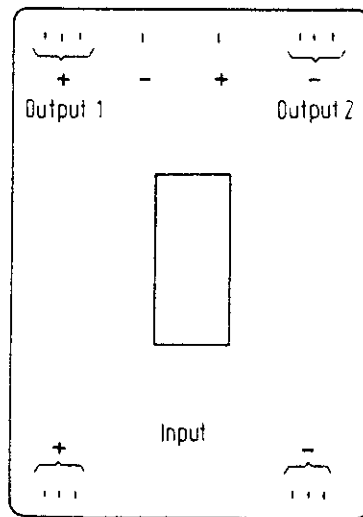
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CA 3039



PSR 54-7



FCR 6-1212-6

Serie A...

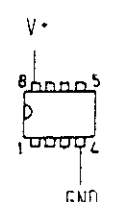
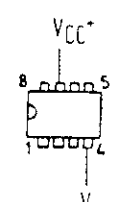
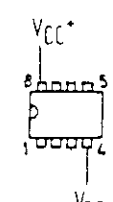
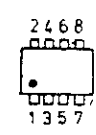
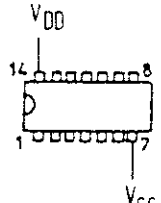
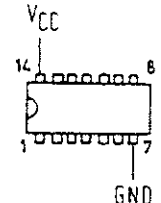
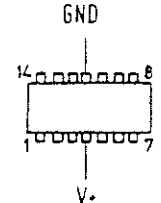
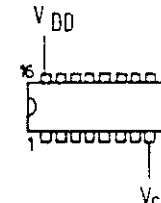
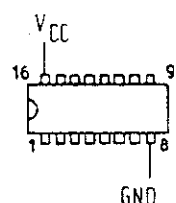
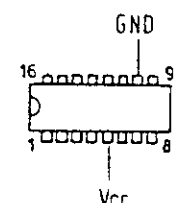
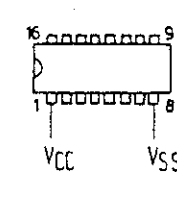
Bv. 955-9480.004 / 4

4 Bl  
Bl. 4

10

ELEKTRODENKENNZEICHNUNG  
ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

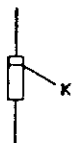
Solern nicht anders vermerkt, alle Anschlußschemas von oben gesehen  
Unless otherwise noted, all connection plans are seen from above  
Sans autres indications tous les schémas de raccordement sont vus de dessus

 <p>LM 358 N LM 393 N</p>	 <p>TL 061 TL 071 TL 081</p>	 <p>TL 062</p>	 <p>TE 500</p>
 <p>MC 14011 MC 14012 MC 14023 MC 14025 MC 14073 MC 14082 CD 4047 HEF 4068</p>	 <p>SN 74 LS 00 SN 74 LS 08 SN 74 LS 10 SN 74 LS 20</p>	 <p>LM 324 N</p>	 <p>HEF 4027 HEF 40174 MC 14027 MC 14518 CD 40160 CD 40175</p>
 <p>SN 74 LS 112</p>	 <p>SN 74 LS 90</p>	 <p>MC 14049</p>	
		<p>Serie A...</p> <p>Bv. 2011-9480.009/4 10 2 Bl. Bl. 1</p>	



ELEKTRODENKENNZEICHNUNG  
ELECTRODE DESIGNATION / DESIGNATION d'ELECTRODE

Solfern nicht anders vermerkt, alle Anschlußschemas von oben gesehen  
Unless otherwise noted, all connection plans are seen from above  
Sans autres indications tous les schemas de raccordement sont vus de dessus

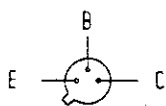


BB 329  
ZPD 5,1  
ZPD 5,6  
ZPD 7,5  
ZPD 10  
ZTE 2  
HP 5082 - 2800  
HP 5082 - 2811  
HP 5082 - 2815  
1N4448

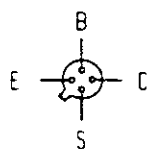


BB 113

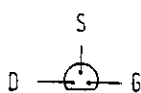
Von unten gesehen / Seen from below / Vus de dessous



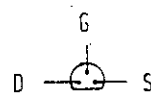
BCY 59 D  
BCY 78 D  
2N 2369  
2N 2894  
2N 3251  
2N 3947  
2N 4035  
2N 4209



BFY 90



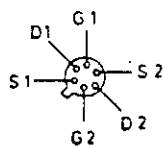
BFY 245 A



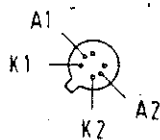
VN 10 LM



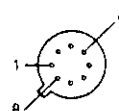
MPS - A 13



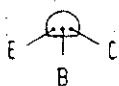
U 402



ID 101



µA 741 HC



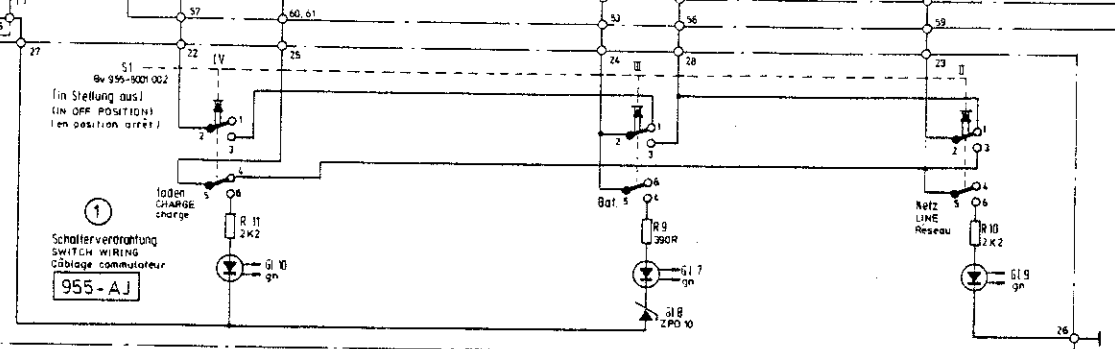
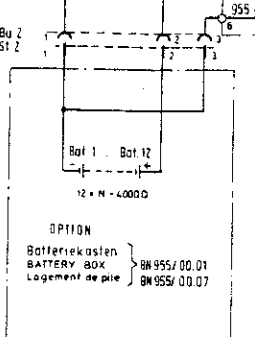
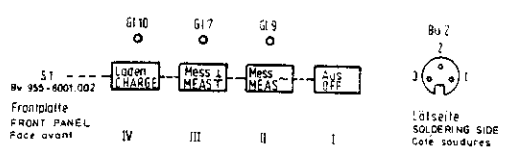
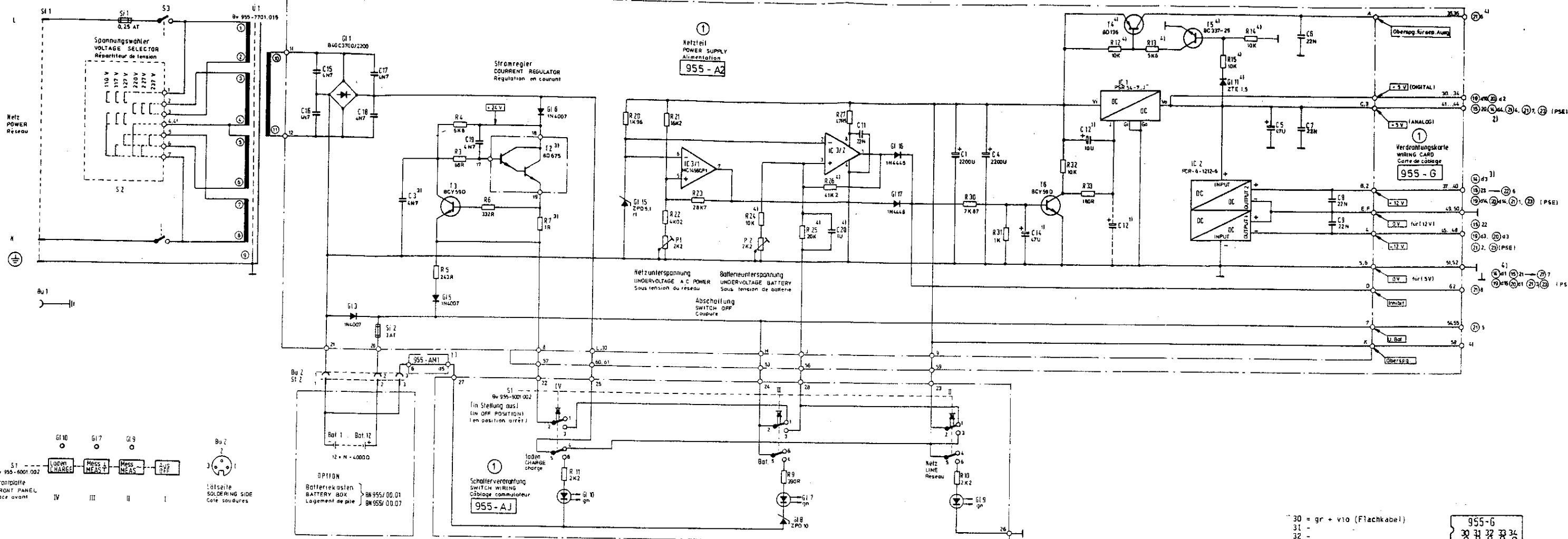
MPS - A 63

Serie A...

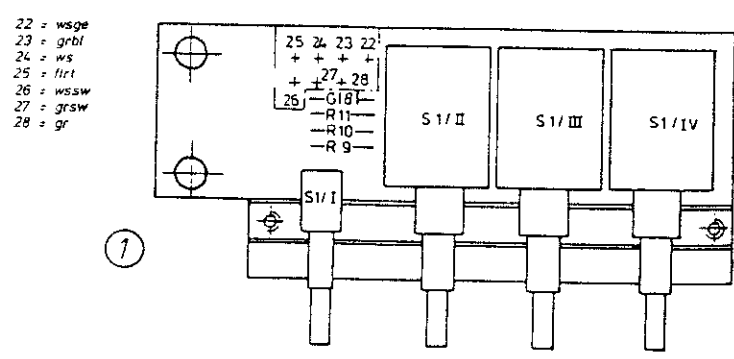
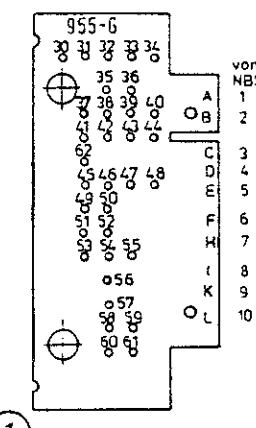
Bv. 2011 - 9480.009/4

2 Bl.  
Bl. 2

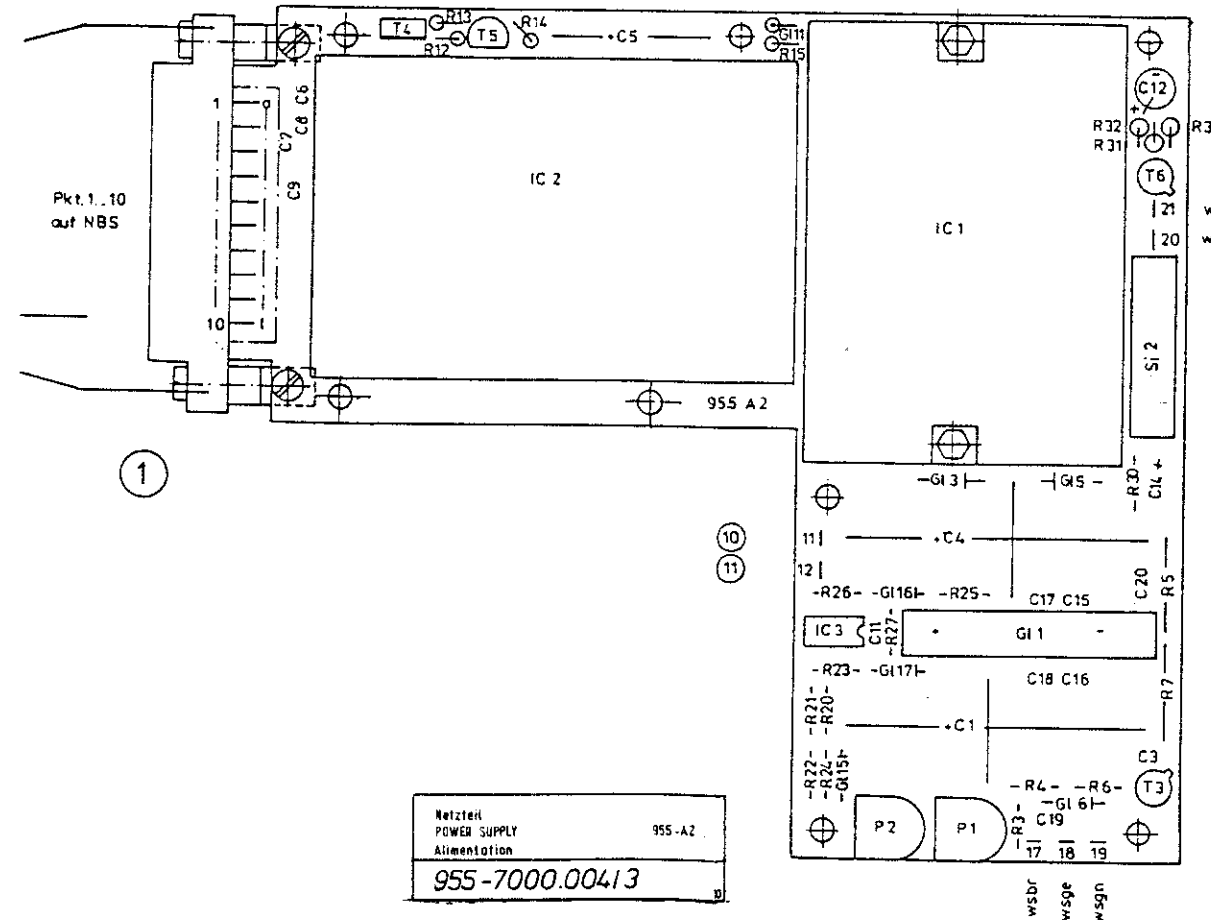
- 1 **Selektiver Pegelmesser SPM-15**      **BN 955/01/02**
- 1 **Selective Level Meter SPM-15**      **BN 955/01/02**
- 1 **Mesureur de niveau sélectif SPM-15** **BN 955/01/02**



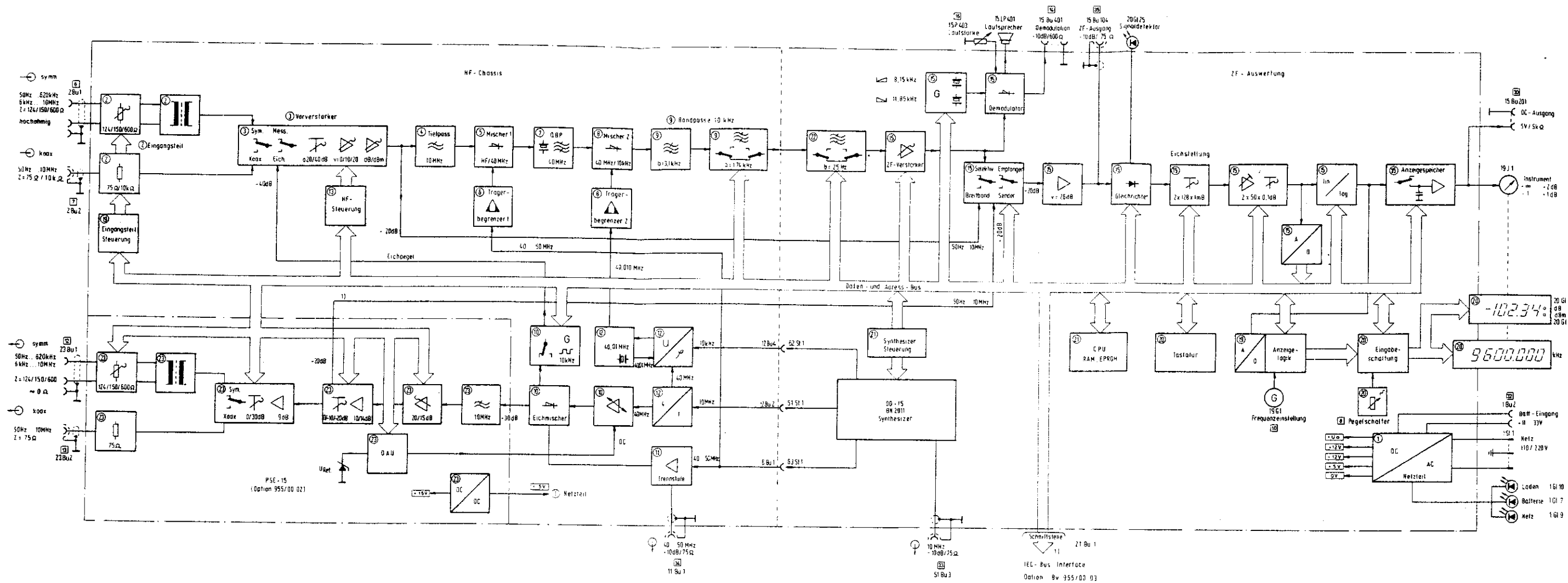
- 30 = gr + vio (Flachkabel)
- 31 -
- 32 -
- 33 -
- 34 -
- 35 -
- 36 = fl w/
- 37 = bl (Flachkabel)
- 38 = 2 x wsrt
- 39 = 2 x wsrt
- 40 -
- 41 = 2 x grnt
- 42 = 2 x grnt
- 43 = grnt
- 44 -
- 45 = gn (Flachkabel)
- 46 = 2 x wsbl
- 47 = wsbl
- 48 -
- 49 = wssw
- 50 = wssw
- 51 = wssw
- 52 = 2 x ws
- 53 -
- 54 -
- 55 -
- 56 = gr
- 57 = usge
- 58 = 1 x grbl
- 59 -
- 60 = flrt
- 61 -
- 62 = wsbr



Schalterverdrahtung  
SWICH WIRING  
Câblage commutateur  
955-A1  
955-7033.00014



Netzteil  
POWER SUPPLY  
Alimentation  
955-A2  
955-7000.00413

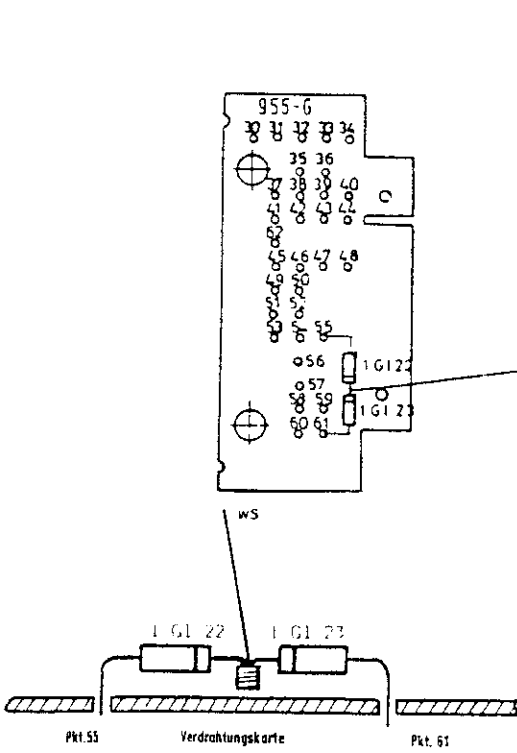
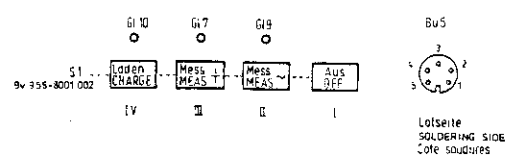
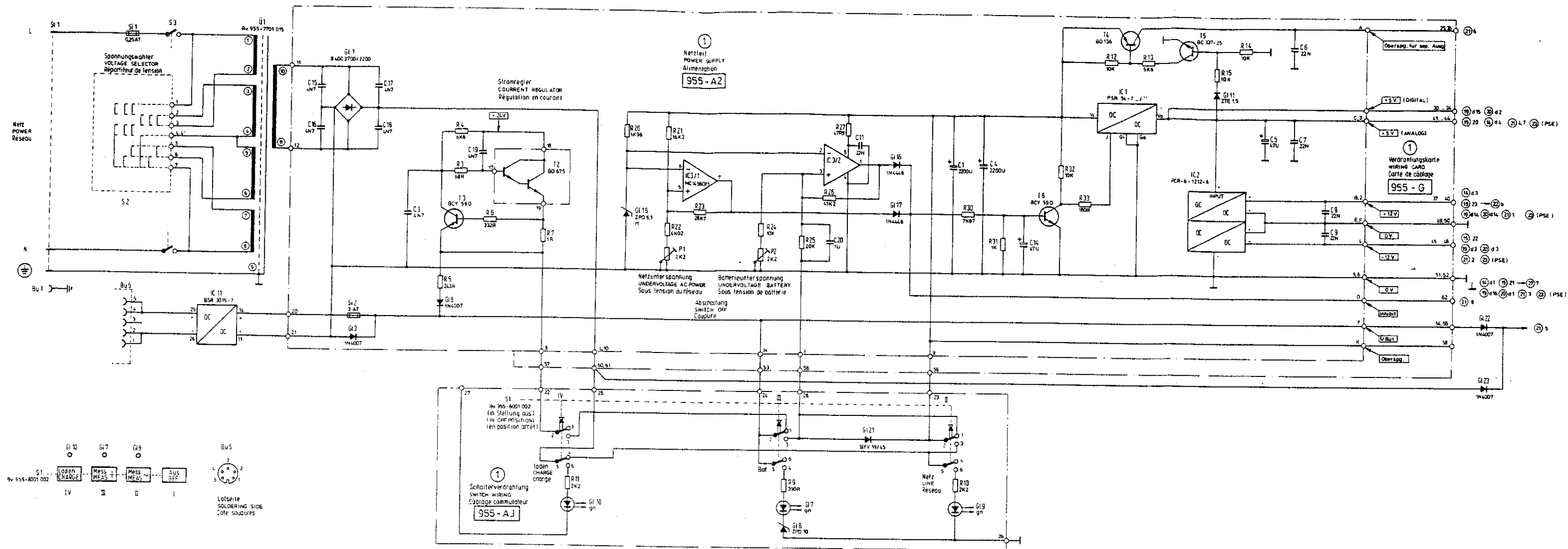


- |                      |                       |                              |
|----------------------|-----------------------|------------------------------|
| Anzeigelogik         | DISPLAY LOGIC         | Logique d'affichage          |
| Anzeigespeicher      | DISPLAY MEMORY        | Mémoire d'affichage          |
| Bandpass             | BANDPASS FILTER       | Passes bande                 |
| Batterie             | Batterie              | Batterie                     |
| Breitband            | WIDEBAND              | Large bande                  |
| Data- und Adress-Bus | DATA- AND ADDRESS BUS | Bus d'adresses et de données |
| Demodulator          | DEMODULATOR           | Démodulateur                 |
| Eingebeschaltung     | ENTRY CIRCUIT         | Circuit d'entrée             |
| Eingangsteil         | INPUT SECTION         | Section entrée               |
| Eichen               | CALIBRATE             | Étalonnage                   |
| Empfänger            | RECEIVER              | Récepteur                    |
| Eichmischer          | CALIBRATION MIXER     | Mélangeur d'étalonnage       |
| Eichpegel            | CALIBRATION LEVEL     | Niveau étalon                |
| Eichstellung         | CALIBRATION SETTING   | Position d'étalonnage        |
| F. IEC-Bus Adapter   | F. IEC BUS ADAPTOR    | Adaptateur bus IEC           |
| Frequenzinstellung   | FREQUENCY SETTING     | Commande de la fréquence     |
| Gleichrichter        | RECTIFIER             | Redresseur                   |
| HF-Steuerung         | RF-CONTROL            | Commande RF                  |
| hochohmig            | HIGH IMPEDANCE        | à haute impédance            |
| Instrument           | METER                 | Instrument                   |
| Laden                | CHARGE                | Charge                       |
| Lautsprecher         | LOUDSPEAKER           | Haute-parleur                |
| Lautstärke           | VOLUME                | Volume sonore                |
| Messan               | MEASURE               | Mesure                       |
| Mischer              | MIXER                 | Mélangeur                    |
| Netz                 | MAINS                 | Réseau                       |
| Netzteil             | POWER SUPPLY          | Alimentation                 |
| Pegelschalter        | LEVEL SWITCH          | Commutateur de niveau        |
| QBP (Quarzbandpass)  | CRYSTAL FILTER        | Filtere passe bande à quartz |
| Schnittstelle        | INTERFACE             | Interface                    |
| Selektiv             | SELECTIV              | Sélectif                     |
| Sender               | GENERATOR             | Générateur                   |
| Signaldetektor       | SIGNAL DETECTOR       | Détecteur de signaux         |
| Synthesizer          | SYNTHESIZER           | Synthétiseur                 |
| Tastatur             | KEYBOARD              | Clavier                      |
| Tiefpass             | LOW-PASS FILTER       | Filtere passe bande          |
| Trennstufe           | BUFFER STAGE          | Séparateur                   |
| Trägerbegrenzer      | CARRIER LIMITER       | Limiteur de porteur          |
| Vorverstärker        | PRE AMPLIFIER         | Préamplificateur             |
| ZF-Ausgang           | IF-OUTPUT             | Sortie IF                    |
| ZF-Verstärker        | IF-AMPLIFIER          | Amplificateur IF             |

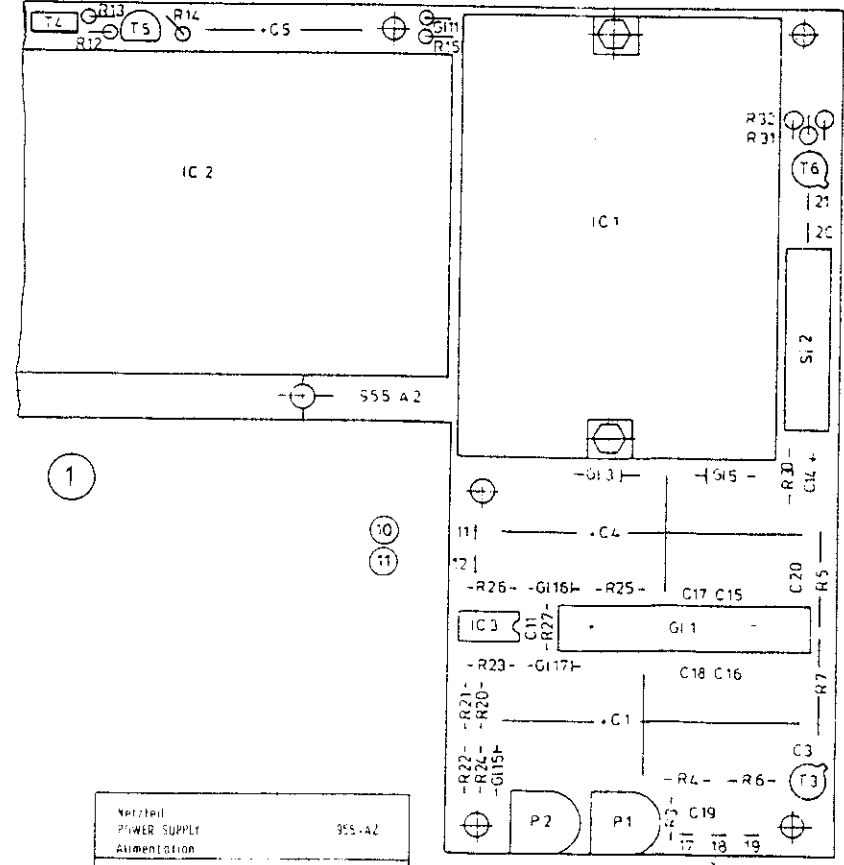
Seriennummerung  
SERIES MODIFICATIONS  
Modification de série

Serie A ... enthält ... DEL DEC. 1987

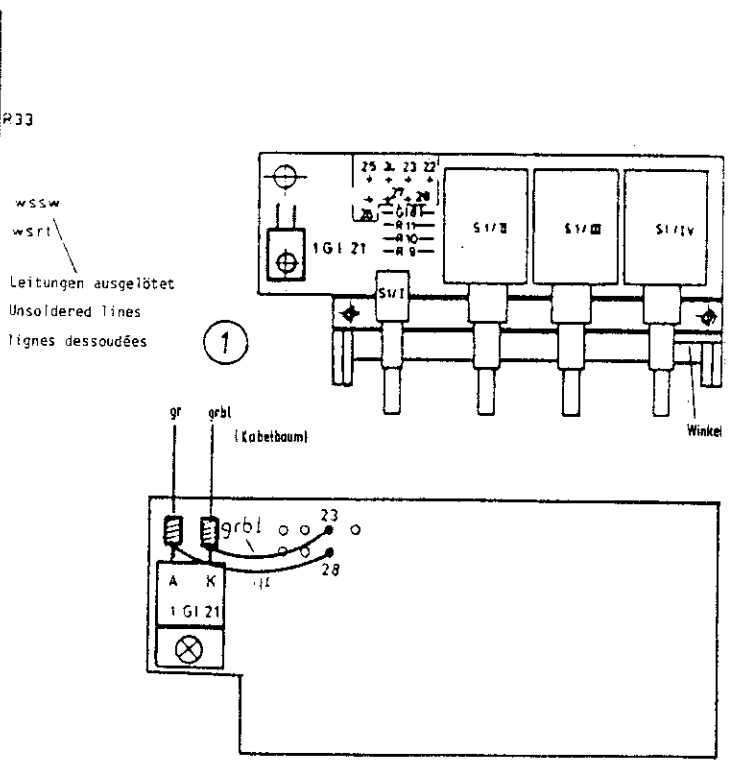
SPM - 15 / BN 955	Serie A ...
Blockschaltplan BLOCK DIAGRAM Schéma synoptique	
955 - 7500.012 / 3	2 <sup>1 Blatt</sup> / <sub>Blatt =</sub> FF



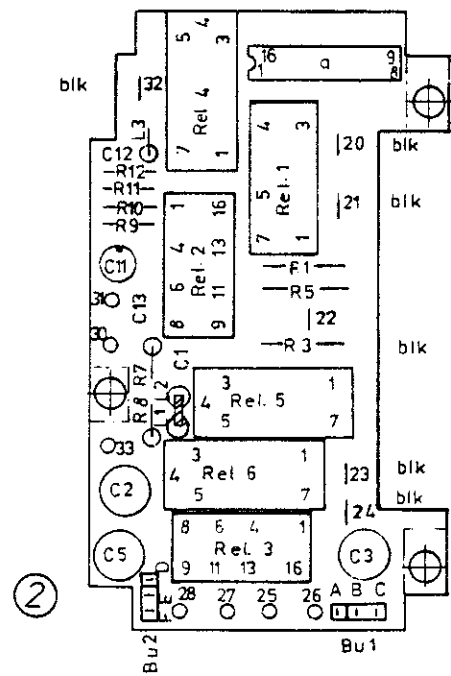
Benennung: Verdrahtungskarte WIRING CARD Carte de câblage 955-G  
**955-7006.00814**



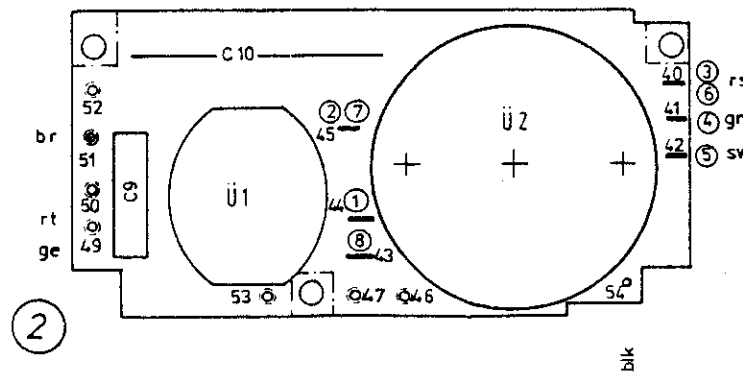
Netzteil POWER SUPPLY Alimentation 955-A2  
**955-7000.00413**



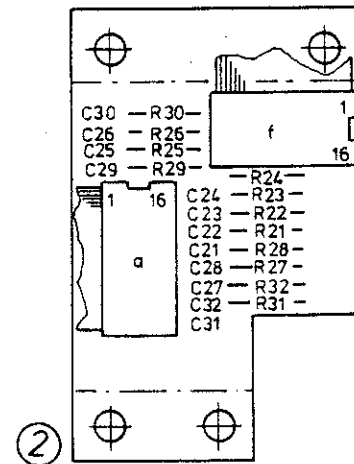
Schaltverdrahtung SWITCH WIRING Câblage commutateur 955-AJ  
**955-7033.00014**



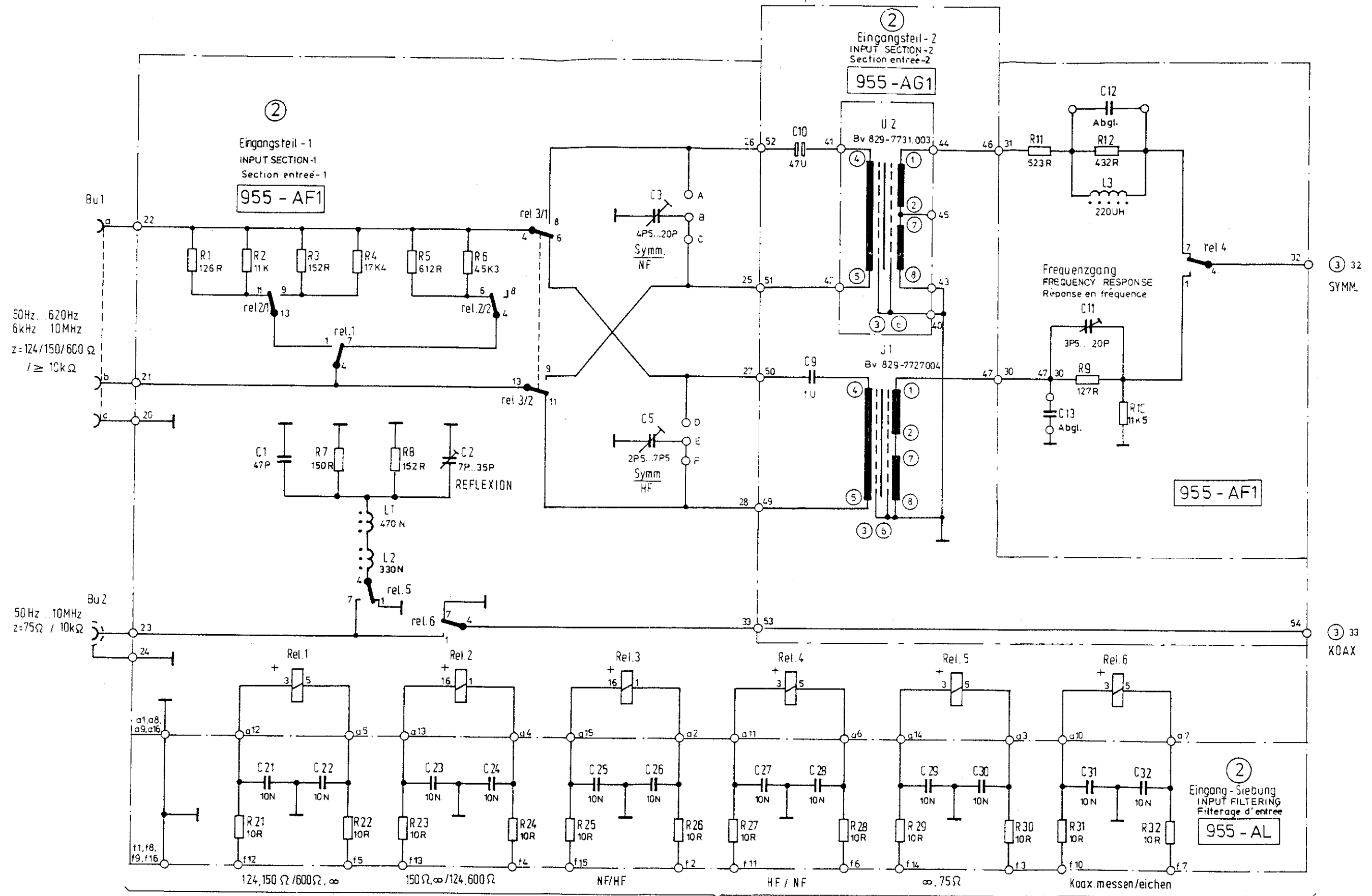
Eingangsteil 1	
INPUT SECTION 1	955 - AF1
Section entrée 1	
<b>955-7030.00314</b>	



<b>Benennung:</b>	
Eingangsteil 2	
INPUT SELECTION 2	955-AG1
Section entrée 2	
<b>955-7031.00214</b>	



Eingang-Siebung	
INPUT FILTERING	955-AL
Filterage d'entrée	
<b>955-7035.00814</b>	



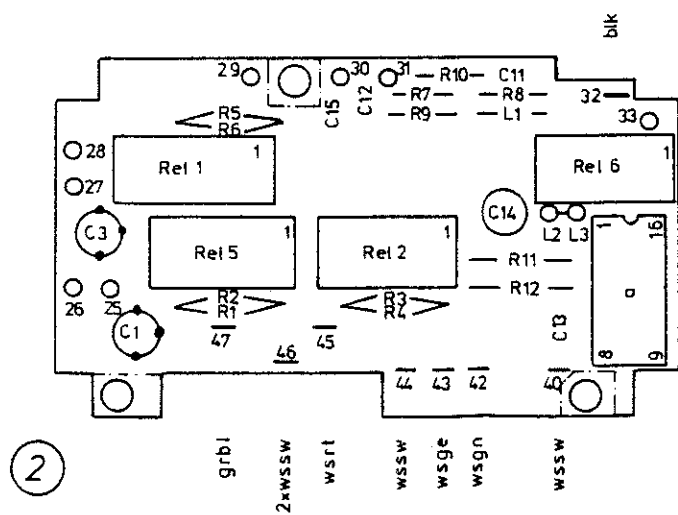
50Hz...620Hz  
6kHz...10MHz  
z=124/150/600 Ω  
I ≥ 10kΩ

50Hz...10MHz  
z=75Ω / 10kΩ

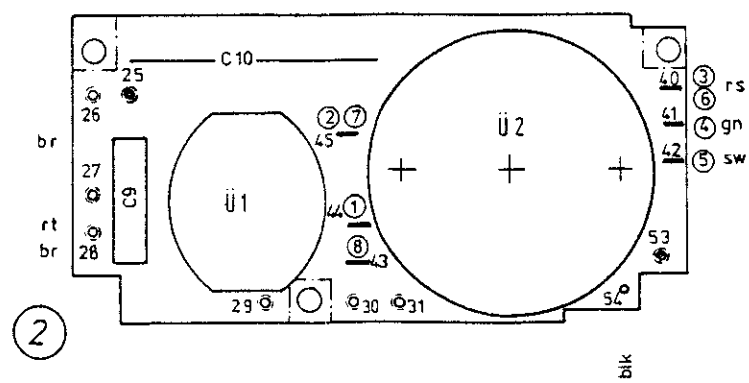
zu ⑧ Anzeigelogik  
to ⑧ DISPLAY LOGIC  
à ⑧ Logique d'affichage

Nur Ausführung 01  
Only version 01  
Uniquement pour version 01

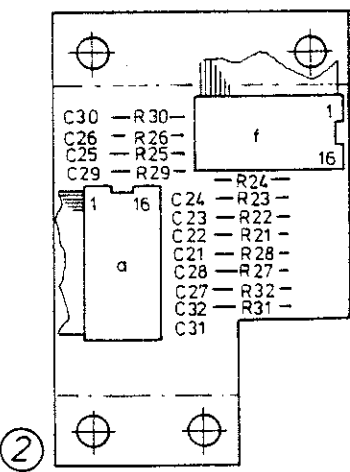
	Stromlaufplan ② für Gerät...BN.955/SPM-15	Serie N
	Eingangsteil- INPUT SECTION Section entrée	955-7502.023 / 3



Benennung:	
Eingangsteil-US	
INPUT SECTION-US	
Section entrée-US	955-L
955-7010.007/4	

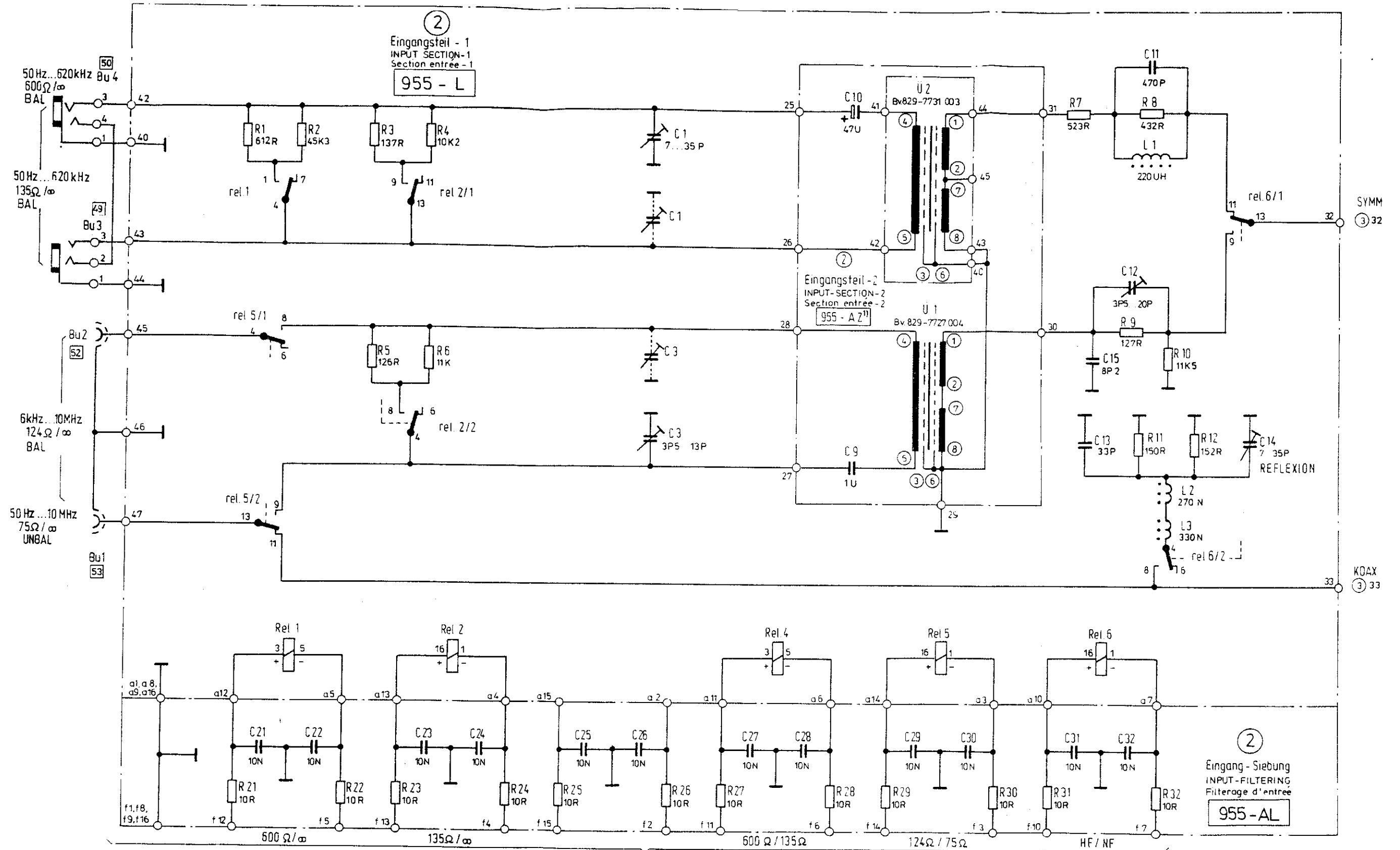


Benennung:	
Eingangsteil 2	
INPUT SELECTION 2	955-AZ
Section entrée 2	
955-7049.007/4	



Eingang-Siebung	
INPUT FILTERING	955-AL
Filterage d'entrée	
955-7035.008/4	



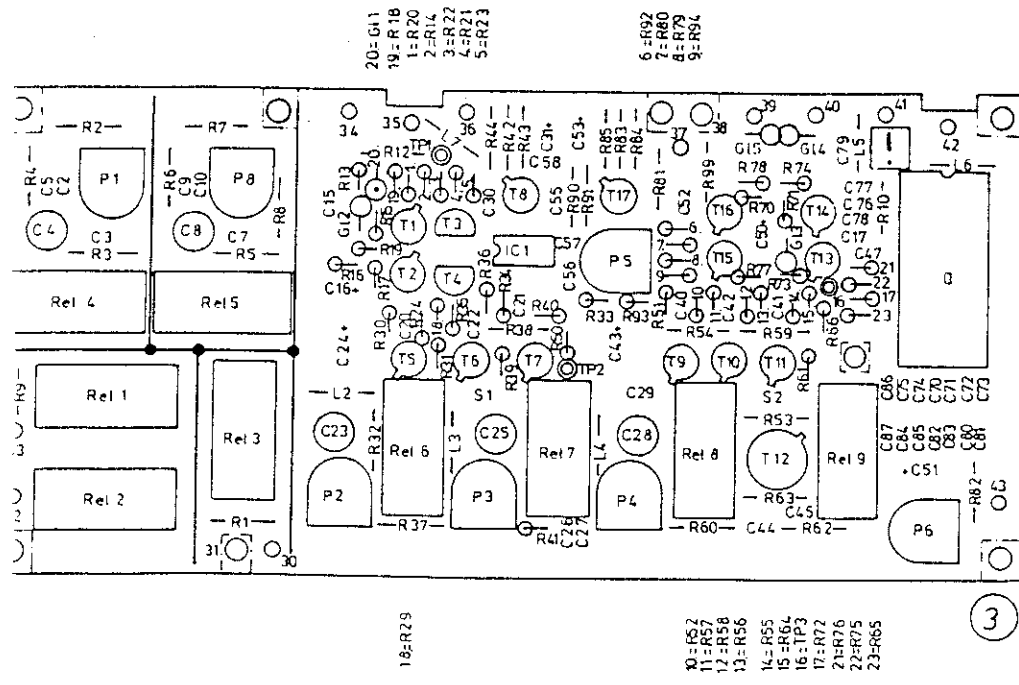
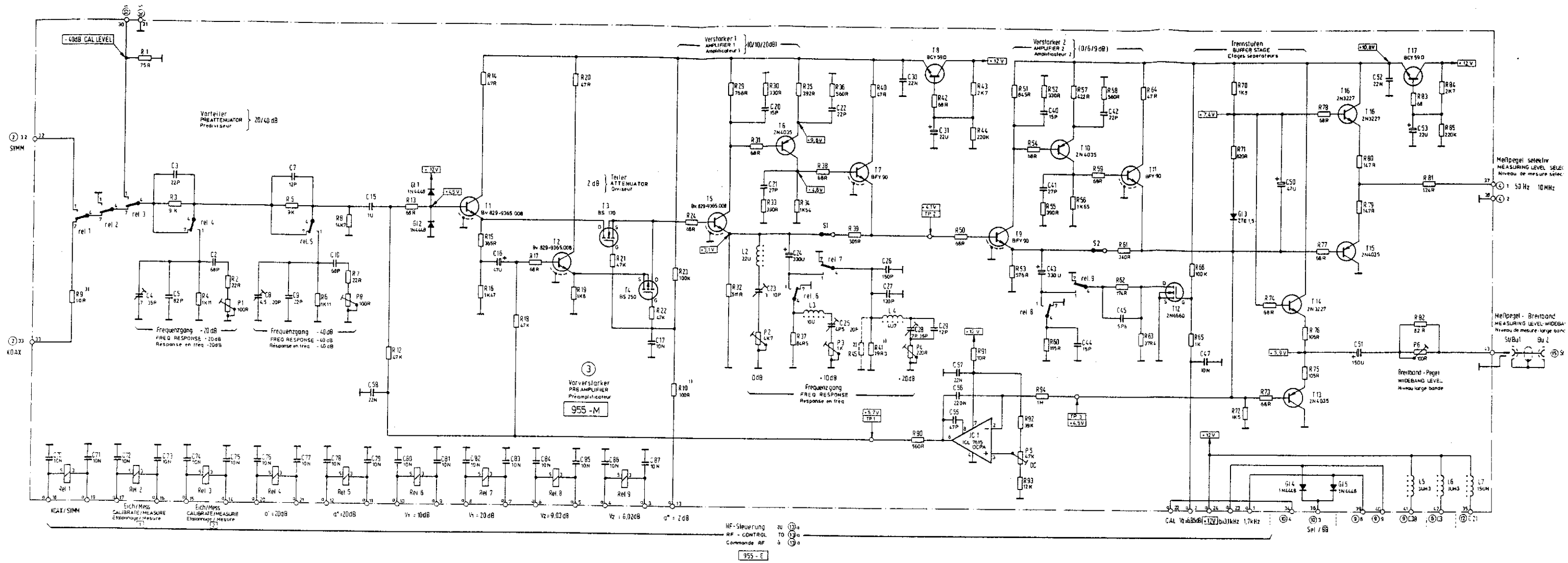


Serienanmerkung: 1) Serie E... M: LP-Index / 955 - AG

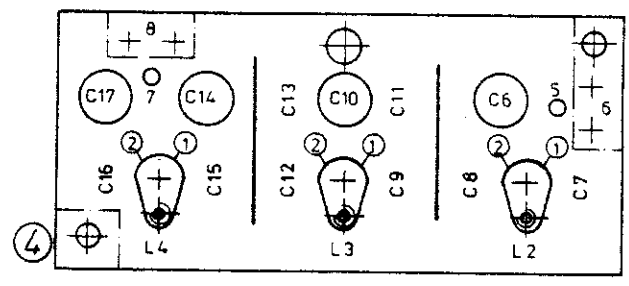
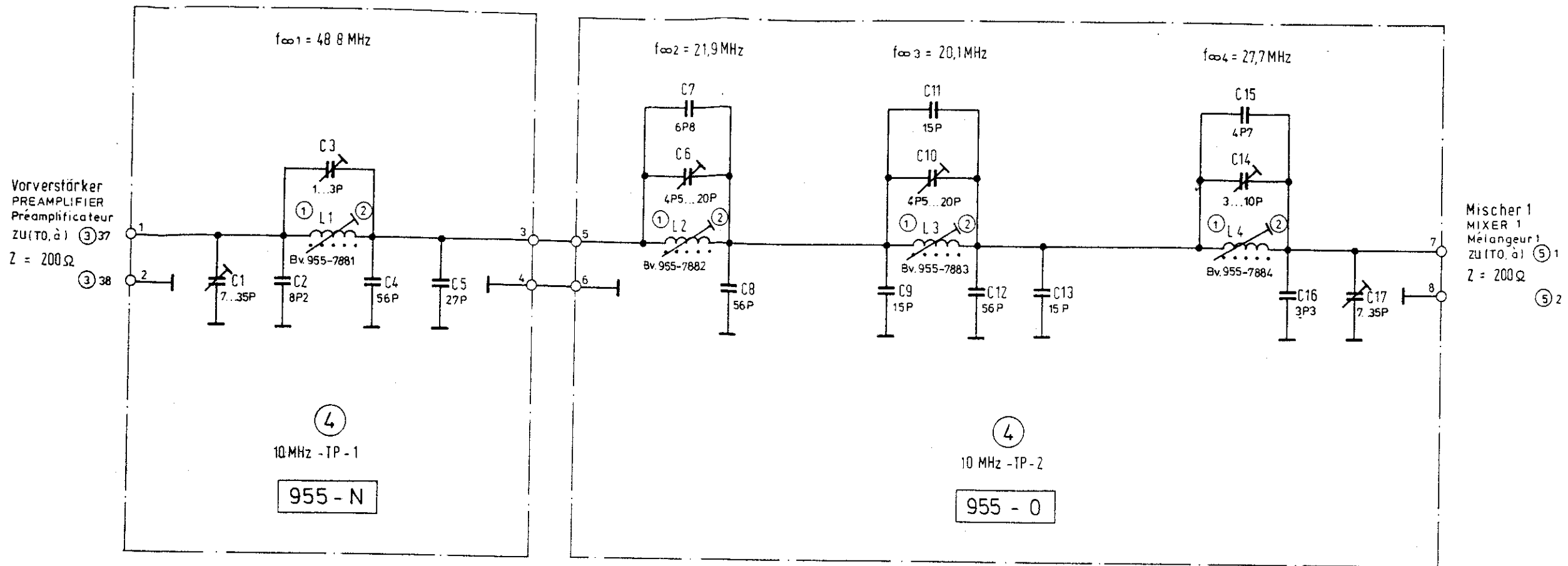
zu (19) f Anzeigelogik  
to (19) f DISPLAY LOGIC  
à (19) f Logique d'affichage

Nur Ausführung 02  
Only version 02  
Uniquement pour version 02

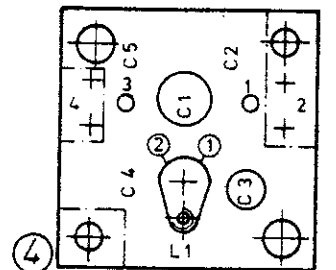
	Stromlaufplan	für Gerät... SPM-15 / BN 955/G2..	Serie E...
	Eingangsteil - US INPUT SECTION - US Section entrée - US	②	955 - 7502 . 502 / 3
			1. Blatt Blatt-Nr...



Benennung: Vorverstärker PREAMPLIFIER 955-M  
 955-7011.00614

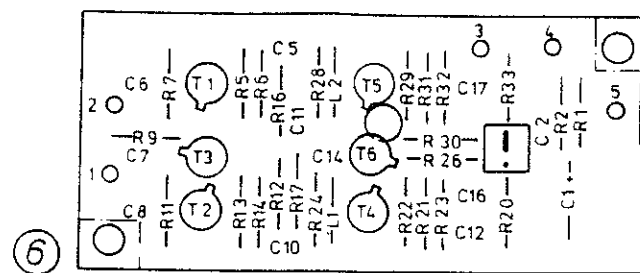
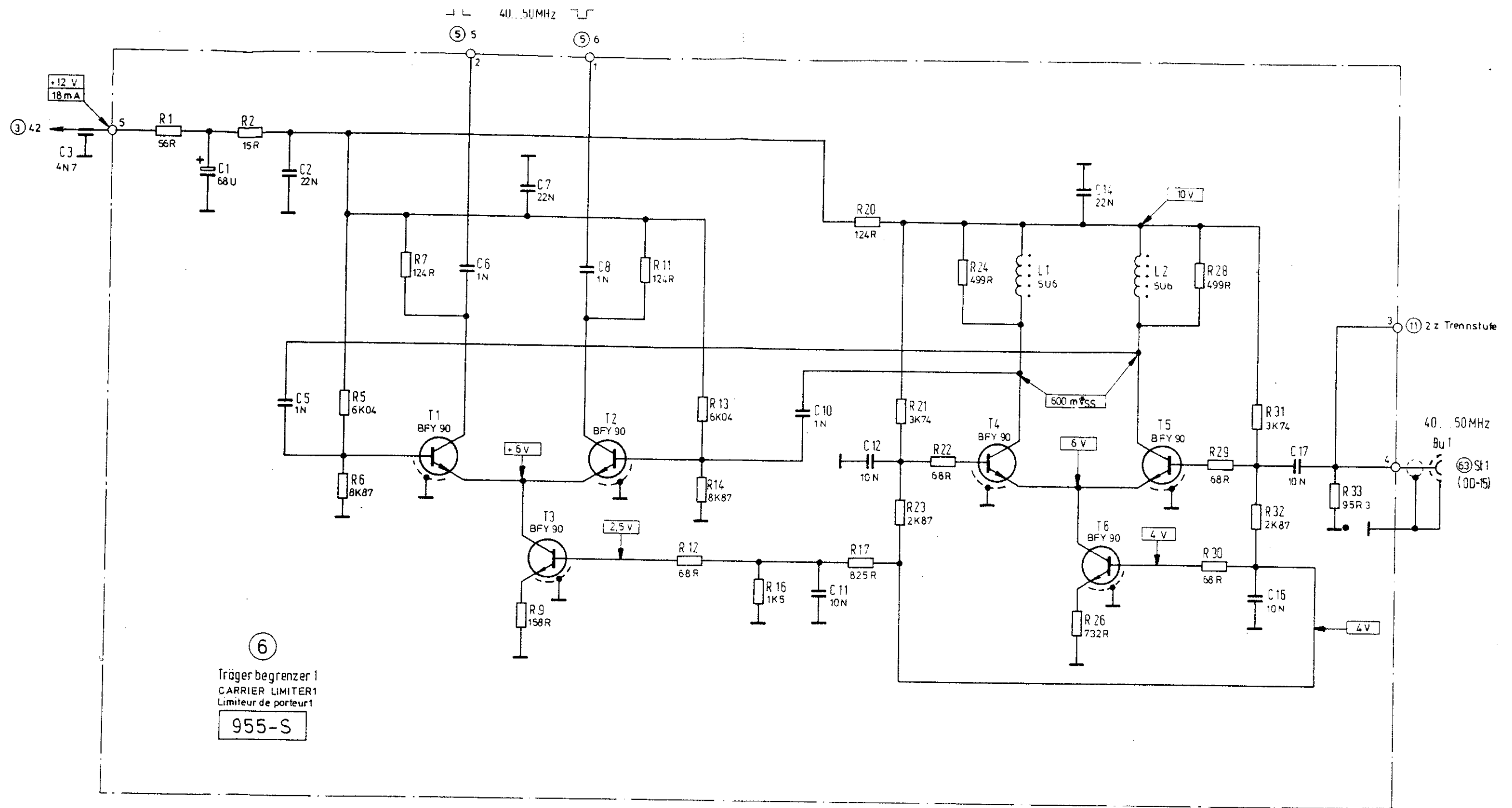


Eingangstiefpass 2  
 INPUT LOW-PASS FILTER 2 955-0  
 Filtre passe-bas d'entrée 2  
**955-7013.00414** 1a



Tiefpass  
 LOW-PASS FILTER 955-N  
 Filtre passe-bas  
**955-7012.00514** 1a

	<b>Stromlaufplan</b> (4) für Gerät ... BN.955/SPM:15		Serie A...	Schaltteilliste:
	Eing. - Tiefpass 10 MHz INPUT LOW - PASS FILTER 10 MHz Filtre passe - bas 10 MHz		955 - 7504.018 / 3	... Blatt Blatt-Nr.:



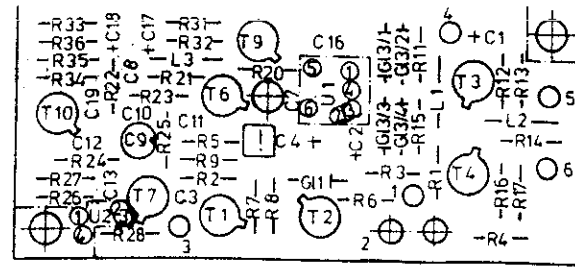
Benennung:  
Trägerbegrenzer I  
CARRIER LIMITER I  
Limiteur de porteur I

955-S

955-7017.00014

1a

	<b>Stromlaufplan</b> für Gerät ..SPM..15 / BN955 ..	Serie A
	Trägerbegrenzer 1 CARRIER LIMITER 1 Limiteur de porteur 1	⑥
		... Blatt Blatt-Nr. 1



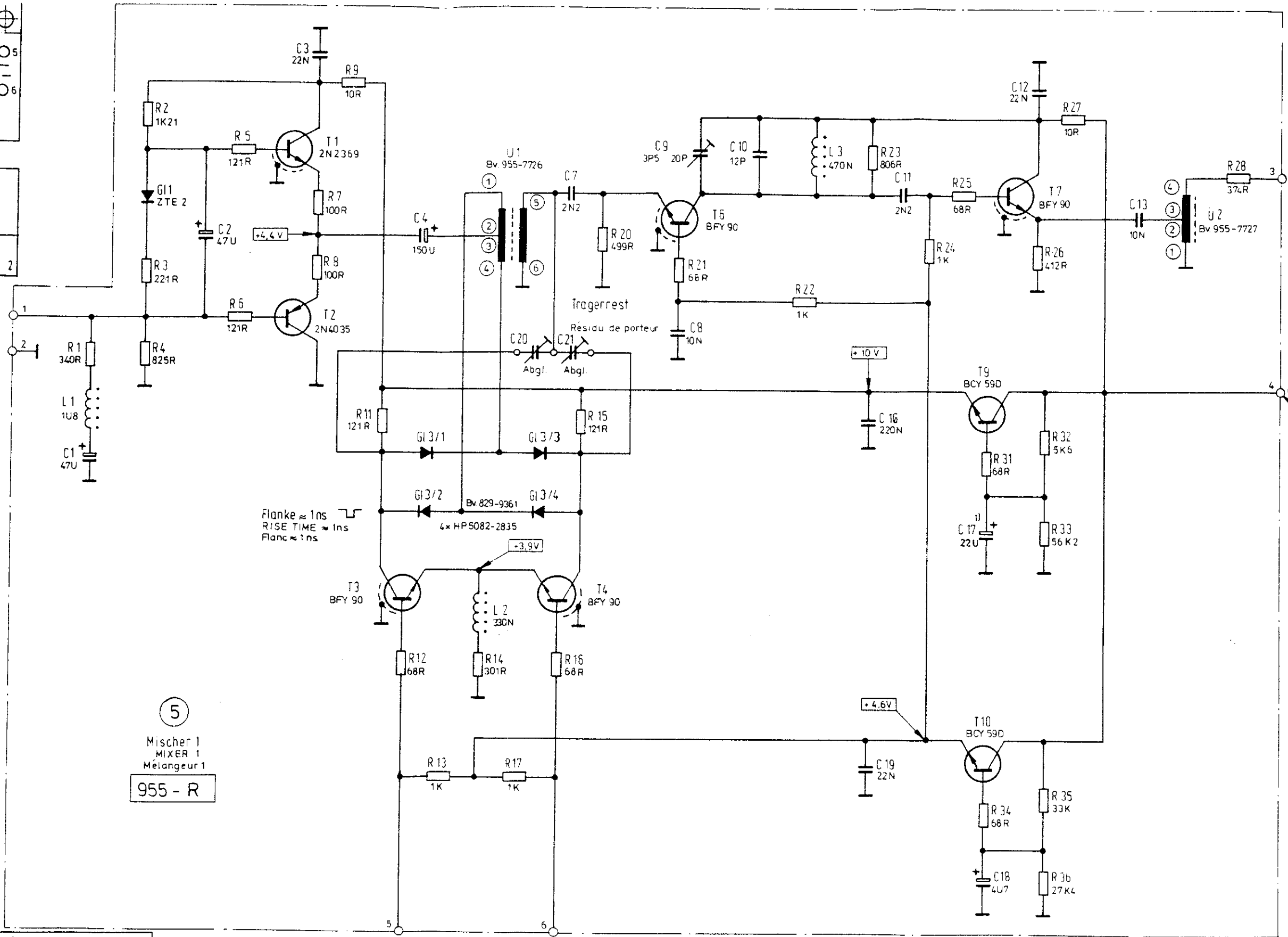
Mischer 1  
MIXER 1  
Mélangeur 1

955 - R

955 - 7016.00114

50Hz...10MHz f<sub>E</sub>

7  
8



5  
Mischer 1  
MIXER 1  
Mélangeur 1

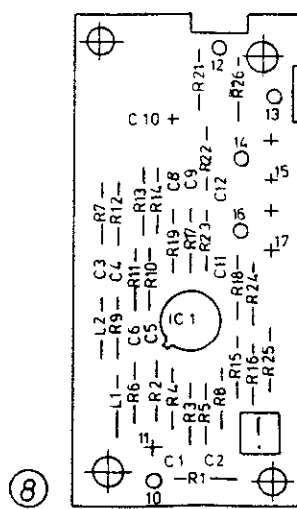
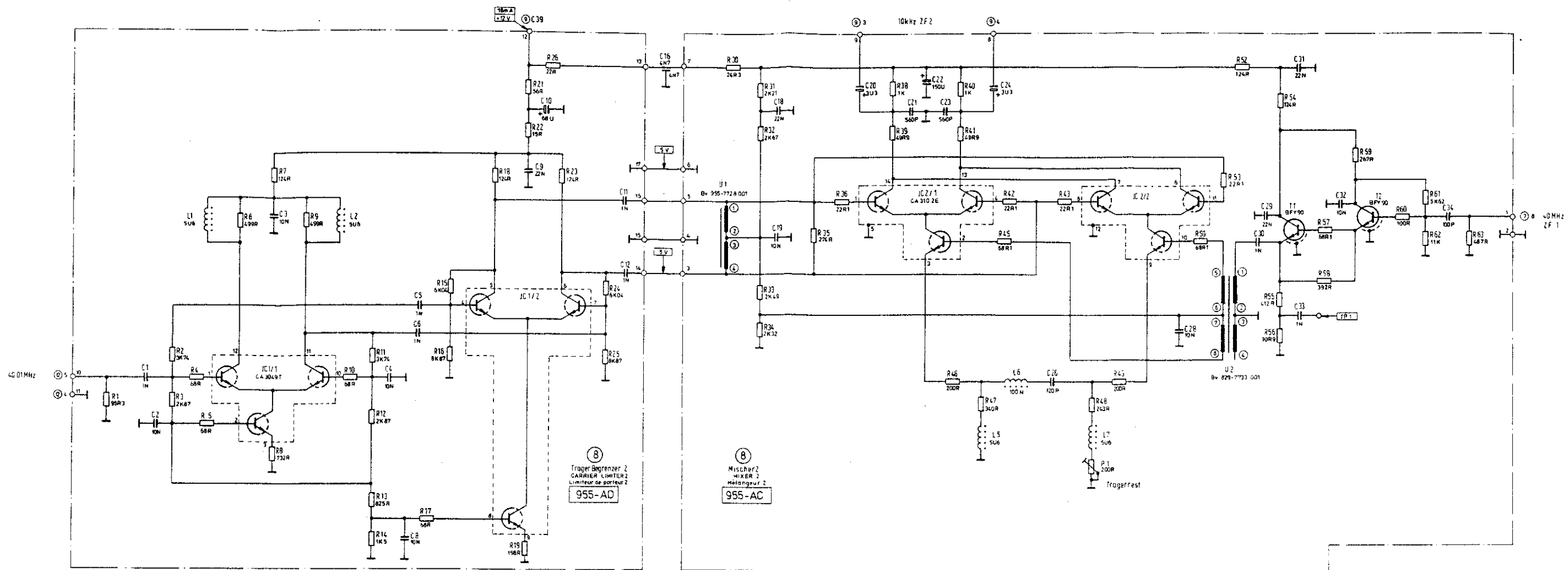
955 - R

Serienanmerkung  
SERIES MODIFICATIONS  
Modification de série

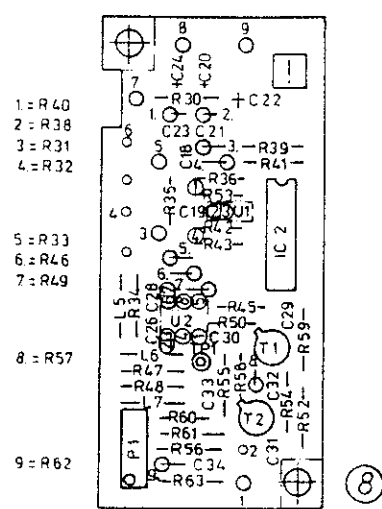
Serie A E: C17/33U

40 50 MHz

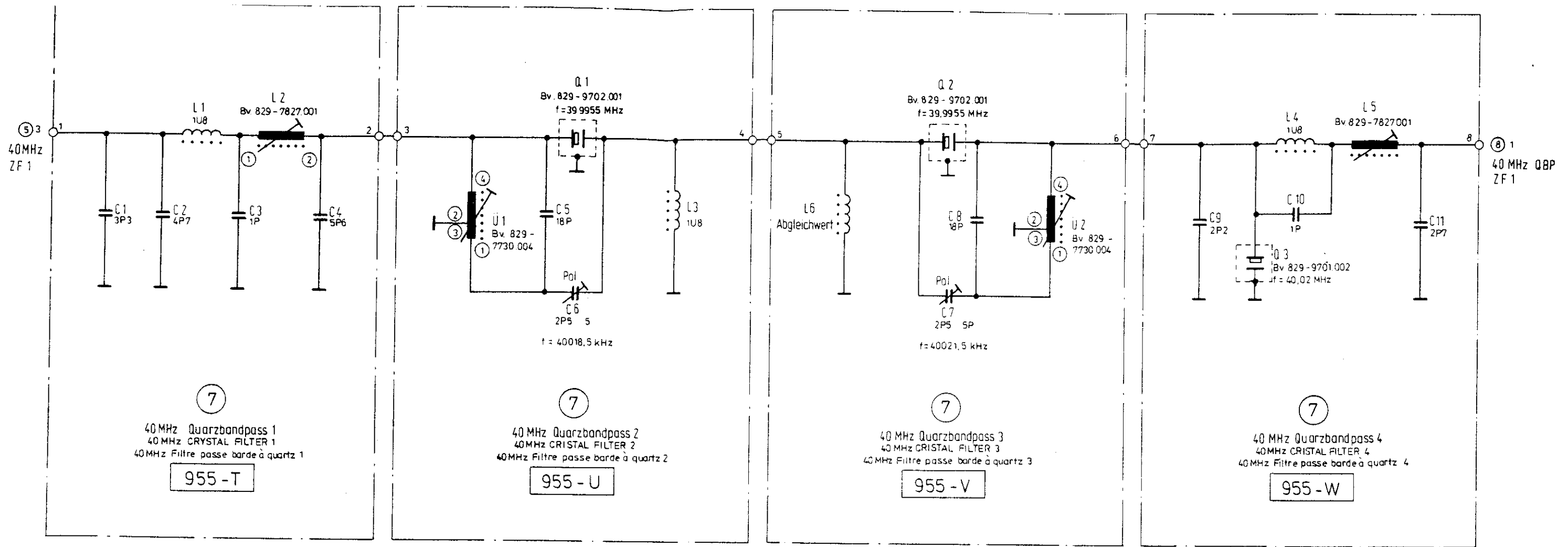
	Stromlaufplan	für Gerät: BN 955 / SPM - 15	Serie A	Schaltteilliste:	1. Bla
	Mischer 1 MIXER 1 Mélangeur 1	5	955 - 7505.017 / 3		Blatt-Nr. 3



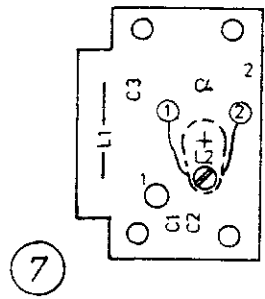
Trägerbegrenzer 2  
CARRIER LIMITER 2  
Limiteur de porteuse 2  
955-AD  
955-7028.00214



Mischer 2  
MIXER 2  
Mélangeur 2  
955-AC  
955-7027.00314



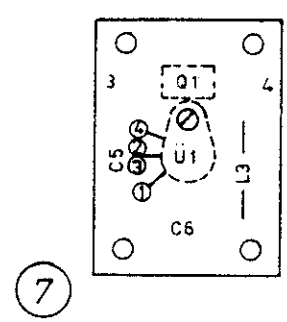
Grunddämpfung 3,5 dB  
 INSERTION LOSS 3,5 dB  
 Affaiblissement fondamental 3,5 dB



**Benennung:**  
 40 MHz-Quarzbandpass 1  
 40 MHz-CRYSTAL FILTER 1  
 40 MHz Filtre passe bande à quartz 1  
 955-T

---

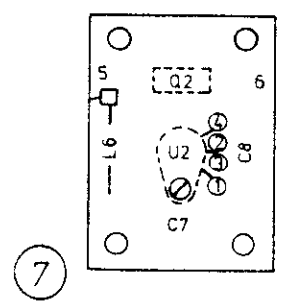
955-7018.00914 2



**Benennung:**  
 40 MHz-Quarzbandpass 2  
 40 MHz-CRYSTAL FILTER 2  
 40 MHz Filtre passe bande à quartz 2  
 955-U

---

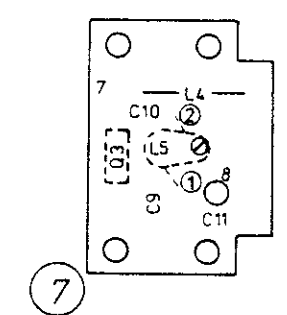
955-7019.00814 2



**Benennung:**  
 40 MHz-Quarzbandpass 3  
 40 MHz-CRYSTAL FILTER 3  
 40 MHz-Filtre passe bande à quartz 3  
 955-V

---

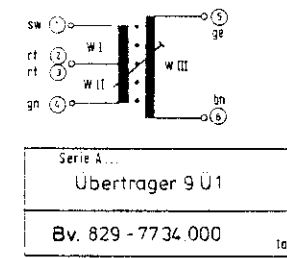
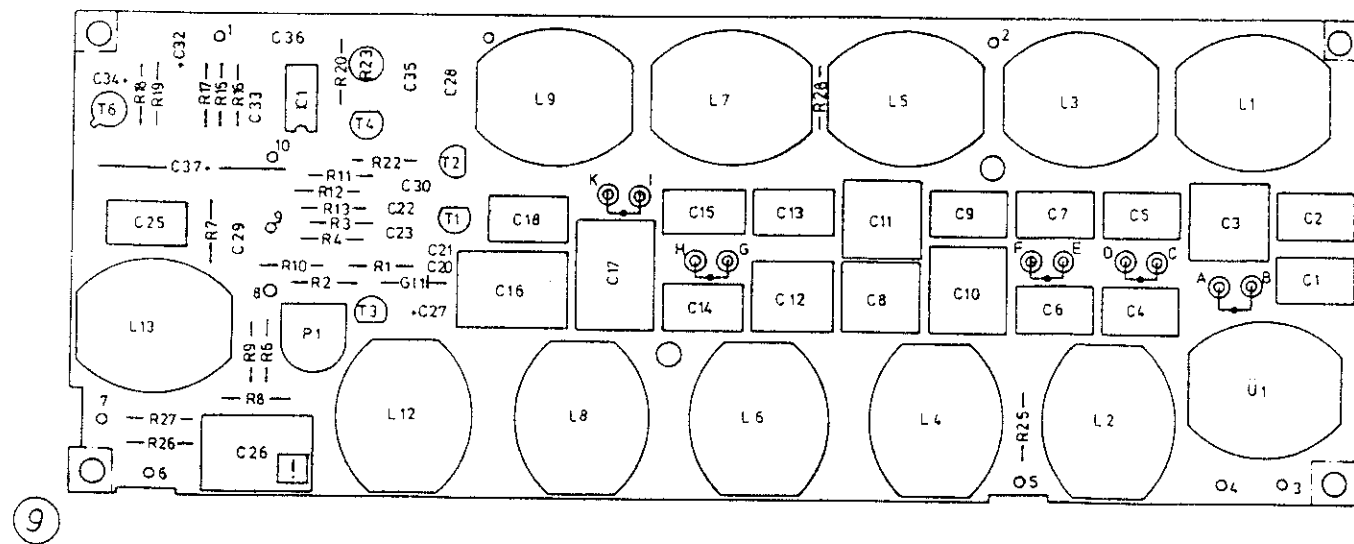
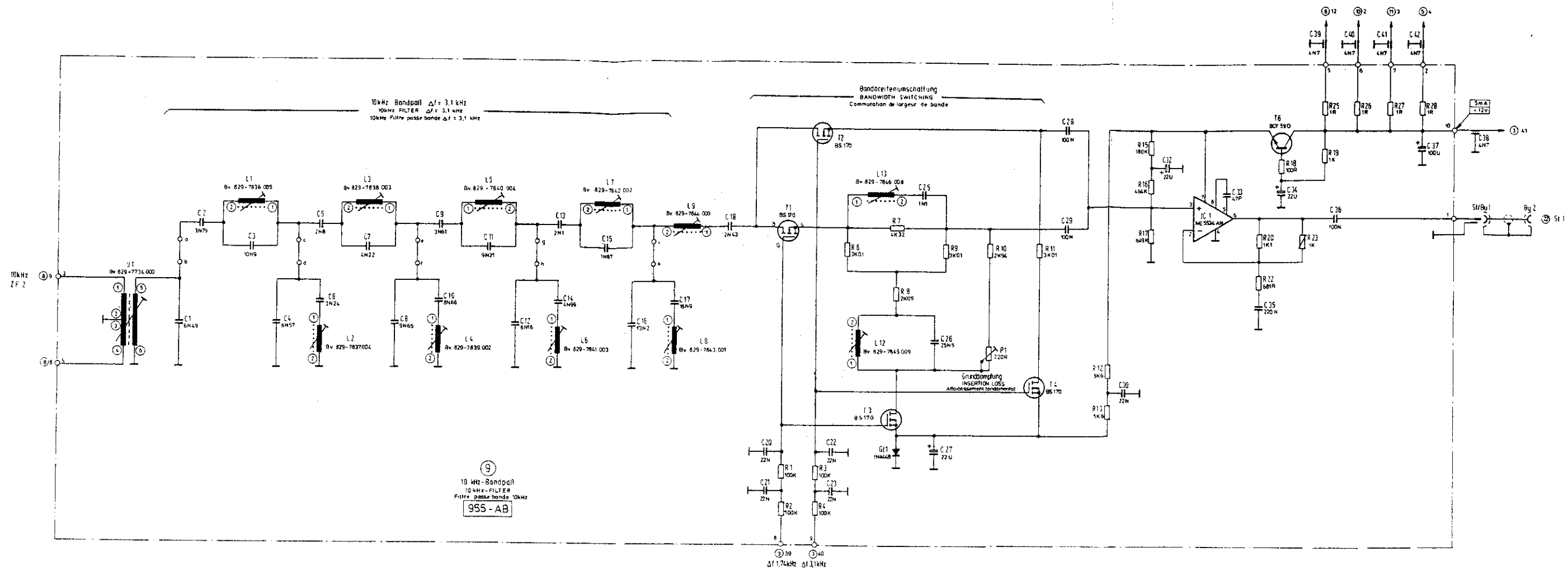
955-7020.00014 2



**Benennung:**  
 40 MHz-Quarzbandpass 4  
 40 MHz-CRYSTAL FILTER 4  
 40 MHz Filtre passe bande à quartz 4  
 955-W

---

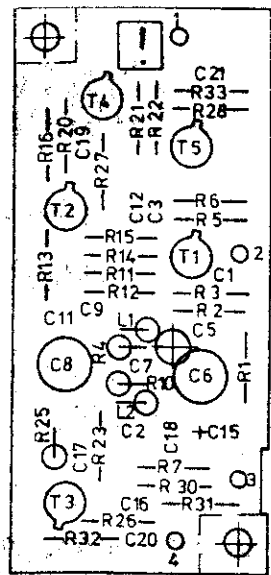
955-7021.00914 3



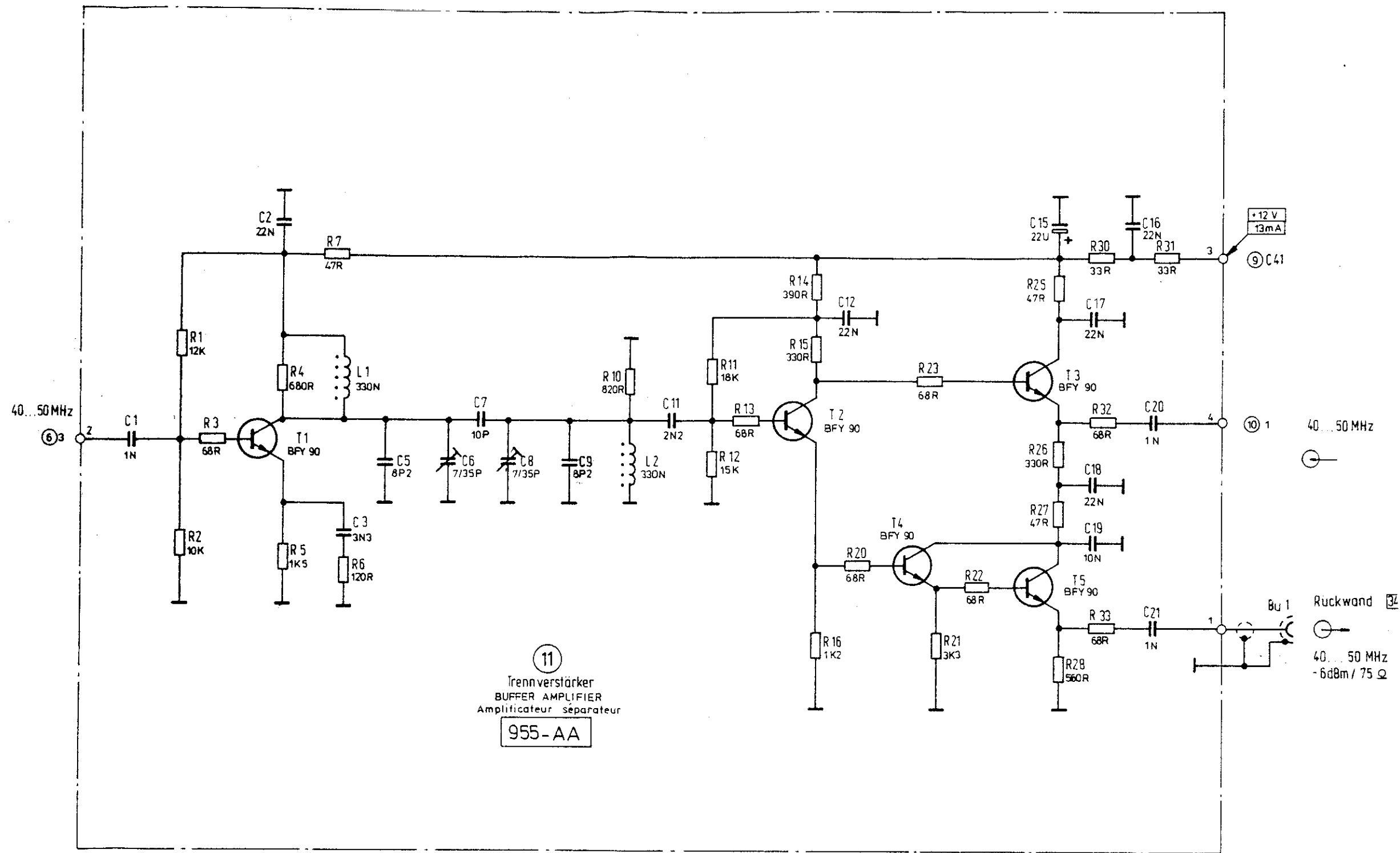
Benennung  
 10 kHz-Bandpaß  
 10 kHz-FILTER  
 Filtre passe bande 10 kHz  
 955-AB  
 955-7026.00413



11



Trennverstärker  
 BUFFER AMPLIFIER 955 - AA  
 Amplificateur séparateur  
 955 - 7025.00514



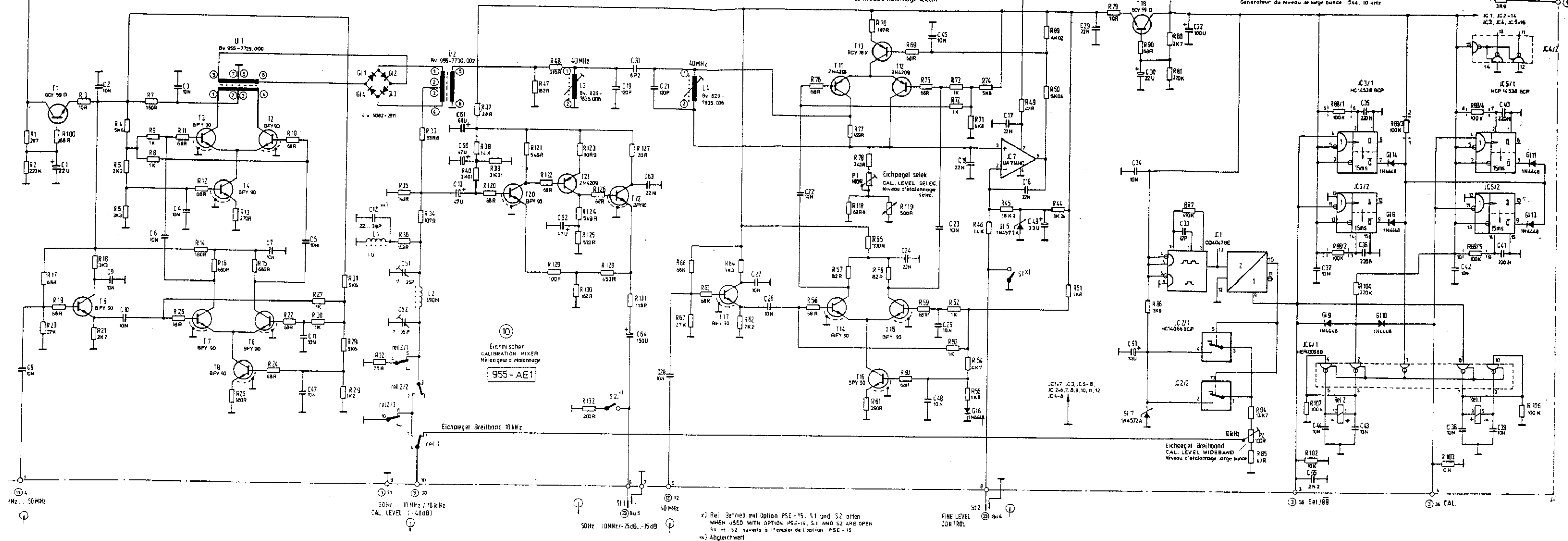
11  
 Trennverstärker  
 BUFFER AMPLIFIER  
 Amplificateur séparateur  
 955 - AA

<b>Stromlaufplan</b> Trennverstärker BUFFER AMPLIFIER Amplificateur séparateur	für Gerät ... BN.955 / SPM-15	Serie A...	Schaltteilleiste:
	11	955 - 7511.014 / 3	1... Blatt Blatt-Nr.:

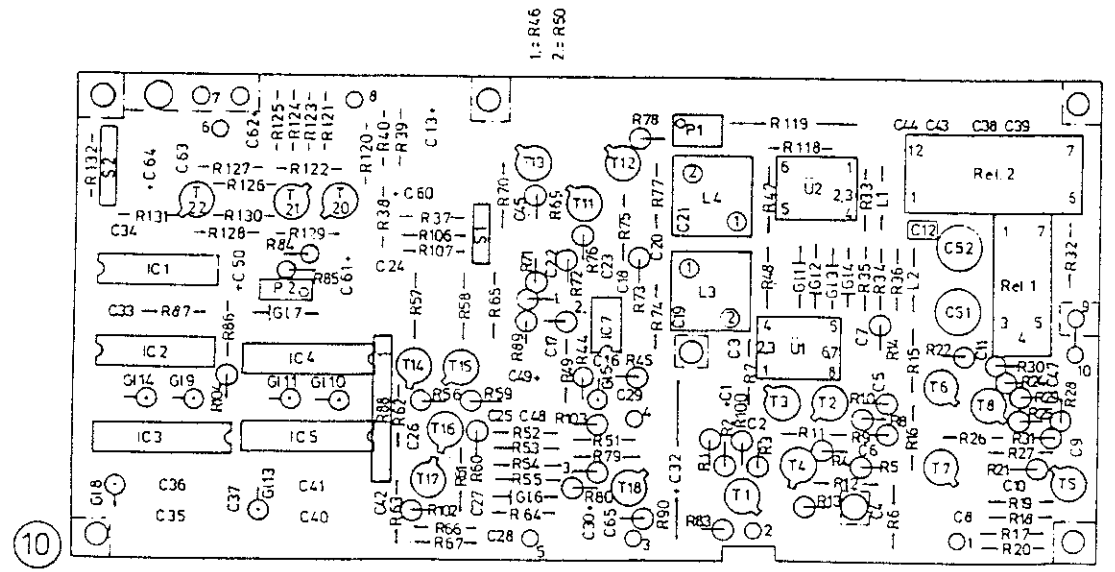
Eichmischer  
CALIBRATION MIXER  
Mélangeur d'étalonnage

Selektiv-Eichpegelerzeugung  
SELECTIVE-CAL. LEVEL GENERATOR  
Générateur du niveau d'étalonnage sélectif

Breitband-Eichpegelerzeugung 10kHz-60kHz  
WIDEBAND - CAL. LEVEL GENERATOR 10 KHz - 60 KHz  
Générateur du niveau de large bande Osc. 10 KHz



10 4 50 MHz  
 31 30  
 50Hz: 10 MHz / 10 kHz  
 CAL. LEVEL: 1-40dB  
 11 12  
 50Hz: 10MHz-75dB...-35dB  
 Bus 5  
 40 MHz  
 13 14  
 50 MHz  
 15 16  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 17 18  
 50 MHz  
 19 20  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 21 22  
 50 MHz  
 23 24  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 25 26  
 50 MHz  
 27 28  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 29 30  
 50 MHz  
 31 32  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 33 34  
 50 MHz  
 35 36  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 37 38  
 50 MHz  
 39 40  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 41 42  
 50 MHz  
 43 44  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 45 46  
 50 MHz  
 47 48  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 49 50  
 50 MHz  
 51 52  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 53 54  
 50 MHz  
 55 56  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 57 58  
 50 MHz  
 59 60  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 61 62  
 50 MHz  
 63 64  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 65 66  
 50 MHz  
 67 68  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 69 70  
 50 MHz  
 71 72  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 73 74  
 50 MHz  
 75 76  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 77 78  
 50 MHz  
 79 80  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 81 82  
 50 MHz  
 83 84  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 85 86  
 50 MHz  
 87 88  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 89 90  
 50 MHz  
 91 92  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 93 94  
 50 MHz  
 95 96  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 97 98  
 50 MHz  
 99 100  
 50 Hz: 10MHz-75dB...-35dB  
 Bus 5  
 x) Bei Betrieb mit Option PSE-15, S1 und S2 offen  
 WHEN USED WITH OPTION PSE-15, S1 AND S2 ARE OPEN  
 S1 et S2 ouverts à l'emplacement de l'option PSE-15  
 \*) Abgleichwert  
 FINE LEVEL CONTROL  
 Bus 4



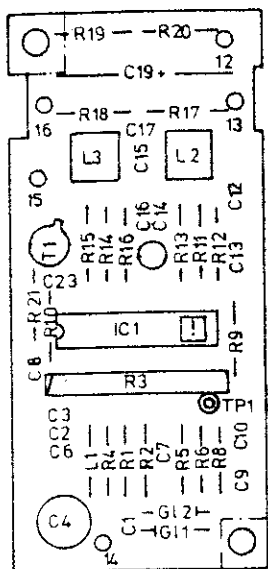
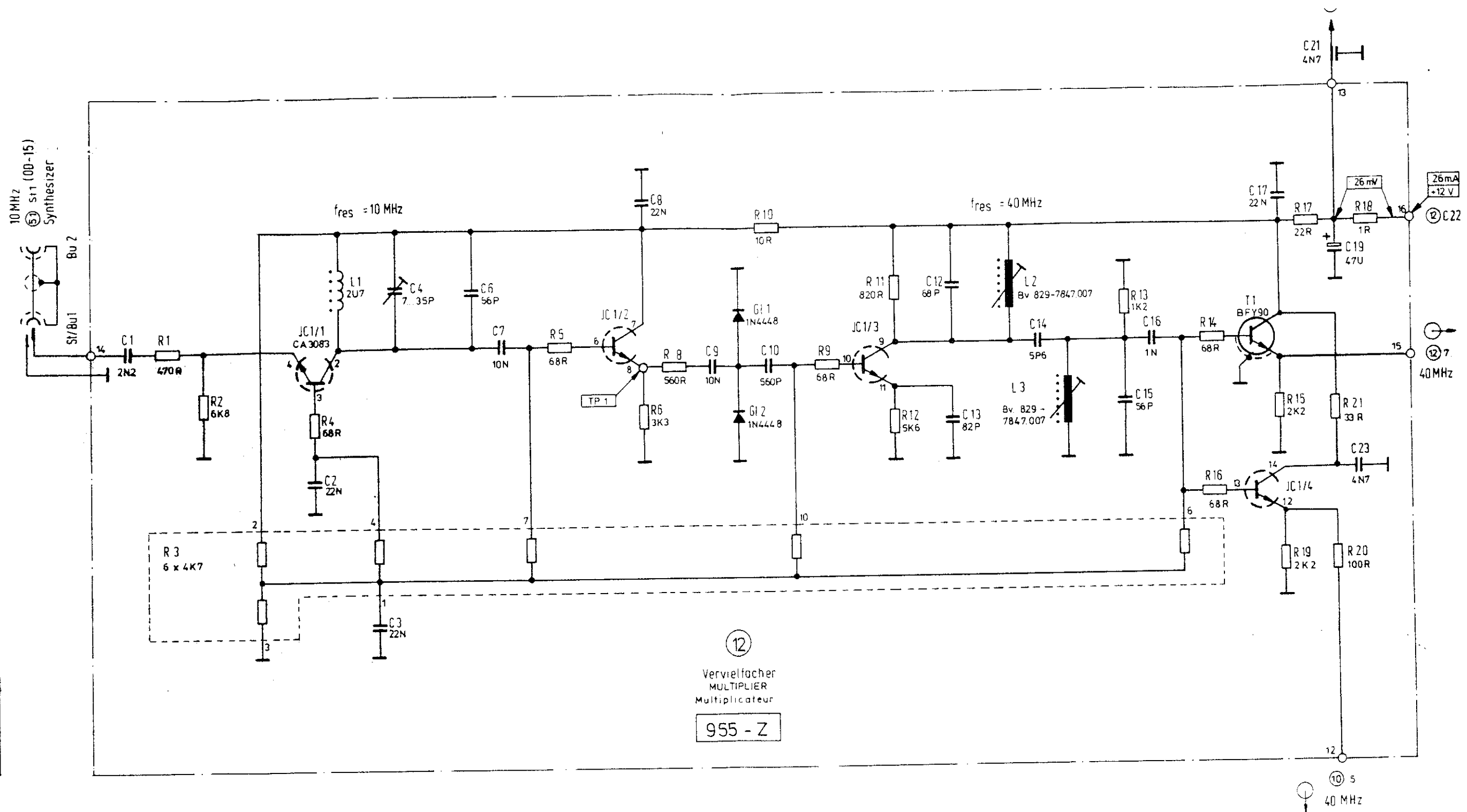
Benennung:  
 Eichmischer  
 CALIBRATION MIXER  
 Mélangeur d'étalonnage  
 955-AE1  
 955-7029.00114

Eichmischer  
 CALIBRATION MIXER  
 Mélangeur d'étalonnage  
 Serie E BN 955/SPM-15  
 955-7510.031/33

Hinweis: Seite 15-17 entfallen

N.B.: p. 15-17 have been omitted

Note: les pages 15 à 17 sont supprimées

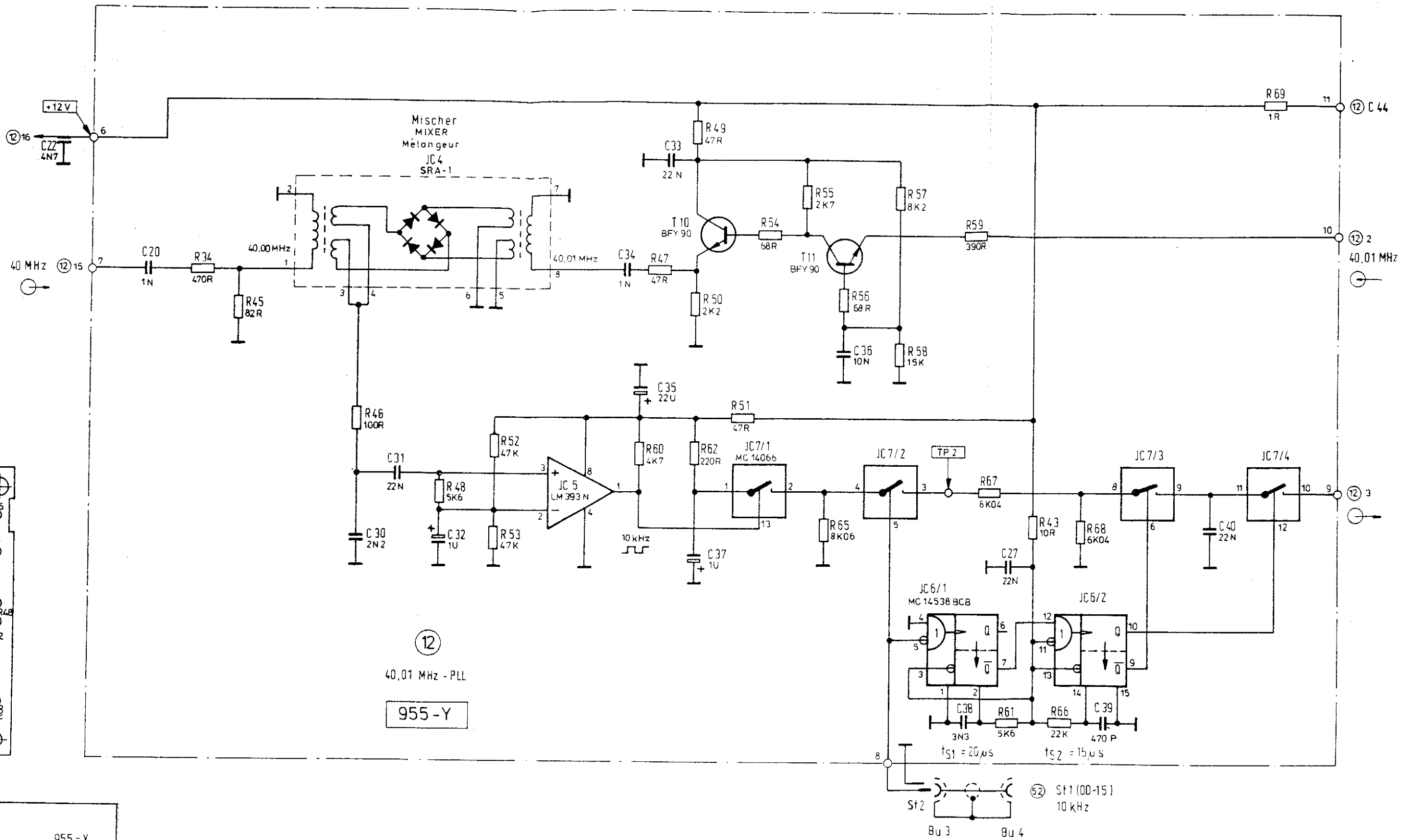


12  
 Vervielfacher  
 MULTIPLIER  
 Multiplicateur  
 955 - Z

12

Benennung:  
 Vervielfacher  
 MULTIPLIER  
 Multiplicateur  
 955-Z  
 955-7024.00614  
 3

Stromlaufplan 12 für Gerät: SPM-15 / BN 955 40,01 MHz Erzeugung 40,01 MHz GENERATION Génération 40,01 MHz	Serie E	3. Blatt
	955 - 7512.026 / 3	Blatt-Nr. 1



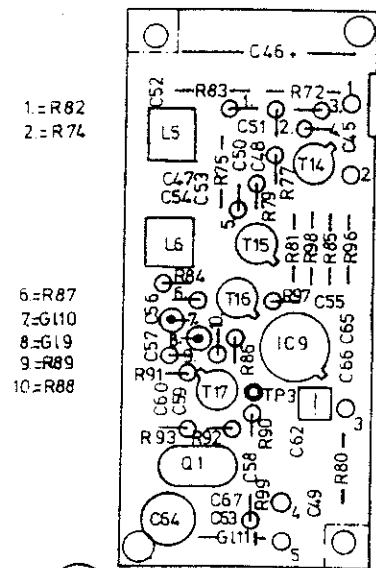
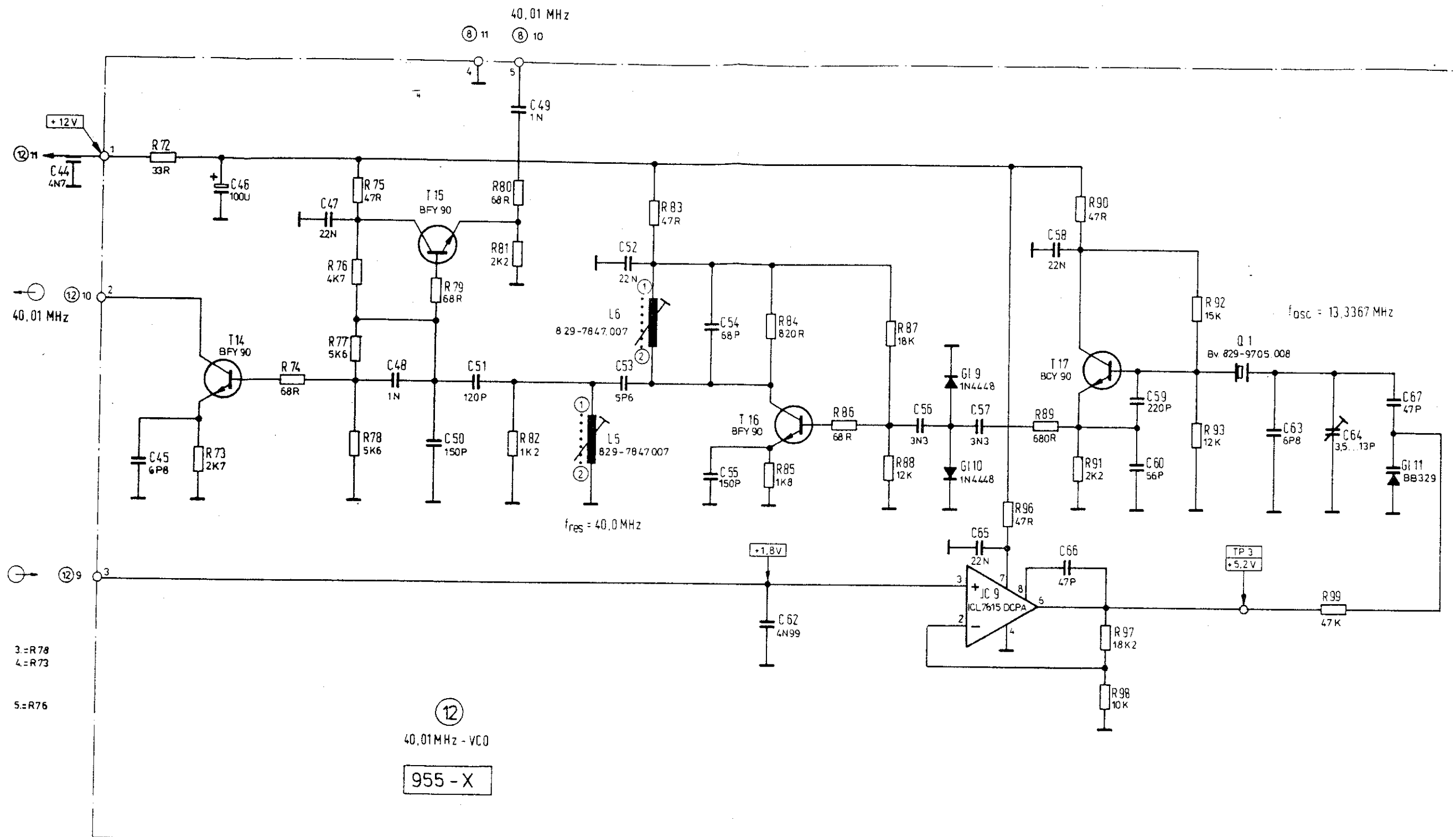
- 1 = R50
- 2 = R47
- 3 = R46
- 4 = R49
- 5 = R51
- 6 = R55
- 7 = R57

12

Benennung: 40,01 MHz PLL 955 - Y

955 - 7023.00714

<b>Stromlaufplan</b> für Gerät : BN.955/SPM-15..... 40,01 MHz Erzeugung 40,01 MHz GENERATION Generation 40,01 MHz	Serie E.....	Schaltteilliste :	3. Blatt
	12	955 - 7512.026 / 3	Blatt-Nr.2

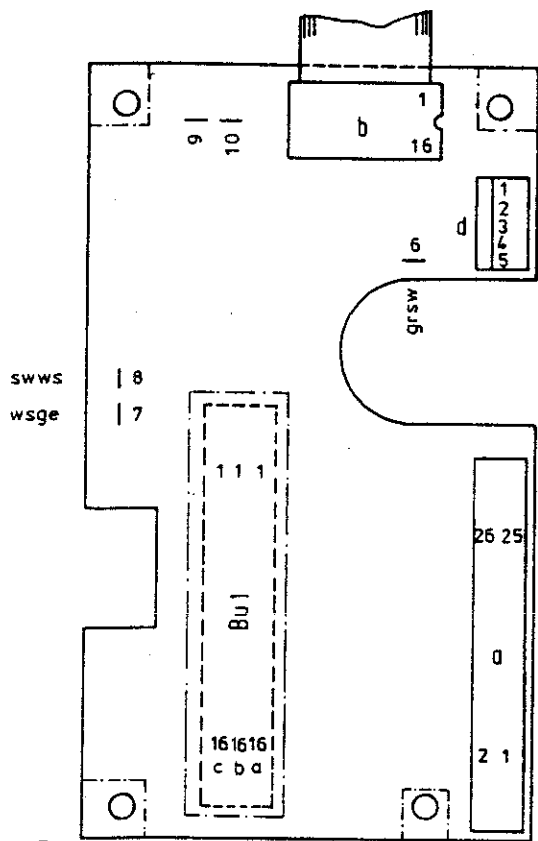


- 1.=R82
- 2.=R74
- 3.=R78
- 4.=R73
- 5.=R76
- 6.=R87
- 7.=G110
- 8.=G19
- 9.=R89
- 10.=R88

12  
40.01MHz - VCO  
955 - X

Benennung:  
40.01 MHz-VCO                      955-X  
**955-7022.00814**

	Stromlaufplan für Gerät : BN. 955 / SPM.-15.....	Serie E	Schaltteilliste:
		40.01 MHz Erzeuger 40.01 MHz GENERATION Génération 40.01 MHz	955 - 7512.026 / 3



14

Schnittstelle  
INTERFACE  
Interface

955-AM1  
955-AM2

955-7036.00714

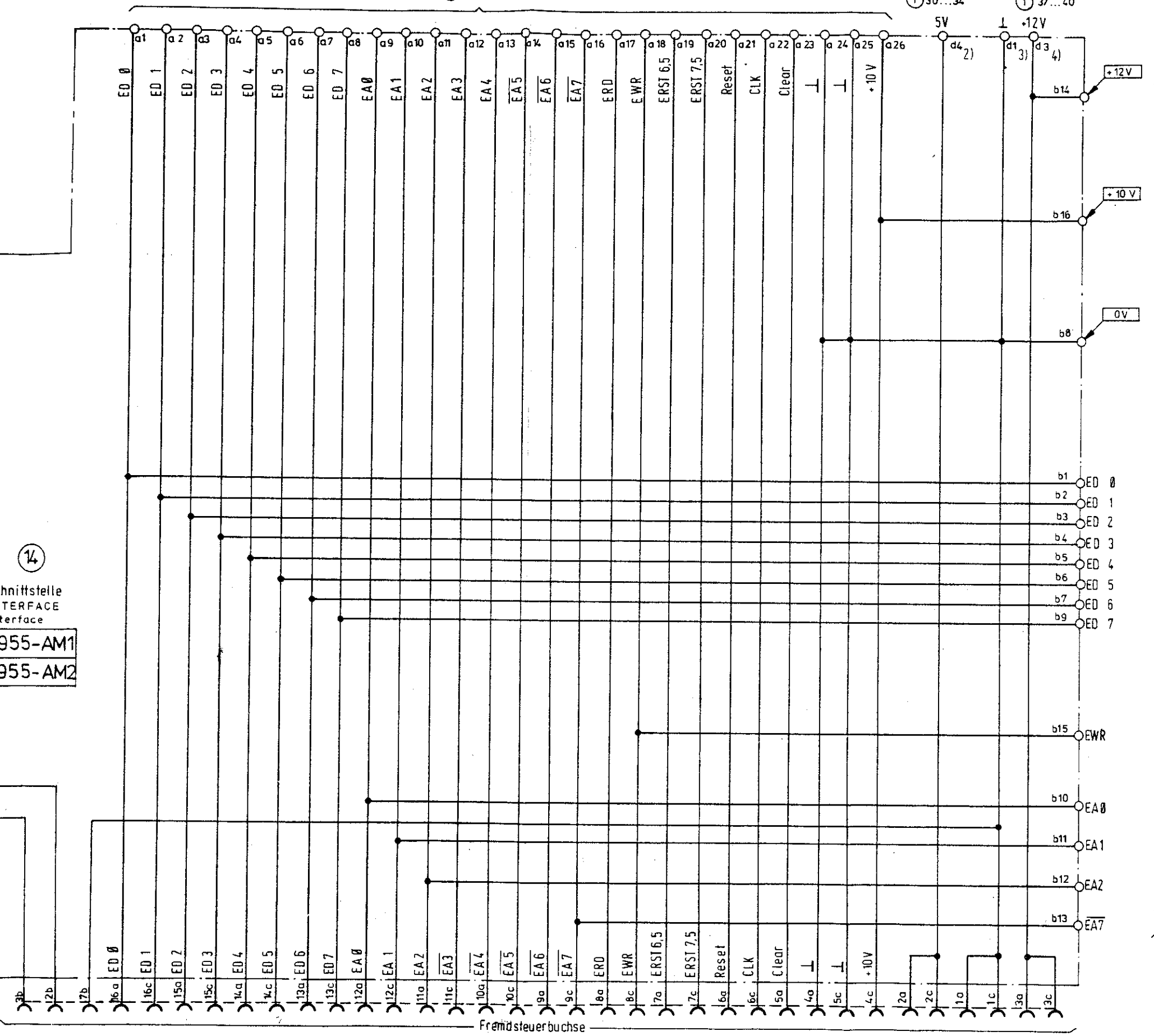
14

Schnittstelle  
INTERFACE  
Interface

955-AM1  
955-AM2

Pkt.10  
Pkt.9

Bu1



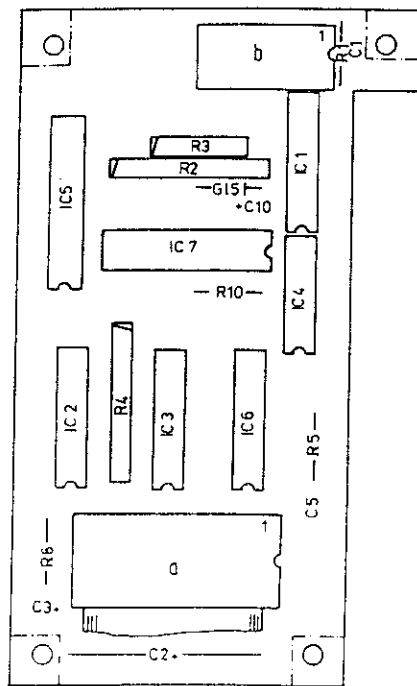
HF-Steuerung  
b HF-CONTROL  
Commande HF

13

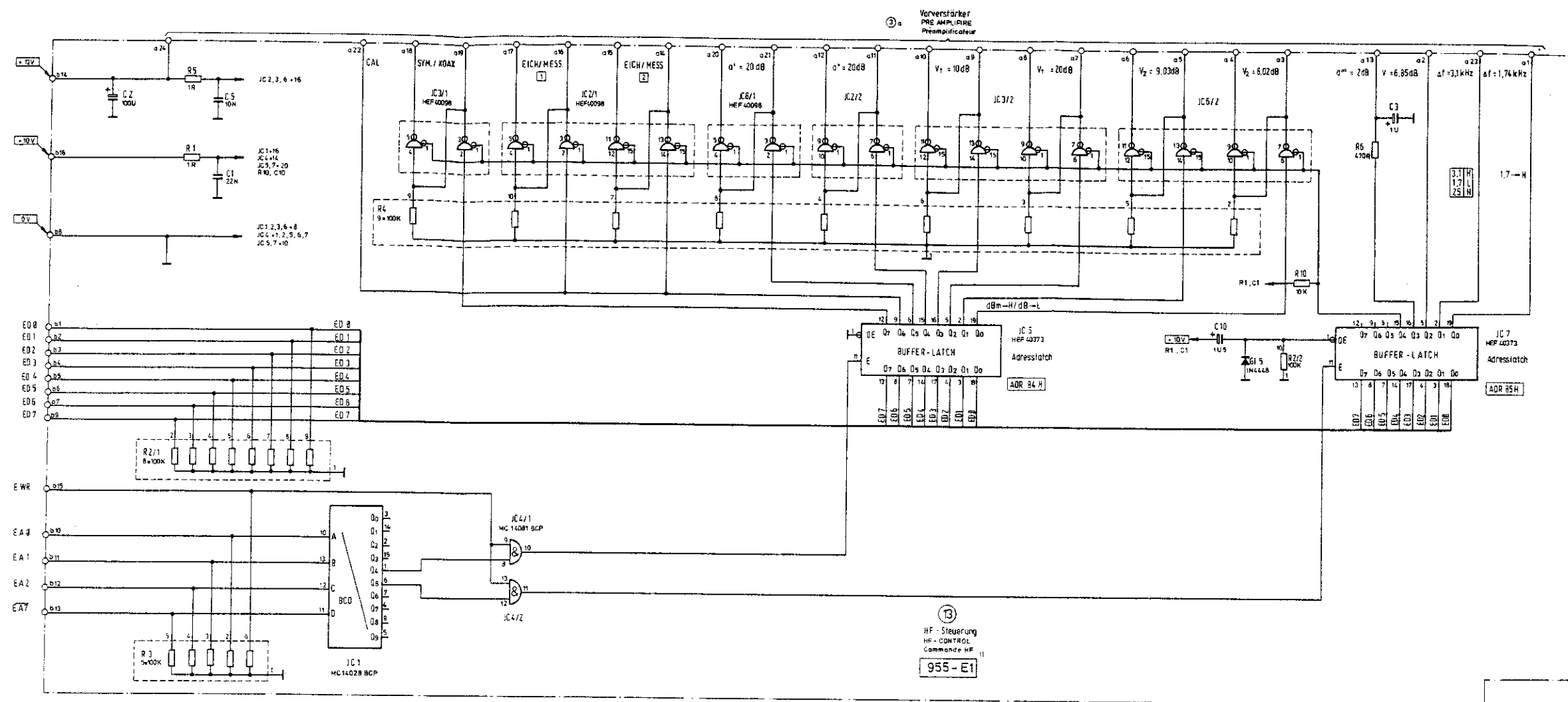
16a ED 0  
16c ED 1  
15a ED 2  
15c ED 3  
14a ED 4  
14c ED 5  
13a ED 6  
13c ED 7  
12a EA 0  
12c EA 1  
11a EA 2  
11c EA 3  
10a EA 4  
10c EA 5  
9a EA 6  
9c EA 7  
8a ERD  
8c EWR  
7a ERST 6,5  
7c ERST 7,5  
6a Reset  
6c CLK  
5a Clear  
4a  
5c  
4c +10V  
2a  
2c  
1a  
1c  
3a  
3c

Fremdsteuerbuchse

<b>Stromlaufplan</b> Schnittstelle INTERFACE Interface	für Gerät.: SPM.:15/ BN.955.....	Serie M .....	Schaltteilleiste:
	(14)	955-7514.024/3	...1... Blatt Blatt-Nr./

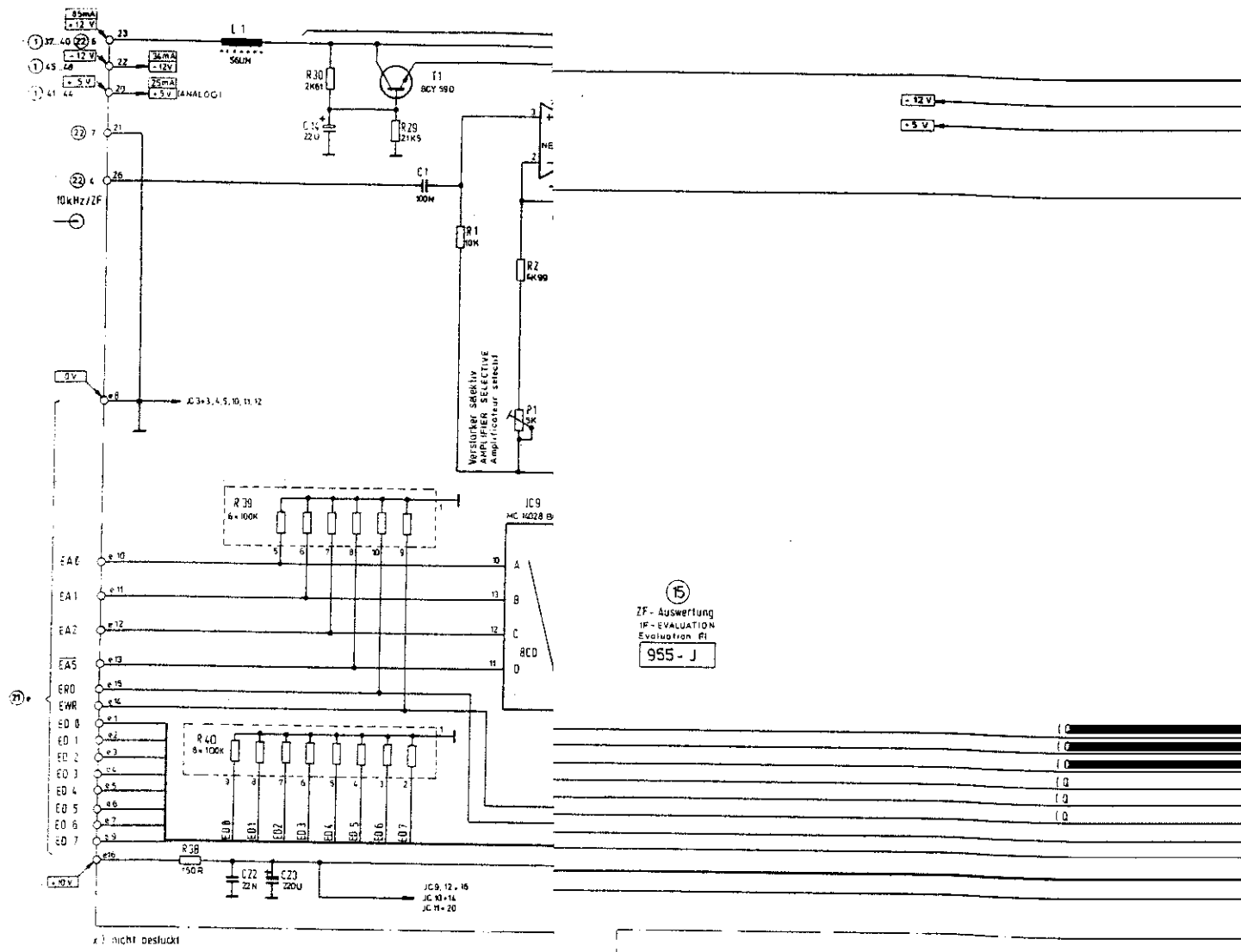


HF-Steuerung  
HF-CONTROL  
Commande HF  
955-E1  
955-7004.00014



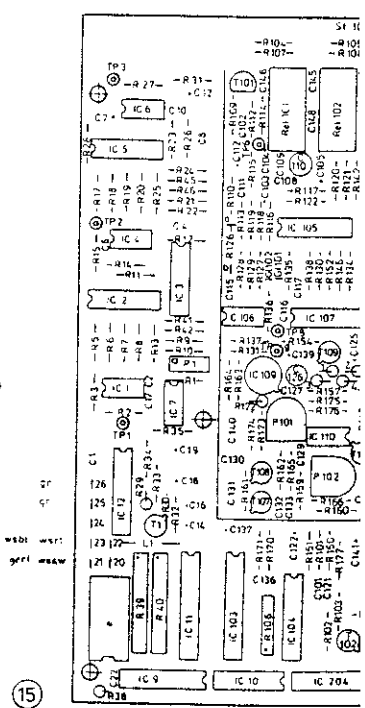
Serienanmerkung 11 Serie Au B: 955-E  
SERIES MODIFICATIONS  
Modification de série





15  
ZF - Auswertung  
IF - EVALUATION  
Evaluation FI  
955 - J

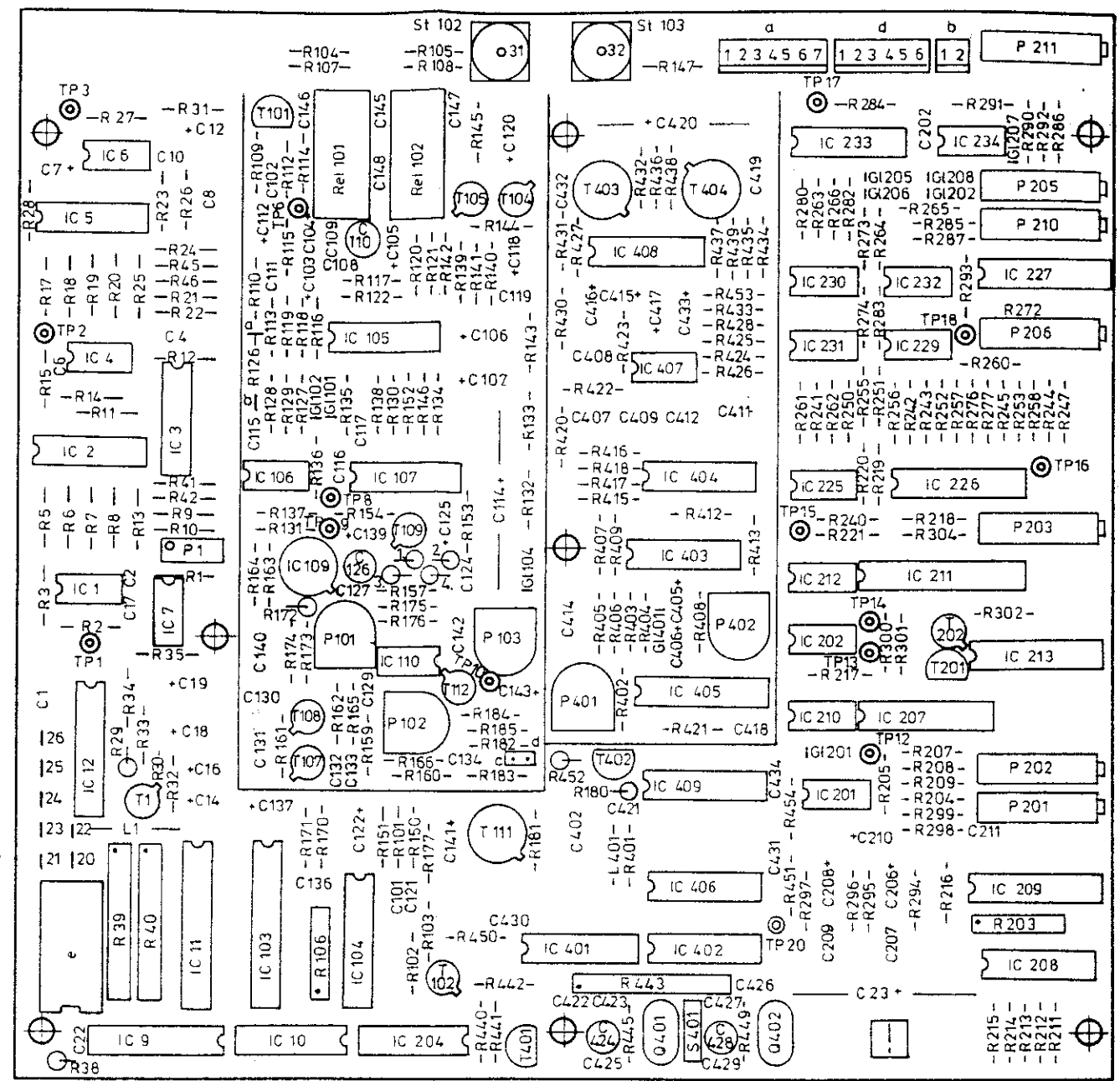
1 N151  
2 L102  
3 R156  
4 H158



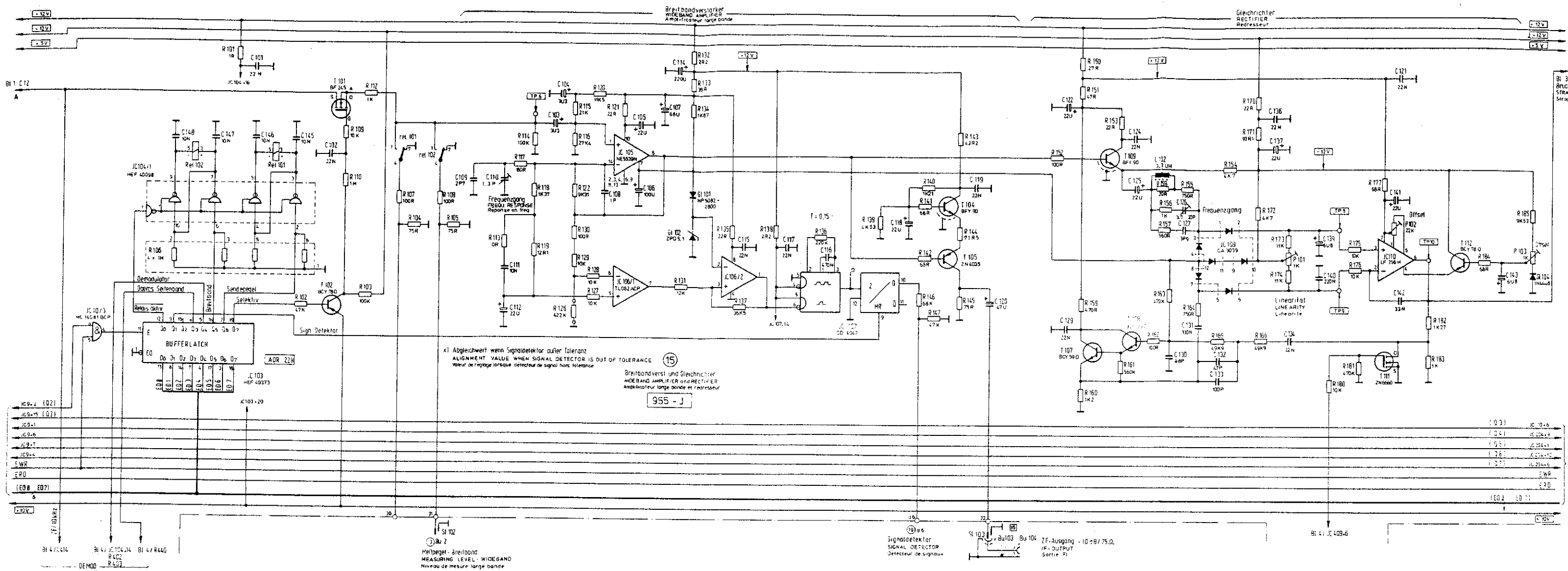
- 1 R155
- 2 L102
- 3 R156
- 4 R158

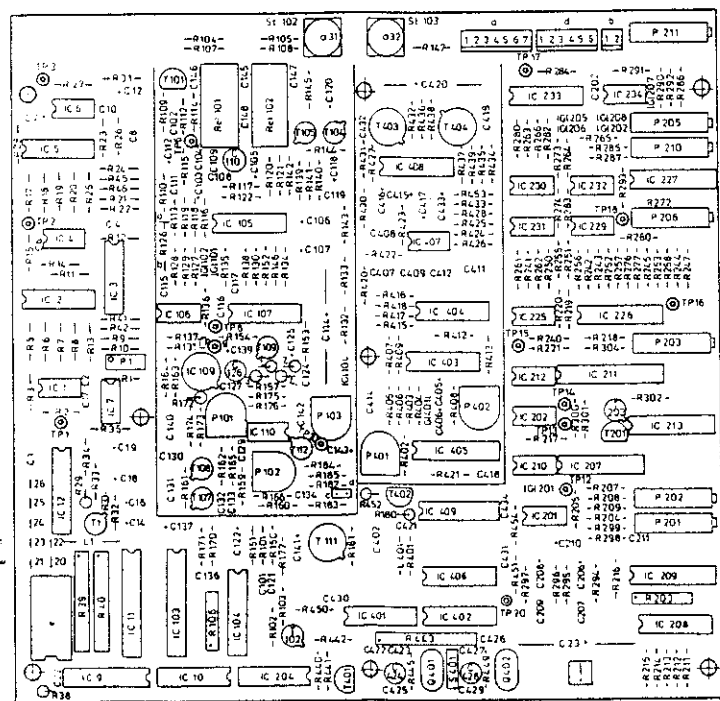
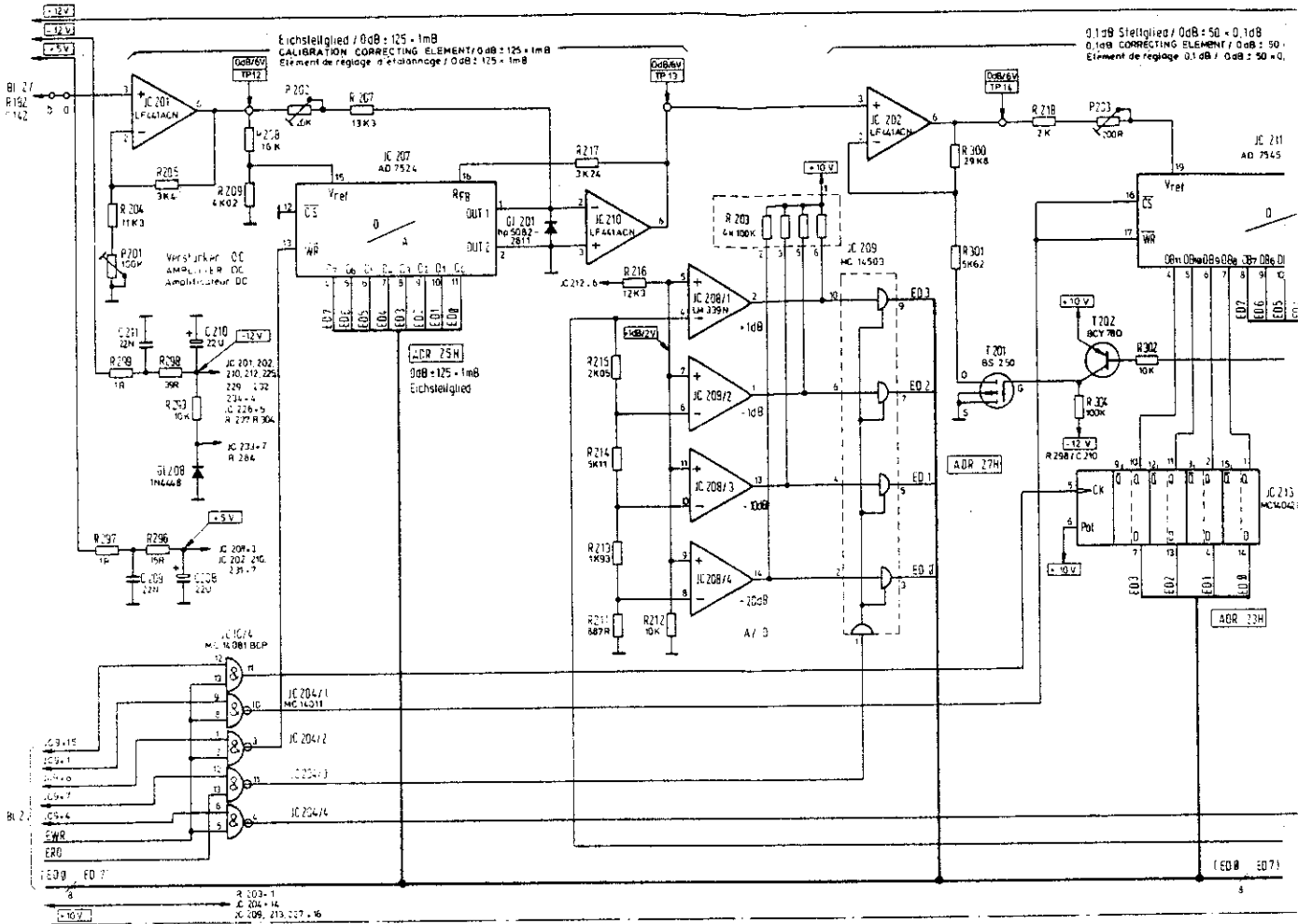
gr  
gr  
wsbl wsrt  
grtt wssw

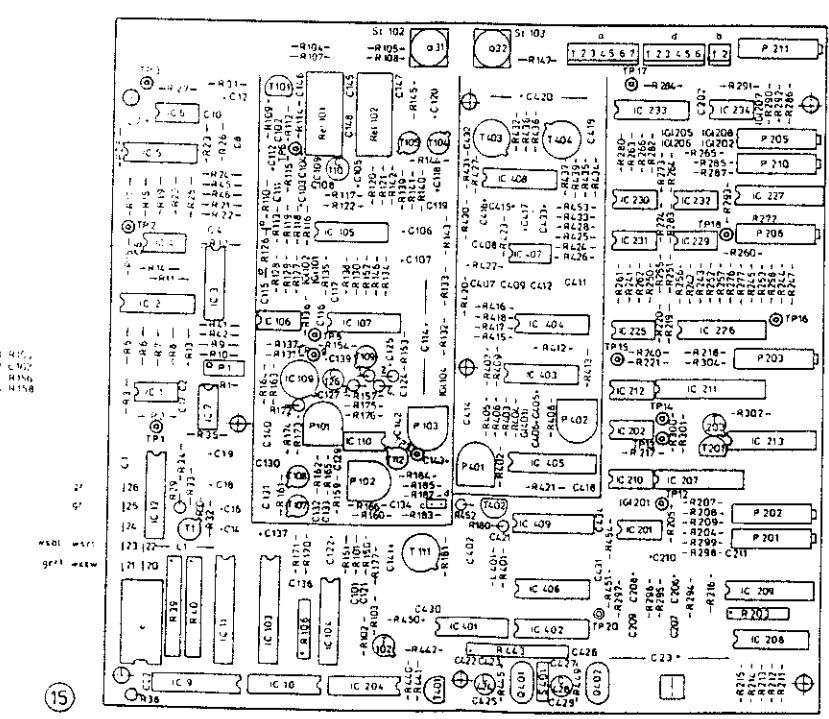
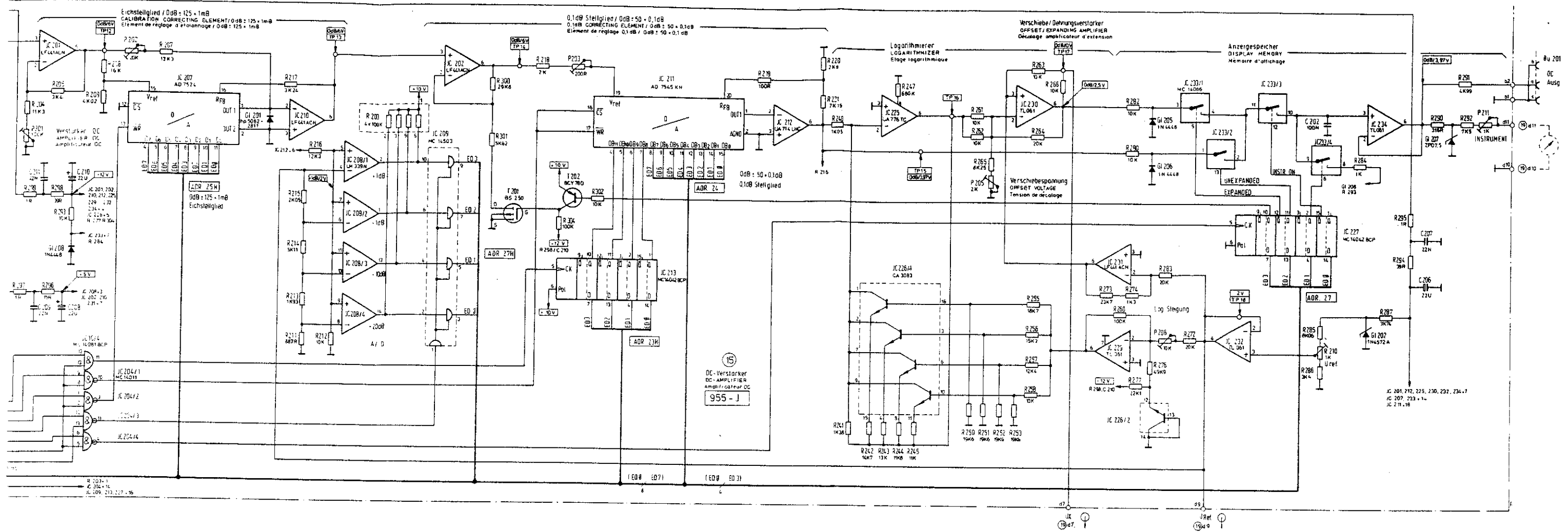
15



Benennung:  
ZF-Auswertung  
EVALUATION IF 955-J  
Evaluation FI  
**955-7008.00613**

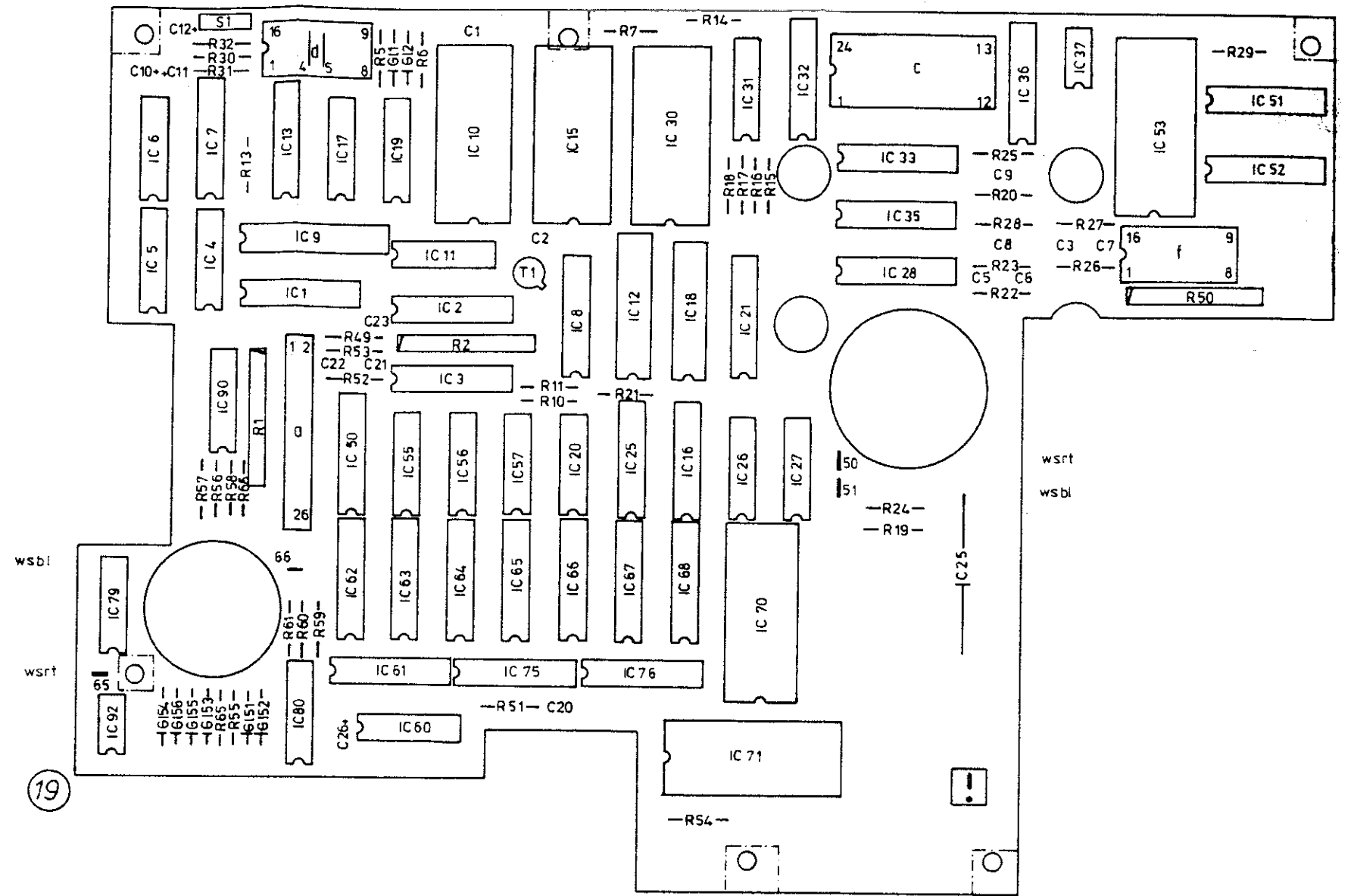






Bestückungszeichnung 1:1 siehe Seite 23  
 Component drawings are 1:1, see Page 23  
 Disposition des composants en grandeur réelle, voir page 23

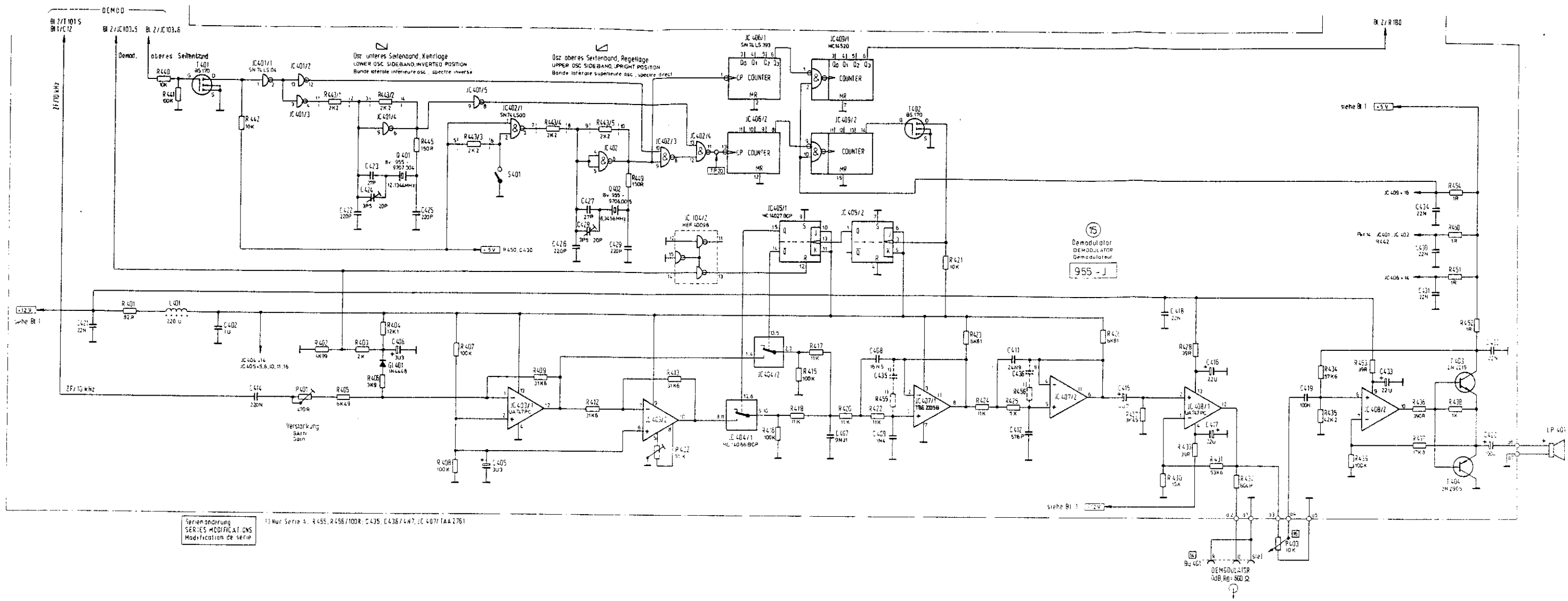
Benennung  
 ZF - Auswertung  
 EVALUATION IF  
 Evaluation FI  
 955-J  
 955-7008.00613

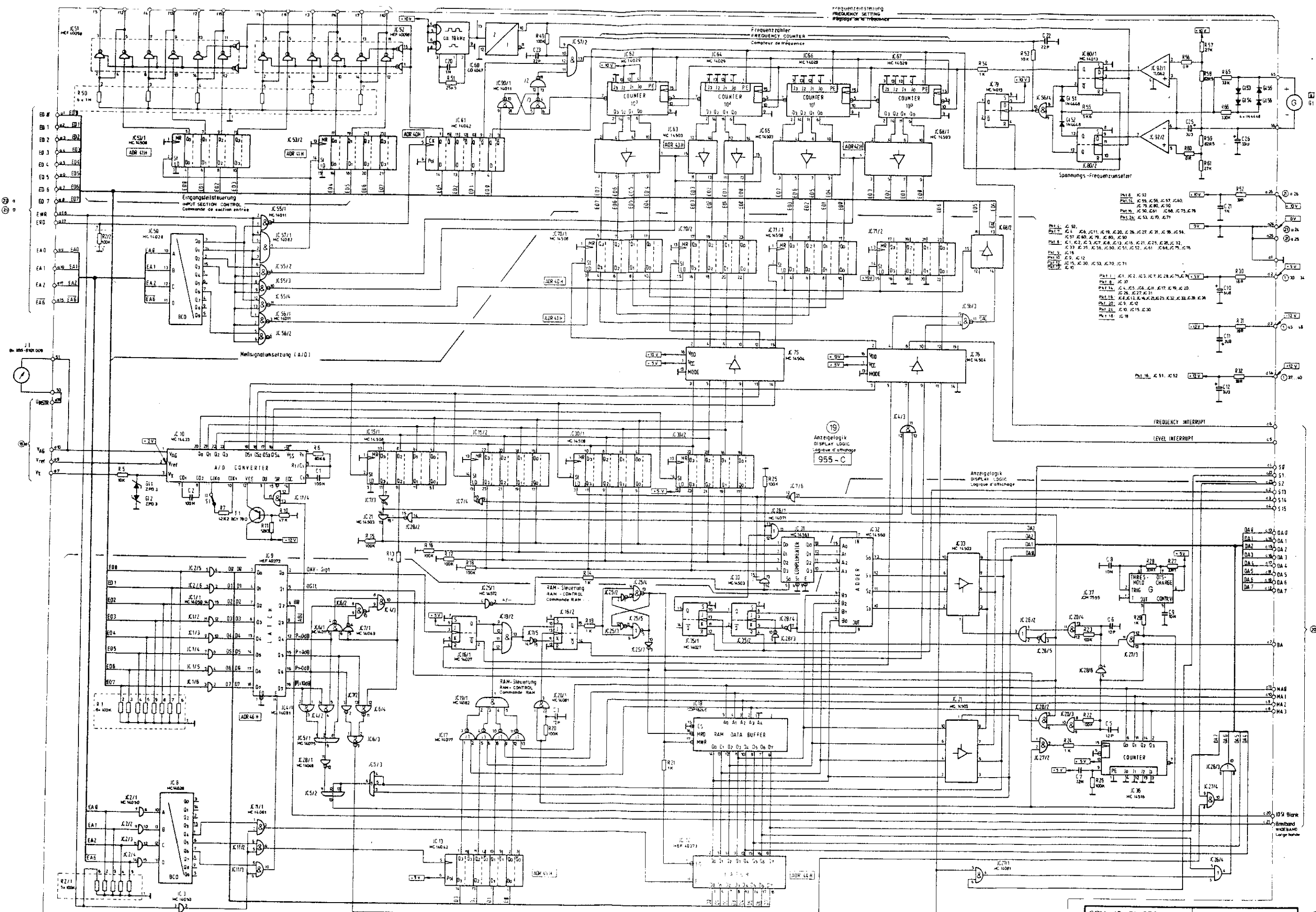


Anzeigelogik  
 DISPLAY LOGIC  
 Logique d'affichage

955-C

955-7002.00213





Veränderung  
SERIES MODIFICATION  
Modification de series

II Serie A. D: S1 enthält/DELETED/absent

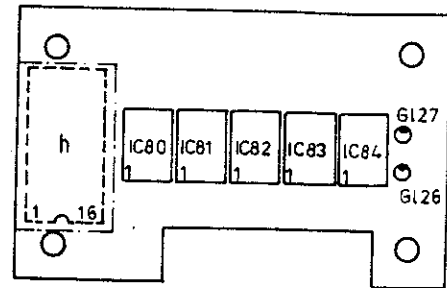
SPM - 15 / BN 955 Serie A

Anzeigelogik  
DISPLAY LOGIC  
Logique d'affichage



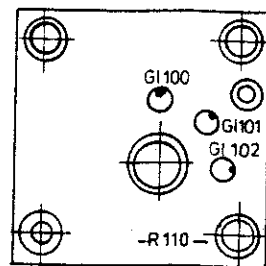
955 - 7519. 016 / 3





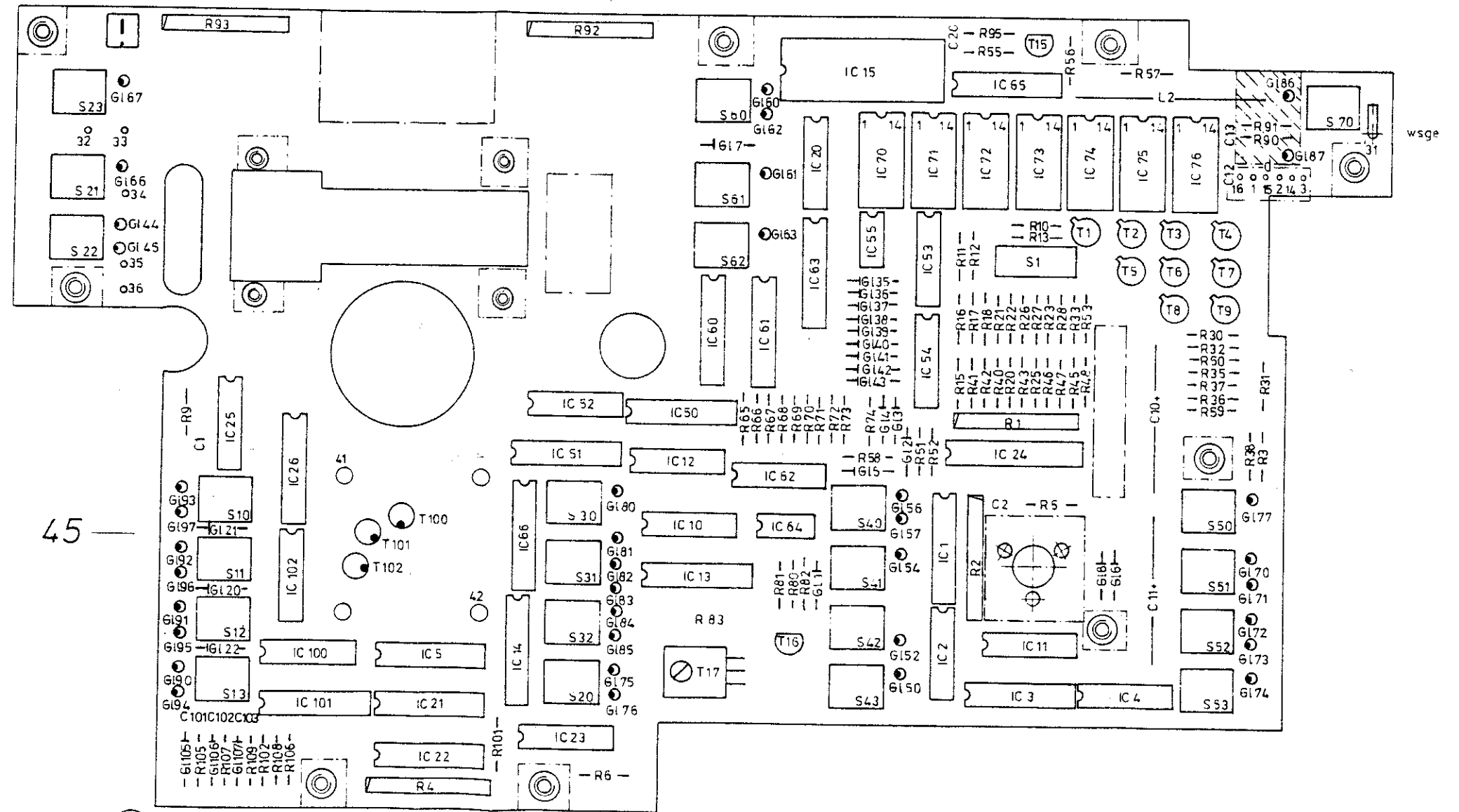
20

Pegelanzeige  
LEVEL SELECTION  
Niveau d'affichage  
955-D  
**955-7003.00114**



20

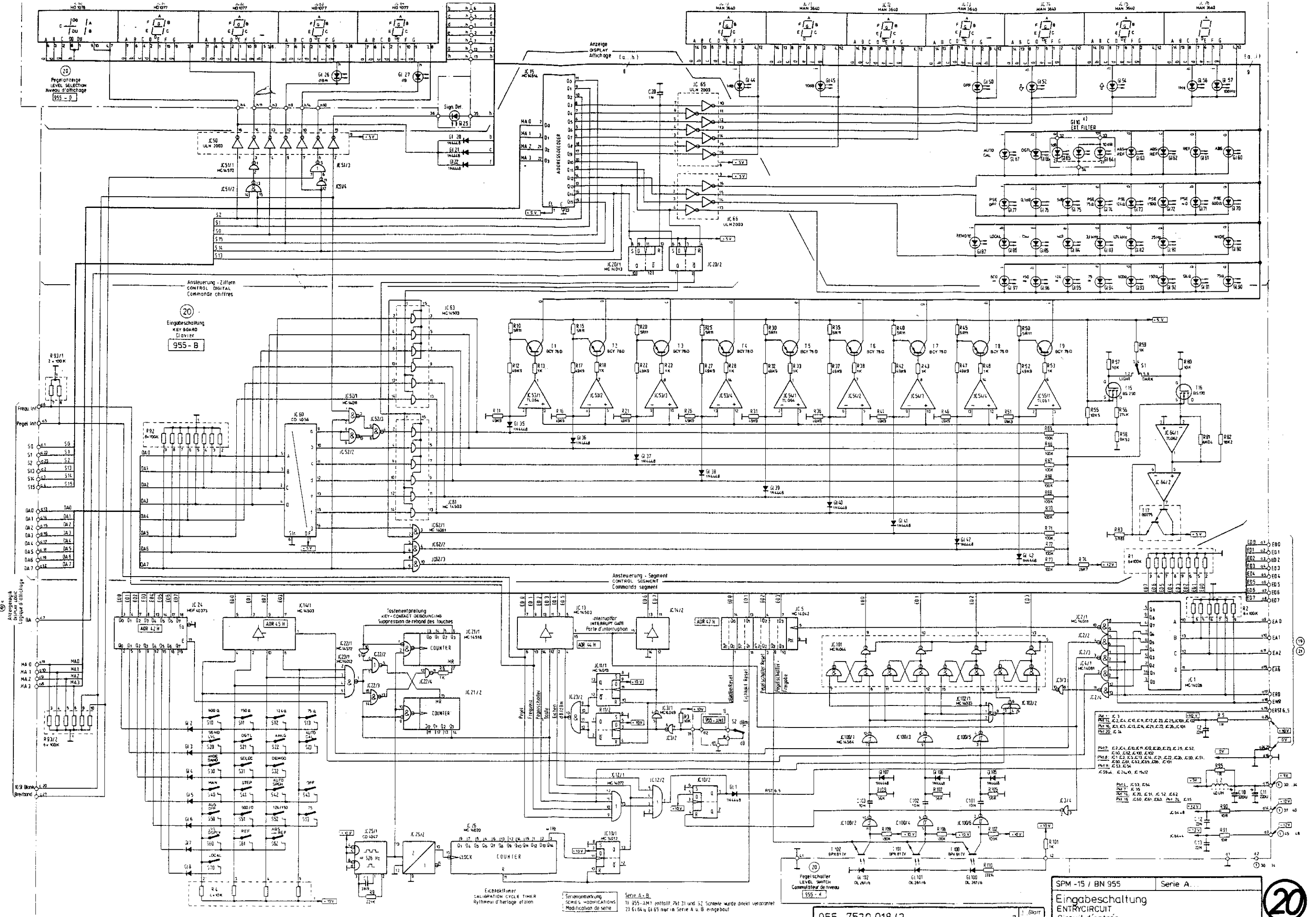
Pegelschalter  
LEVEL SWITCH  
Commutateur de niveau  
955-H  
**955-700700714**



45

20

Eingabeschaltung  
KEYBOARD  
Clavier  
955-B  
**955-7001.00313**



20  
Pegelschalter  
LEVEL SELECTION  
Niveau d'alimentation  
955 - 0

20  
Eingabeschaltung  
KEY BOARD  
Clavier  
955 - B

Anzeige  
DISPLAY  
affichage

Ansteuerung - Segment  
CONTROL SEGMENT  
Commande segment

SPM - 15 / BN 955 Serie A...  
Eingabeschaltung  
ENTRY CIRCUIT  
Circuit d'entrée

955 - 7520 018 / 3



Erklärung  
CALCULATION CYCLE TIMER  
Rythme d'horloge etalon

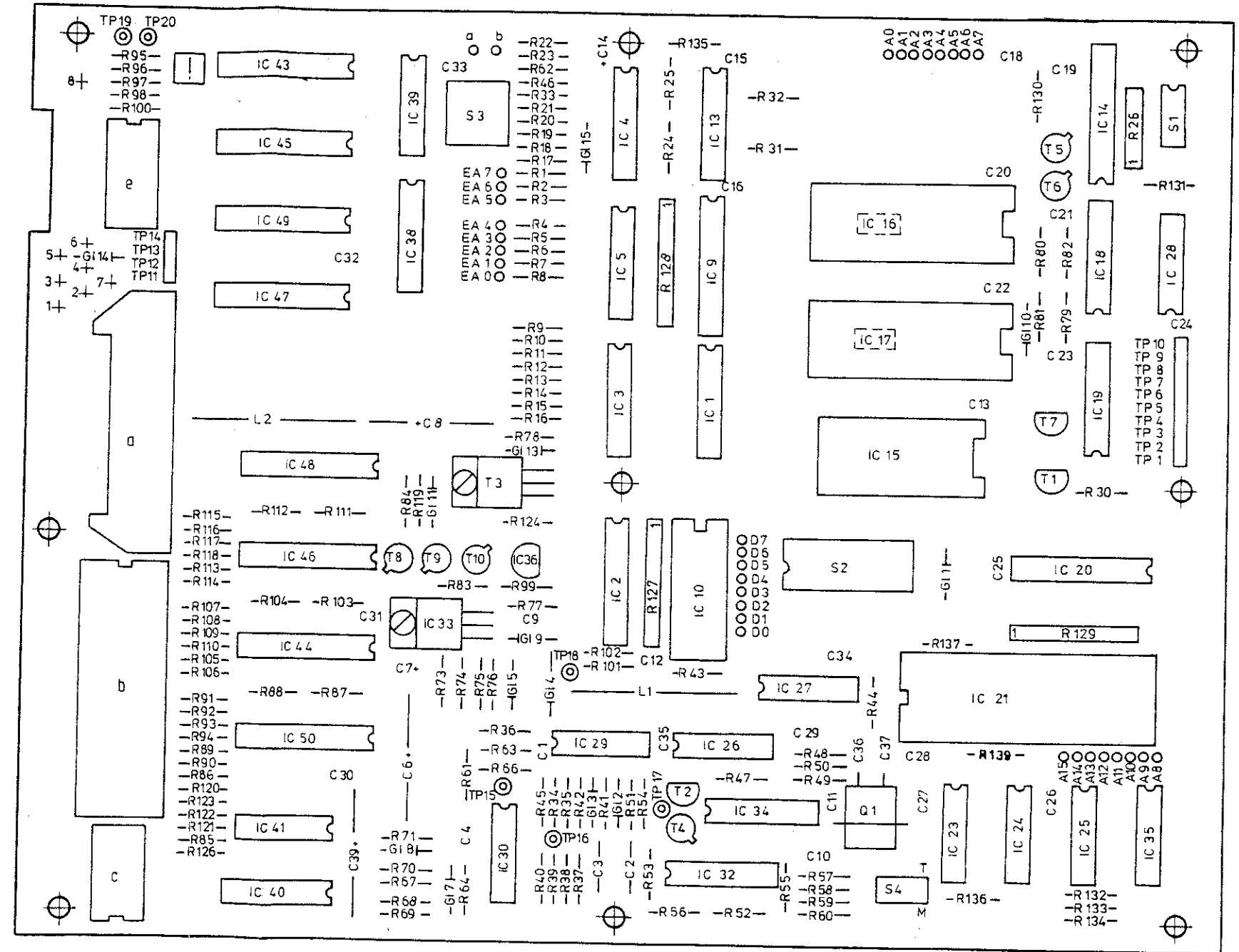
Series A...  
11 955-A01 entfällt Pkt 21 und 52. Schemata wurde direkt veranlasst.  
23 G184 u. G185 nur in Serie A u. B eingebaut

Series A...  
11 955-A01 entfällt Pkt 21 und 52. Schemata wurde direkt veranlasst.  
23 G184 u. G185 nur in Serie A u. B eingebaut

wsbr

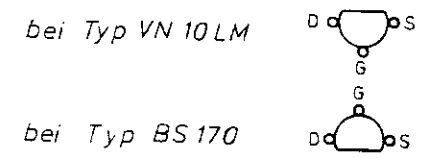
- 1 = wsrt
- 2 = wsbl
- 3 = wssw
- 4 = grrt
- 5 = ws
- 6 = fl \*)
- 7 = grrt

\*) Serie A...H: grbl

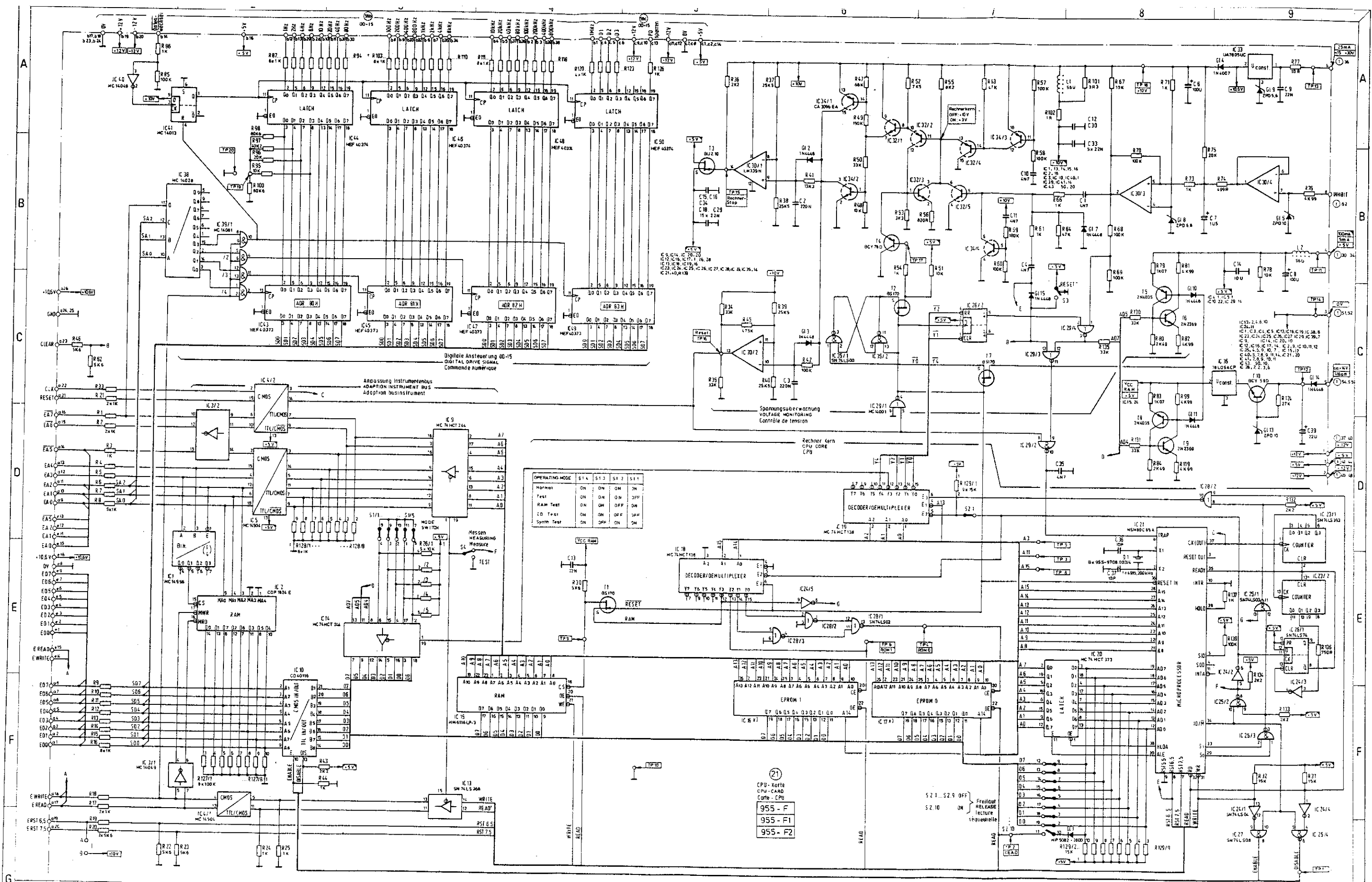


21

Beachte: T1, T2, T7 sind wie folgt zu bestücken:



Benennung:	
CPU - Karte	955-F
CPU - CARD	955-F1
Carte calculateur	955-F2
<b>955 - 7005.00913</b>	



OPERATING MODE	S14	S13	S12	S11
Normal	ON	ON	ON	ON
Test	ON	ON	OFF	OFF
RAM Test	ON	OFF	OFF	OFF
IO Test	ON	ON	OFF	OFF
Synth Test	ON	OFF	ON	ON

21  
CPU - Karte  
CPU - CARD  
Carte - CPU

955 - F  
955 - F1  
955 - F2

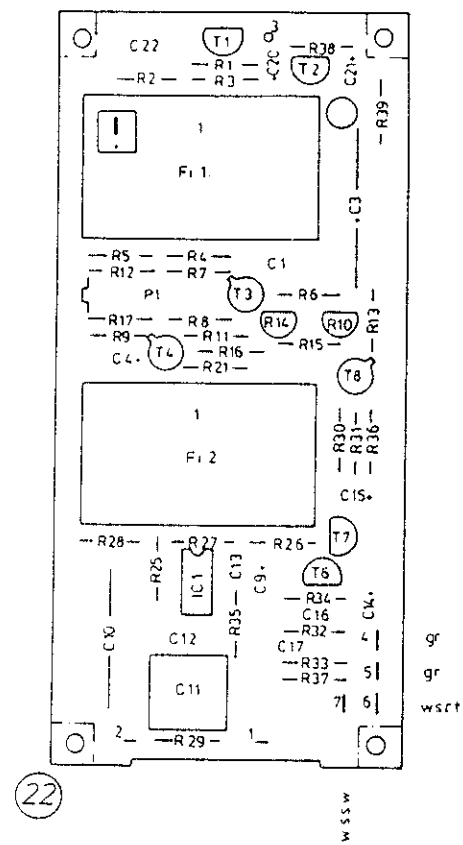
Seriennummerung  
SERIES MODIFICATIONS  
Modification de serie

Programmiert und bestückt nach Programmpaket 955-0430 008/5  
PROGRAMMED AND ASSEMBLED ACCORDING TO PROGRAM PACKAGE  
Programme et équipé suivant assemblée de logiciel

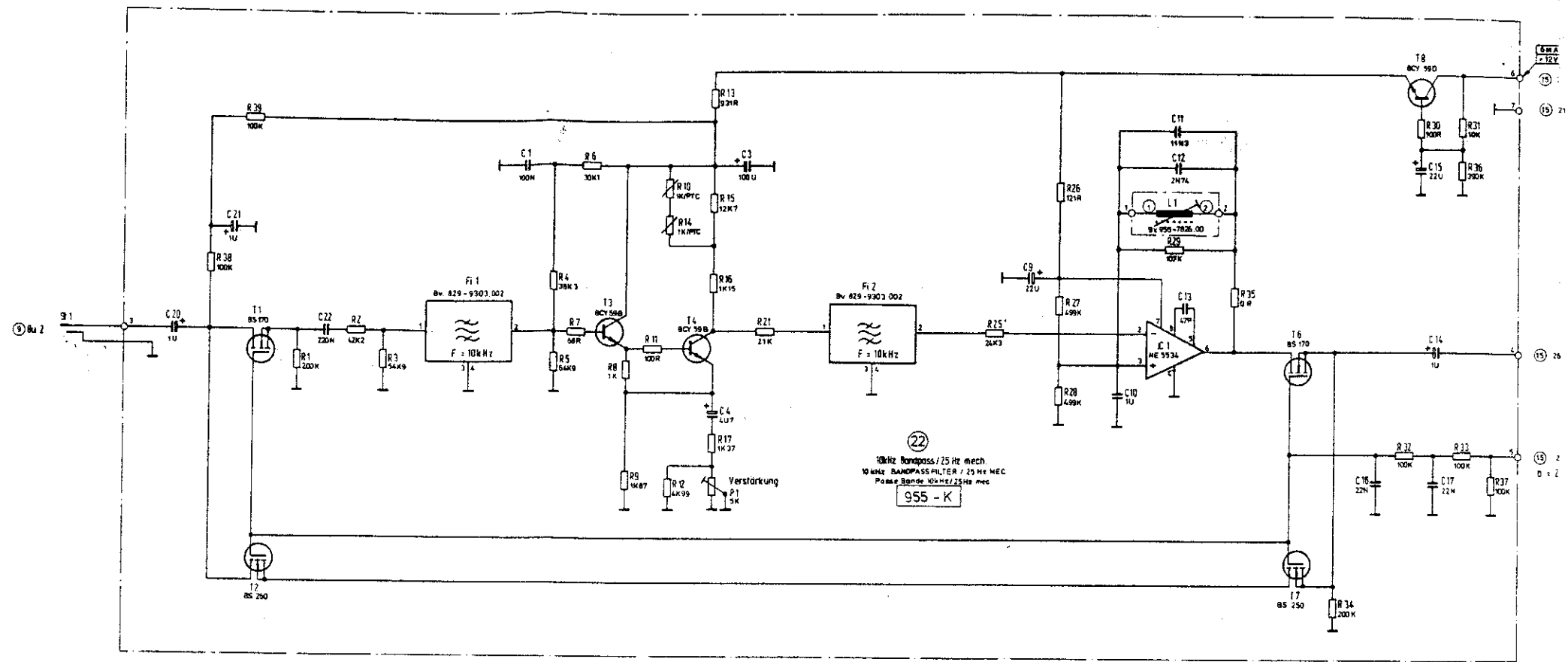
Bestückungszeichnung siehe Seite  
FOR ASSEMBLY MARKINGS SEE PAGE  
Schéma d'implantation voir page

Gleichspannungen gegen Masse  
ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V  
Toutes les tensions données sont mesurées par rapport à 0 V  
Buchsenbelegung siehe  
FOR CONNECTOR ARRANGEMENT SEE  
Gâblage des connecteurs voir

SPM-15/BN 955	Serie M	Ausg.
CPU - Karte CPU - CARD Carte - CPU	21	1 Blatt Sheet 1
955-7521 059/3		1 FF



Bezeichnung:  
 10kHz Bandpass / 25Hz mech. 955-K  
 10kHz BANDPASS / 25Hz MEC.  
 Passe bande 10kHz / 25Hz mec.  
**955-7009.00514**



**Bestückungszeichnung, Stromlaufplan (23)**  
**(Mitlaufsender PSE-15) siehe unter Option**  
**BN 955/00.02.**

**Assembly drawing + circuit diagram (23)**  
**(Tracking Generator PSE-15) see under Option**  
**BN 955/00.02.**

**Schéma de disposition des composants + schéma**  
**de principe (23) (Générateur suiveur PSE-15) voir**  
**option BN 955/00.02.**

**Bestückungszeichnung, Stromlaufplan (24)**  
(<IEC 625>-Bus Anpassung) siehe unter Option  
BN 955/00.03.

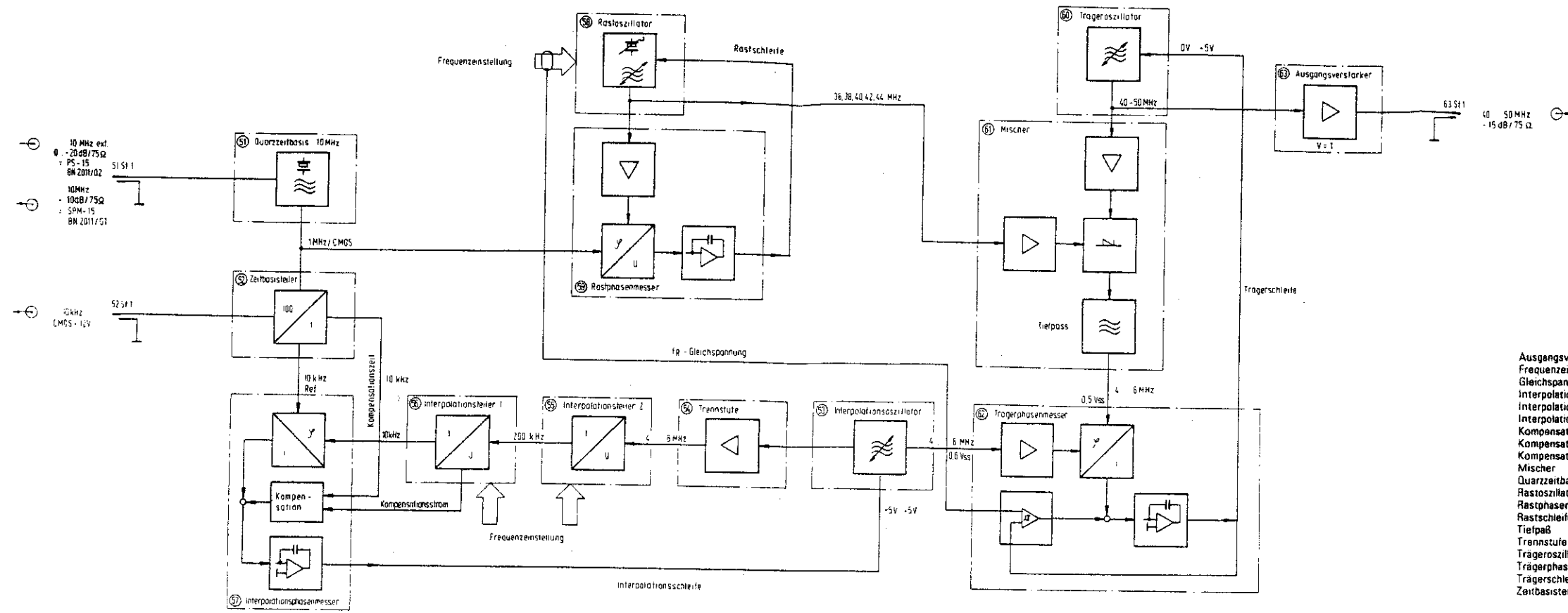
**Assembly drawing + circuit diagram (24)**  
(<IEC 625> Bus Converter) see under Option  
BN 955/00.03.

**Schéma de disposition des composants + schéma  
de principe (24) (adaptation bus <IEC 625>) voir  
option BN 955/00.03.**

**1.1 Synthesizer OD-15**  
**1.1 Synthesizer OD-15**  
**1.1 Synthétiseur OD-15**

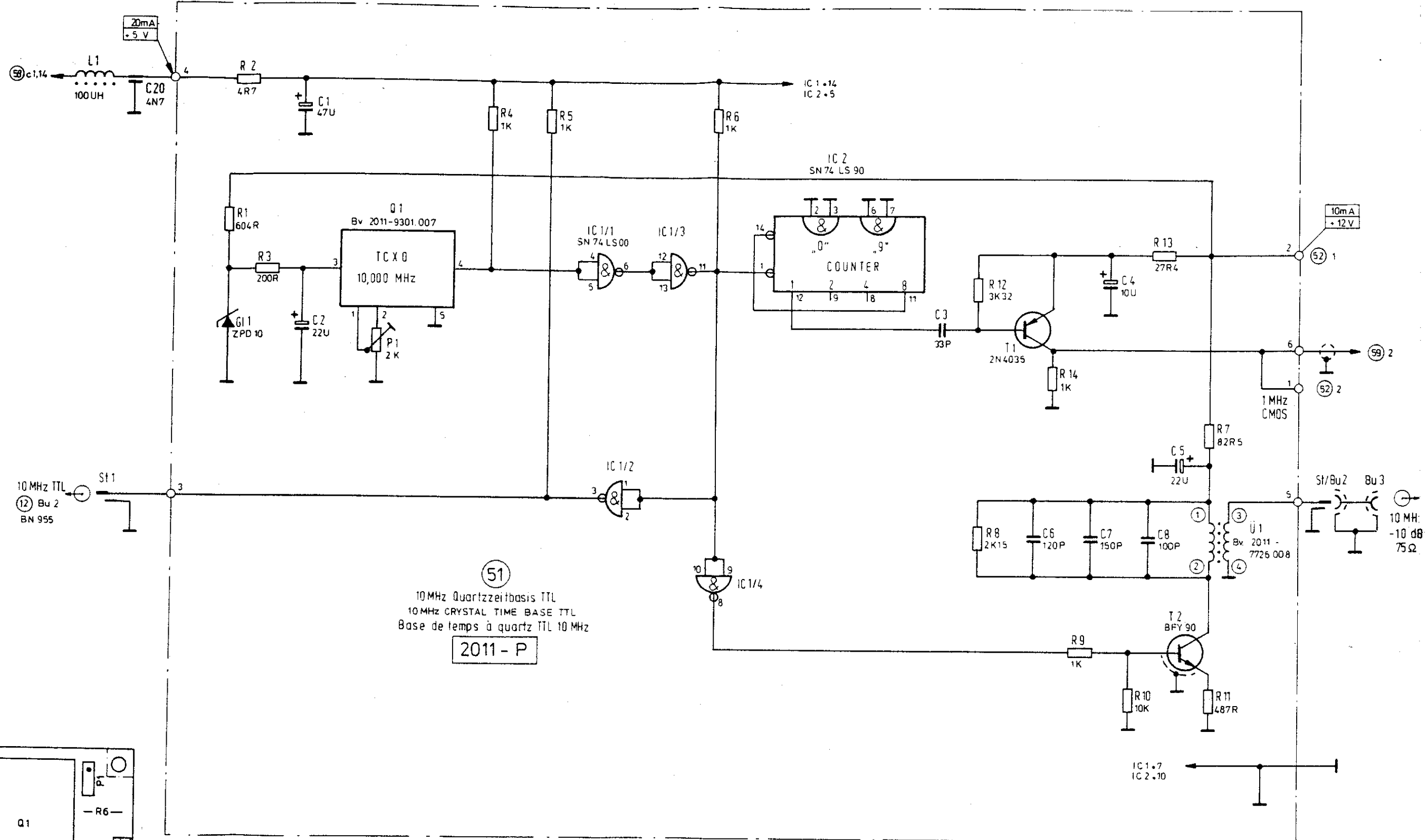
**BN 2011/01**  
**BN 2011/01**  
**BN 2011/01**





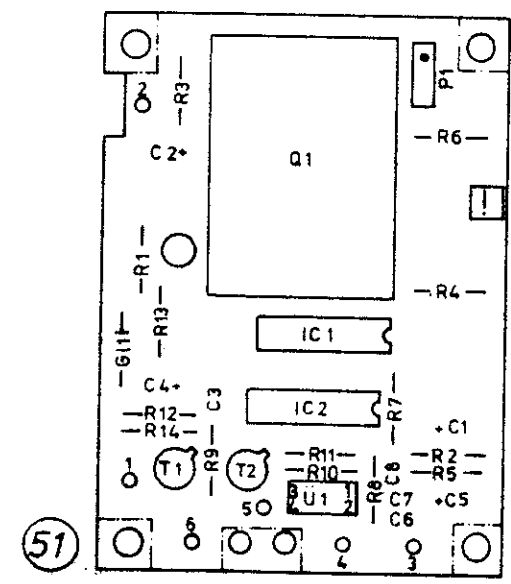
- |                                   |                                  |                                   |
|-----------------------------------|----------------------------------|-----------------------------------|
| <b>Ausgangverstärker</b>          | <b>OUTPUT AMPLIFIER</b>          | <b>Amplificateur de sortie</b>    |
| <b>Frequenzstellung</b>           | <b>FREQUENCY SETTING</b>         | <b>Réglage de la fréquence</b>    |
| <b>Gleichspannung</b>             | <b>D.C.-VOLTAGE</b>              | <b>Tension continue</b>           |
| <b>Interpolationsphasenmesser</b> | <b>INTERPOLATION PHASE METER</b> | <b>Phasemètre d'interpolation</b> |
| <b>Interpolationsschleife</b>     | <b>INTERPOLATION LOOP</b>        | <b>Bande d'interpolation</b>      |
| <b>Interpolationssteiler</b>      | <b>INTERPOLATION DIVIDER</b>     | <b>Diviseur d'interpolation</b>   |
| <b>Kompensation</b>               | <b>COMPENSATION</b>              | <b>Compensation</b>               |
| <b>Kompensationszeit</b>          | <b>COMPENSATION TIME</b>         | <b>Durée de compensation</b>      |
| <b>Kompensationsstrom</b>         | <b>COMPENSATION CURRENT</b>      | <b>Courant de compensation</b>    |
| <b>Mischer</b>                    | <b>MIXER</b>                     | <b>Mélangeur</b>                  |
| <b>Quarzbasis</b>                 | <b>CRYSTAL TIME BASE</b>         | <b>Base de temps à quartz</b>     |
| <b>Rastoszillator</b>             | <b>LOCKING OSCILLATOR</b>        | <b>Oscillateur verrouillage</b>   |
| <b>Rastphasenmesser</b>           | <b>LOCKING PHASE METER</b>       | <b>Phasemètre de verrouillage</b> |
| <b>Tiefpaß</b>                    | <b>LOW-PASS FILTER</b>           | <b>Filter passe-bas</b>           |
| <b>Trennstufe</b>                 | <b>BUFFER STAGE</b>              | <b>Séparateur</b>                 |
| <b>Trägeroszillator</b>           | <b>CARRIER OSCILLATOR</b>        | <b>Oscillateur de porteur</b>     |
| <b>Trägerphasenmesser</b>         | <b>CARRIER PHASE METER</b>       | <b>Niveau de porteur</b>          |
| <b>Trägerschleife</b>             | <b>CARRIER LOOP</b>              | <b>Boucle de porteur</b>          |
| <b>Zeitbasisteiler</b>            | <b>TIME BASE DIVIDER</b>         | <b>Diviseur de base de temps</b>  |

Gleichspannung gegen Masse, Instrument 100 kΩ, V.  
 ALL VOLTAGE RATIOS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ, V. METER.  
 Toutes les tensions données sont mesurées au rapport à 0 V avec un instrument de 100 kΩ, V.



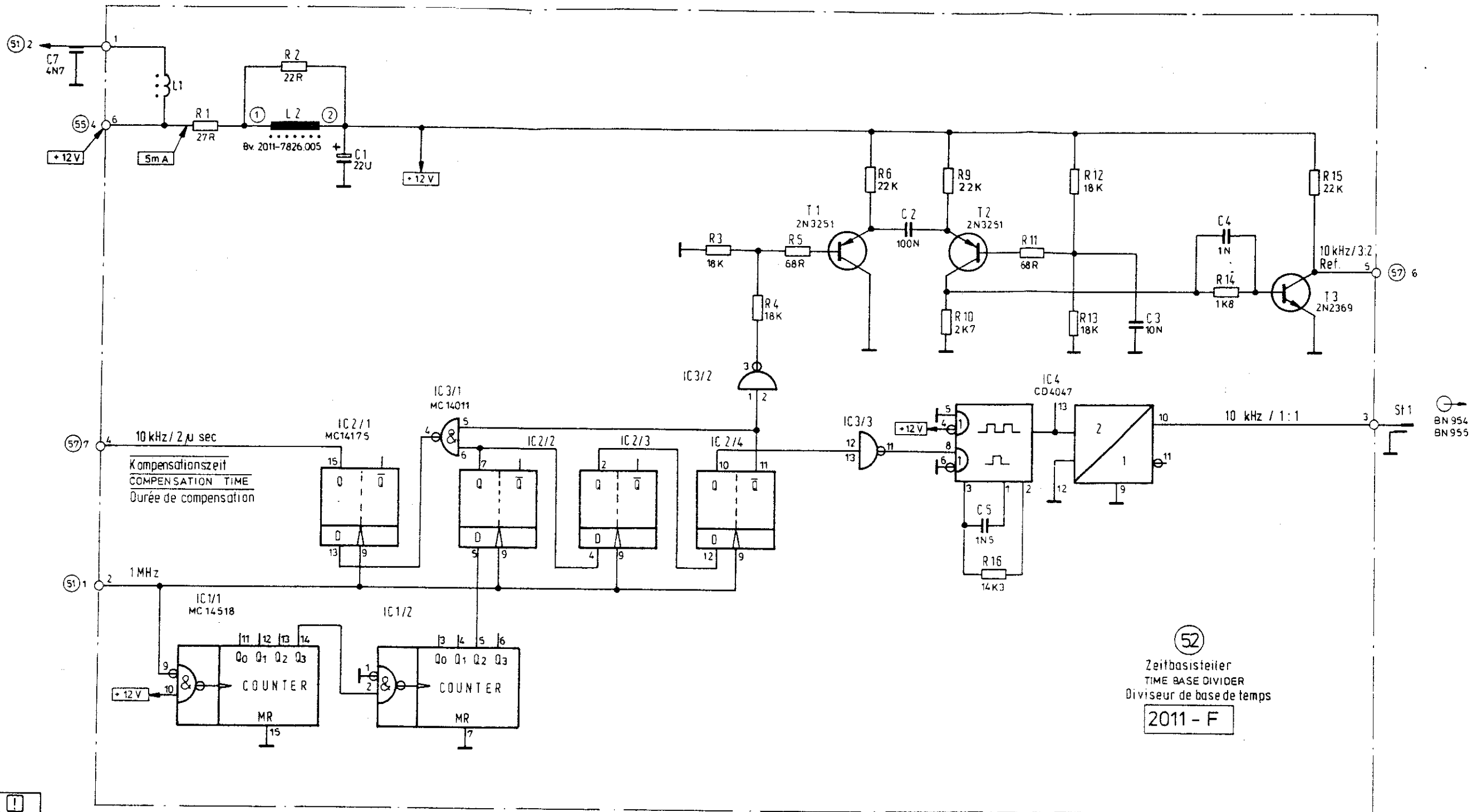
51  
 10 MHz Quartzzeitbasis TTL  
 10 MHz CRYSTAL TIME BASE TTL  
 Base de temps à quartz TTL 10 MHz  
 2011 - P

Gleichspannungen gegen Masse, Instrument = 100 kΩ / V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0V WITH 100 kΩ / V METER  
 Toutes les tensions données sont mesurées par rapport à 0V avec un instrument de 100kΩ / V



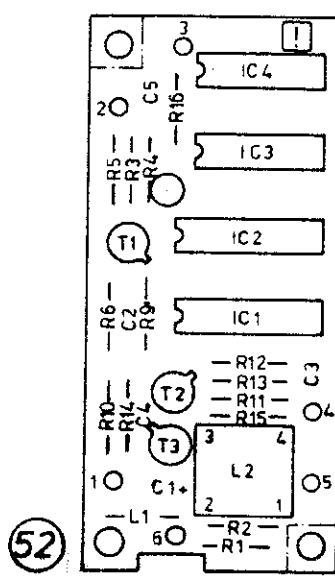
10 MHz-Quartzzeitbasis TTL  
 10 MHz CRYSTAL TIME BASE TTL 2011-P  
 Base de temps à quartz 10 MHz TTL  
 2011-7014.00814

	<b>Stromlaufplan</b> für Gerät: 00-15 / BN 2011/01...	Serie A	Schaltteilliste:
		10 MHz Quartzzeitbasis TTL 10 MHz CRYSTAL TIME BASE TTL 51 Base de temps à quartz TTL 10 MHz	2011-7551.118 / 3



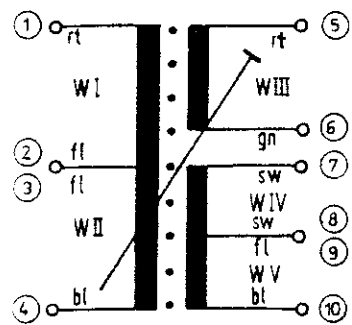
52  
 Zeitbasisteiler  
 TIME BASE DIVIDER  
 Diviseur de base de temps  
 2011-F

Gleichspannungen gegen Masse. Instrument = 100 kΩ/V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100kΩ / V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100kΩ / V

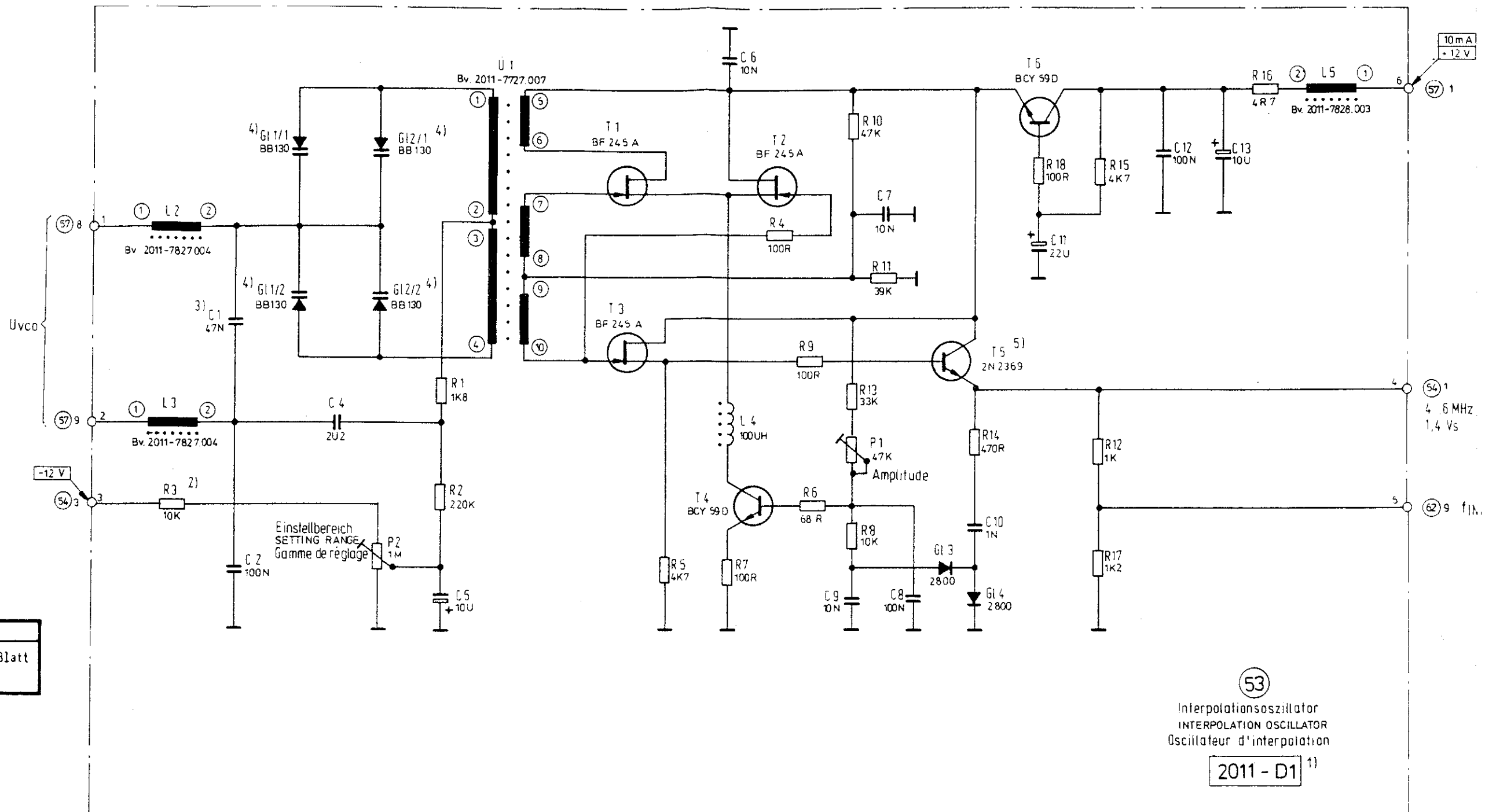


Zeitbasisteiler  
 TIME BASE DIVIDER  
 Diviseur de base de temps  
 2011-F  
 2011-7005.00414

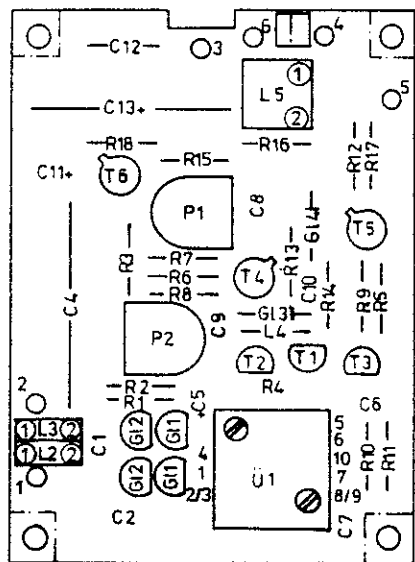
	<b>Stromlaufplan</b> für Gerät: 00-15 / BN 2011	Serie A...	Schaltteilliste:
	Zeitbasisteiler TIME BASE DIVIDER Diviseur de base de temps	52	2011-7552.010 / 3



Serie A ...  
 Bv. 2011-7727.007/14 Blatt 2



53  
 Interpolationsoszillator  
 INTERPOLATION OSCILLATOR  
 Oscillateur d'interpolation  
 2011 - D1<sup>1)</sup>



Serienanmerkung  
 SERIES MODIFICATIONS  
 Modification de série

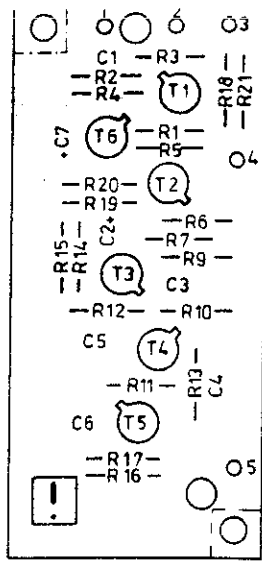
Serie A: 1) 2011-D, 2) 220 K, 3) 100 N  
 4) 2x BB 113, 5) 2N 3947

Gleichspannungen gegen Masse, Instrument = 100 kΩ / V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ / V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ / V

Bei Austausch der Platine D mit D1 müssen auf der Platine K Bauteile (R64, 65, 74) entsprechend K1 ausgetauscht werden!  
 WHEN BOARD D IS REPLACED BY D1, THE COMPONENTS (R64, 65, 74) ON BOARD K MUST BE CHANGED TO CONTROL THE BOARD TO K1!  
 Lors de l'échange de la platine D en D1, les composants (R64, 65, 74) doivent être remplacés suivant K1 sur la platine K!

Interpolationsoszillator  
 INTERPOLATION OSCILLATOR 2011-01  
 Oscillateur d'interpolation  
 2011-7003.006/14

<b>Stromlaufplan</b> für Gerät: 00-15 / BN. 2011..... Interpolationsoszillator INTERPOLATION OSCILLATOR Oscillateur d'interpolation	53	Serie A .....	Schaltteilliste:	1... Bla
		2011-7553.019/3		Blatt-Nr. 1



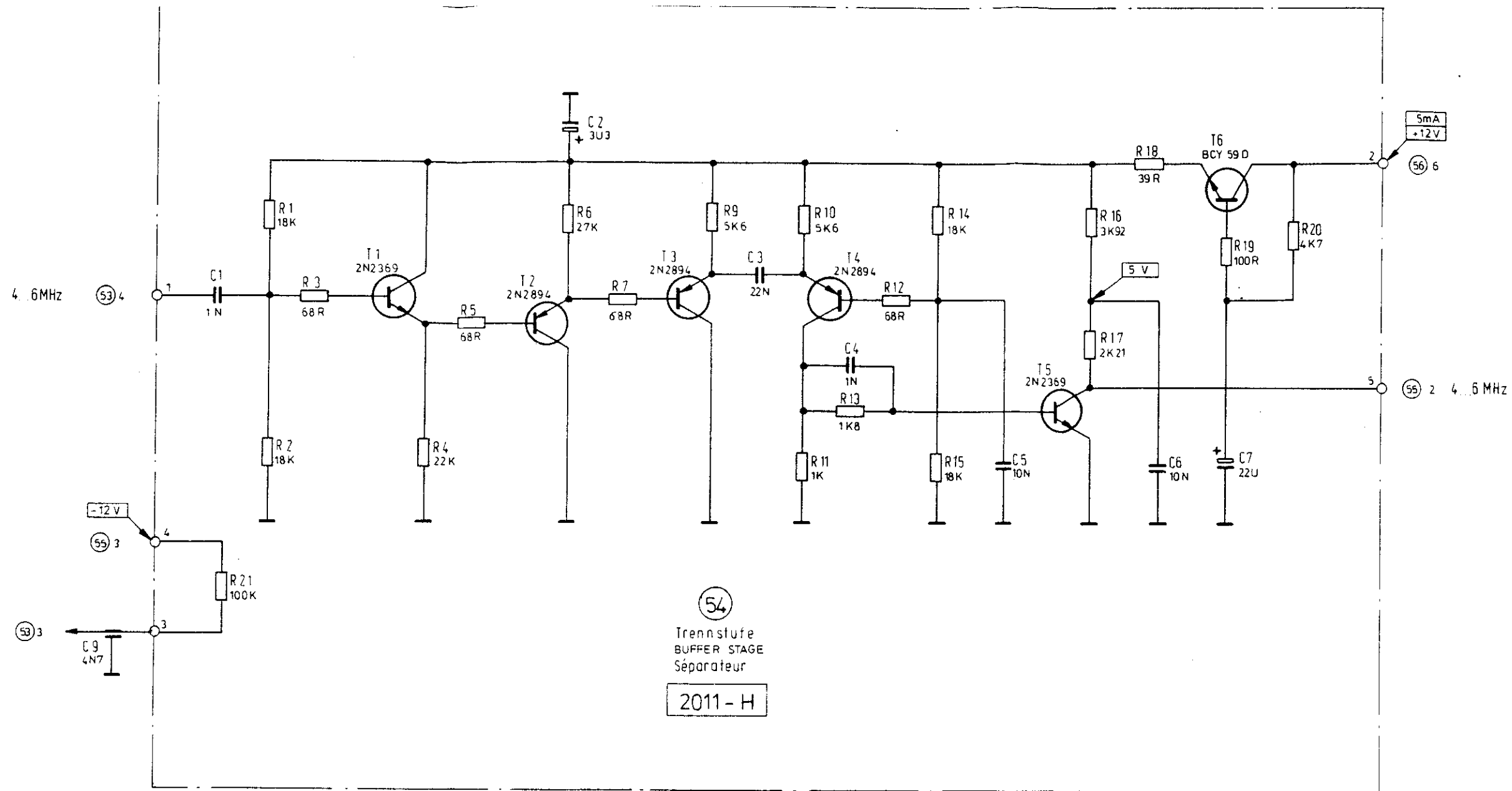
54

Trennstufe  
 BUFFER STAGE  
 Séparateur

2011-H

2011-7007.00214

1a



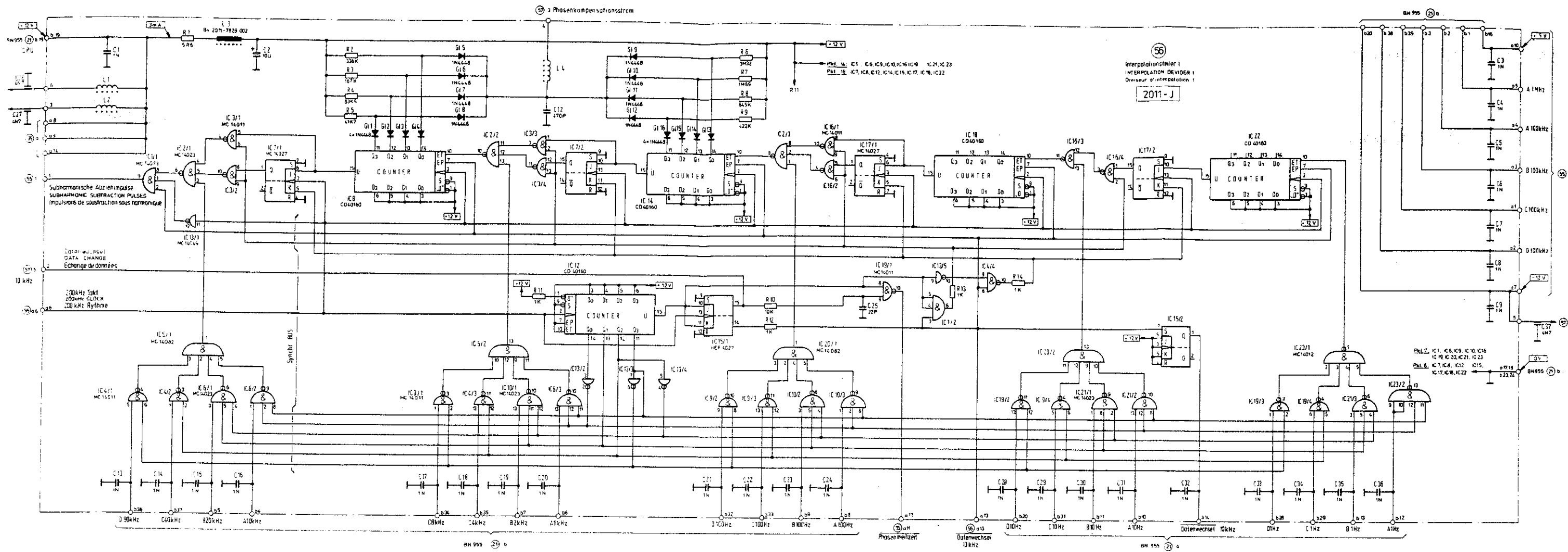
54  
 Trennstufe  
 BUFFER STAGE  
 Séparateur

2011-H

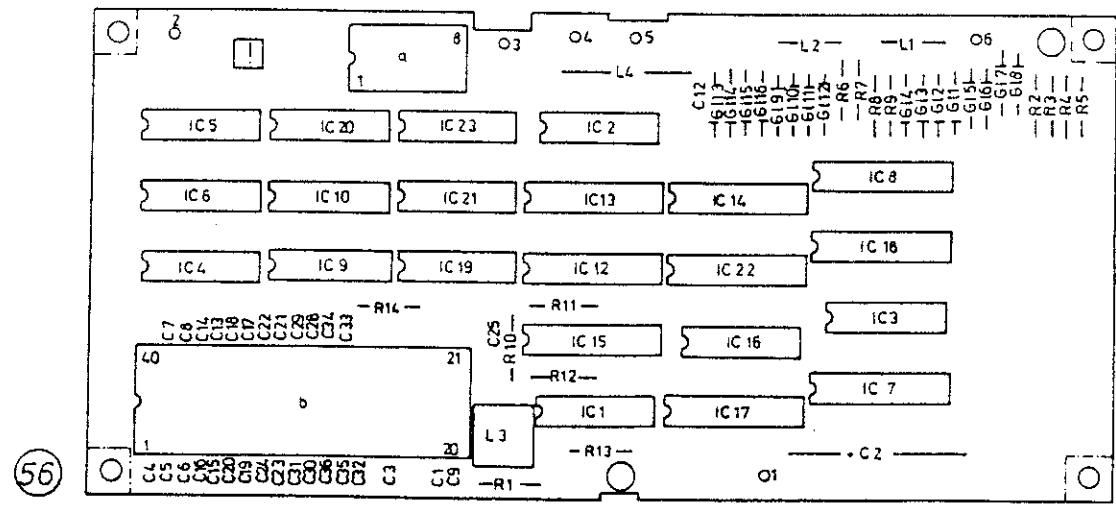
Gleichspannungen gegen Masse, Instrument = 100kΩ/V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0V WITH 100KΩ/V METER  
 Toutes les tensions données sont mesurées par rapport à 0V avec un instrument de 100kΩ/V

	<b>Stromlaufplan</b> Trennstufe BUFFER STAGE Séparateur	für Gerät: 00-15/BN 2011	Serie A ...	Schalteille:
	54	2011-7554.018/3	Blatt Blatt-Nr.	1





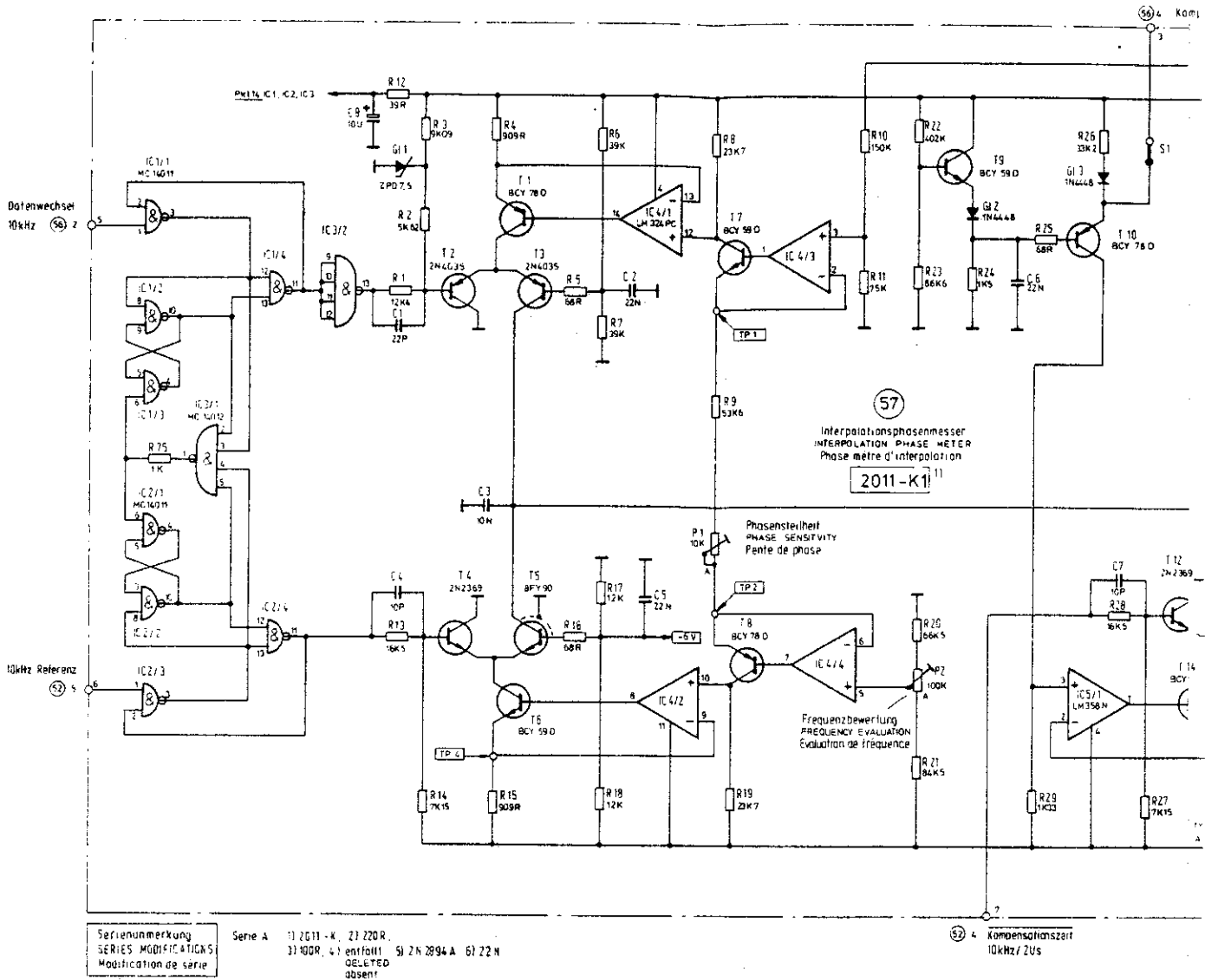
Gleichspannung gegen Masse, Instrument - 100 kΩ V  
AL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ V METER  
Tous les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ V



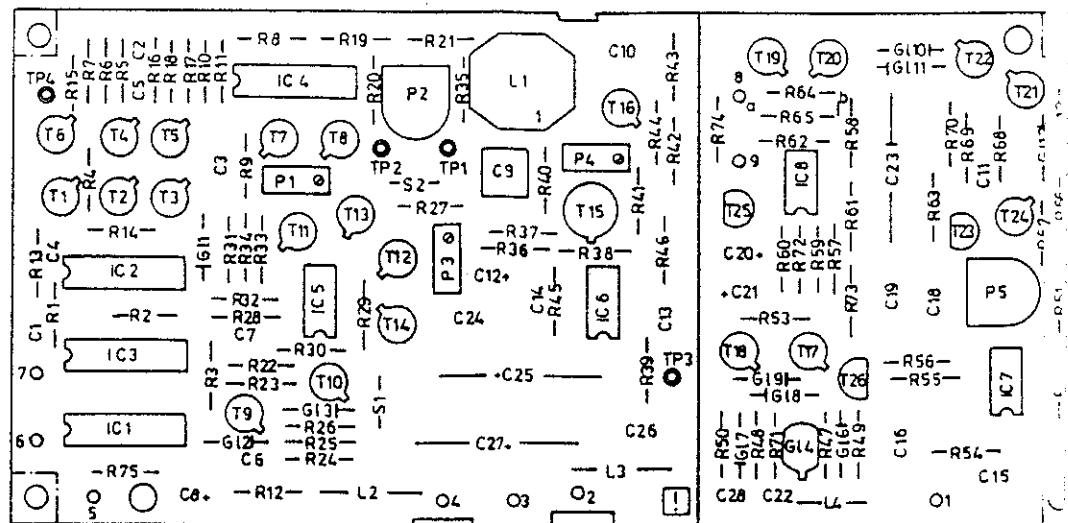
Interpolationsteiler 1  
INTERPOLATION DIVIDER 1  
Diviseur d'interpolation 1

2011-J

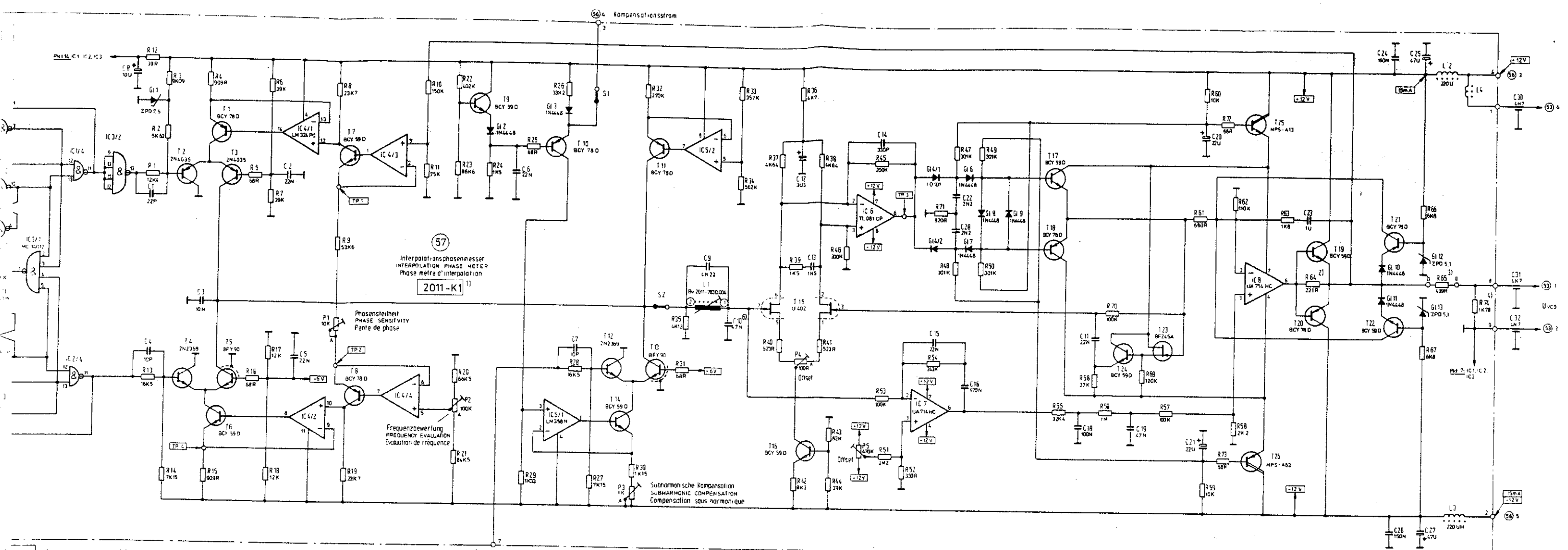
2011-7008.00114



57





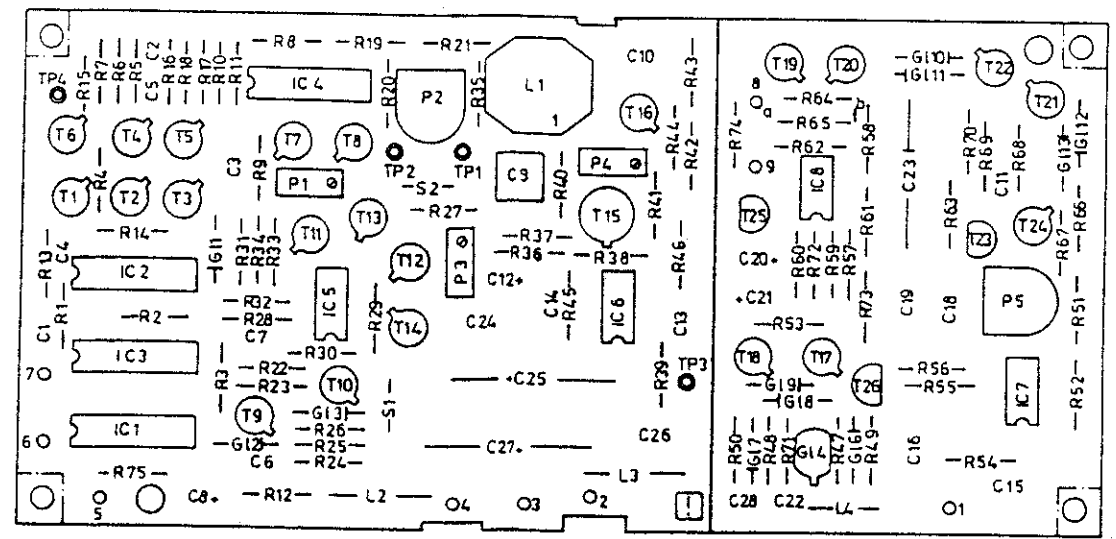


Reihe A 2011-K, 21 228R,  
31 100R, 43 anfallig  
DELETED  
absent!

Bei Austausch der Platine K mit K1 muß auch die  
Platine D mit D1 ausgetauscht werden!  
WHEN THE K BOARD IS REPLACED BY THE K1 BOARD  
THE D BOARD MUST BE REPLACED BY THE D1 BOARD.  
Lors de l'échange de la platine K en K1 la platine D  
doit être également échangée en D1.

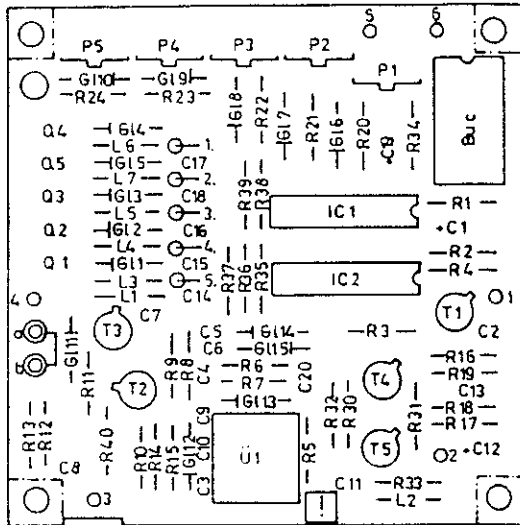
Gleichspannung gegen Masse, Instrument = 100 kΩ/V  
DC VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ/V METER  
Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ/V

57



Interpolationsphasenmesser  
INTERPOLATION PHASE METER  
Phasemeter d'interpolation  
2011-K1  
2011-700900014

	Interpolationsphasenmesser	Serie A	00-15 / 01 2011
	INTERPOLATION PHASE METER	2011 - 7557.015 / 33	
	Phasemeter d'interpolation		



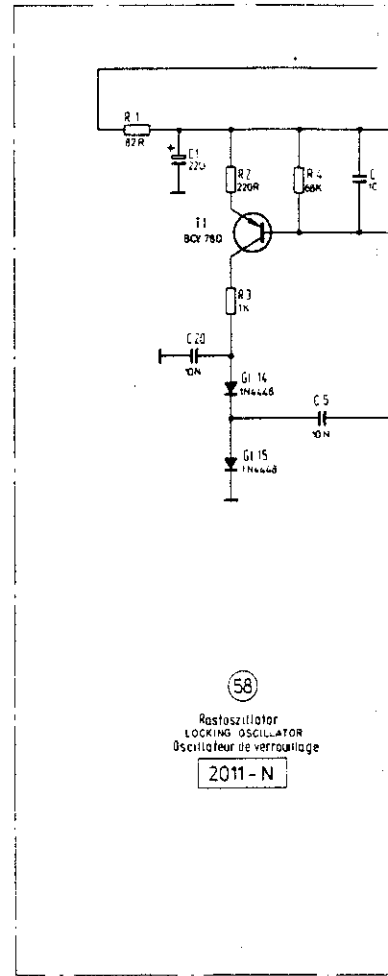
- 1.=R 28
- 2.=R 29
- 3.=R 27
- 4.=R 26
- 5.=R 25

58

Rastoszillator	2011-N
LOCKING OSCILLATOR	
Oscillateur de verrouillage	
2011-7012.00014	

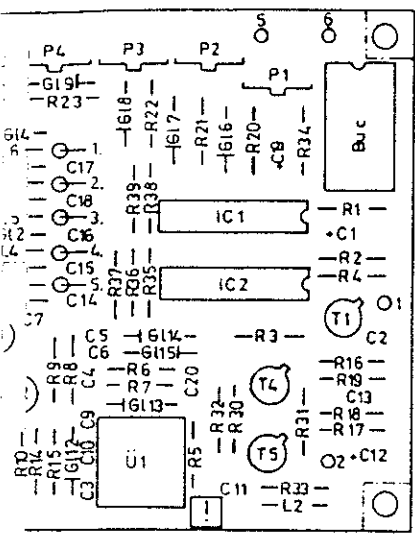


58 Ü 1
Bv. 2011-7728.006/4



58

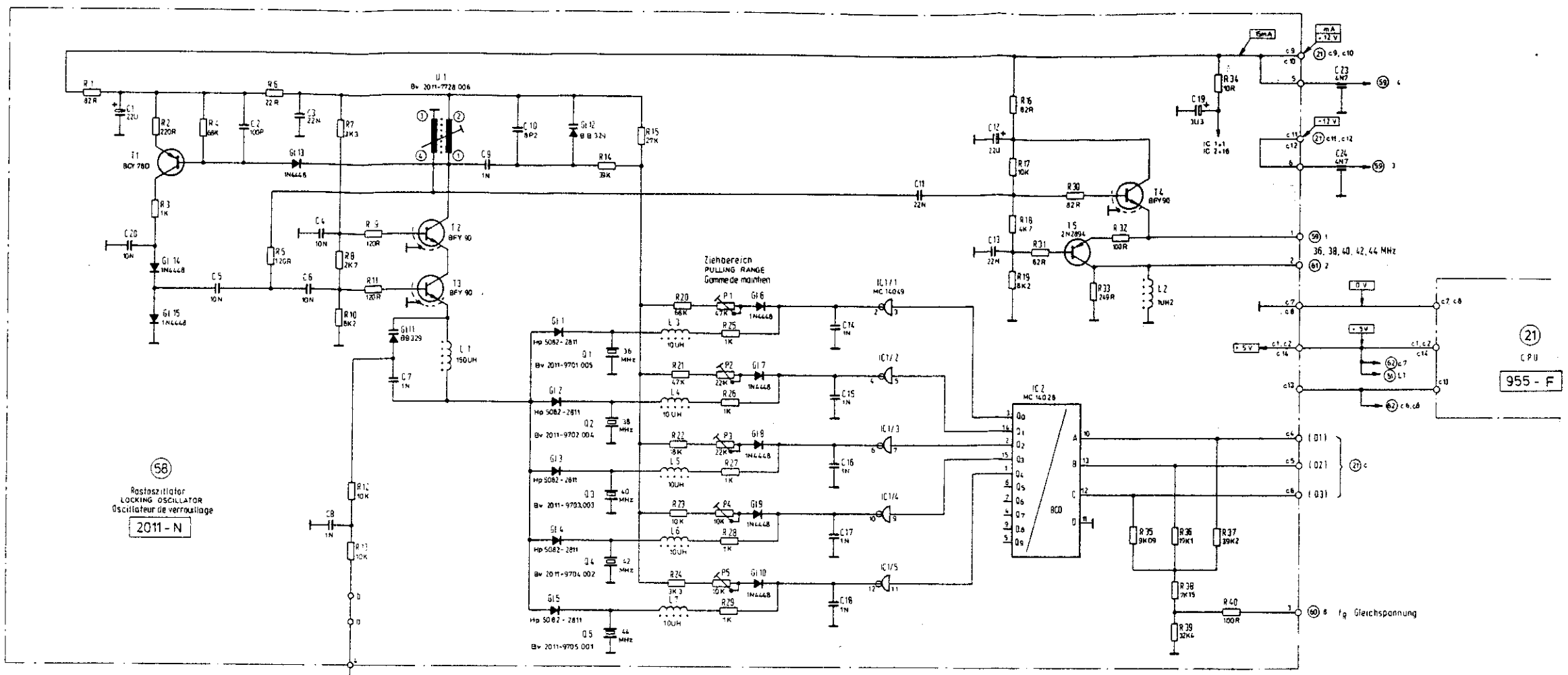
Rastoszillator
LOCKING OSCILLATOR
Oscillateur de verrouillage
2011-N



- 1.-R28
- 2.-R29
- 3.-R27
- 4.-R26
- 5.-R25

Rastoszillator  
 LOCKING OSCILLATOR  
 Oscillateur de verrouillage  
**2011-7012.00014**

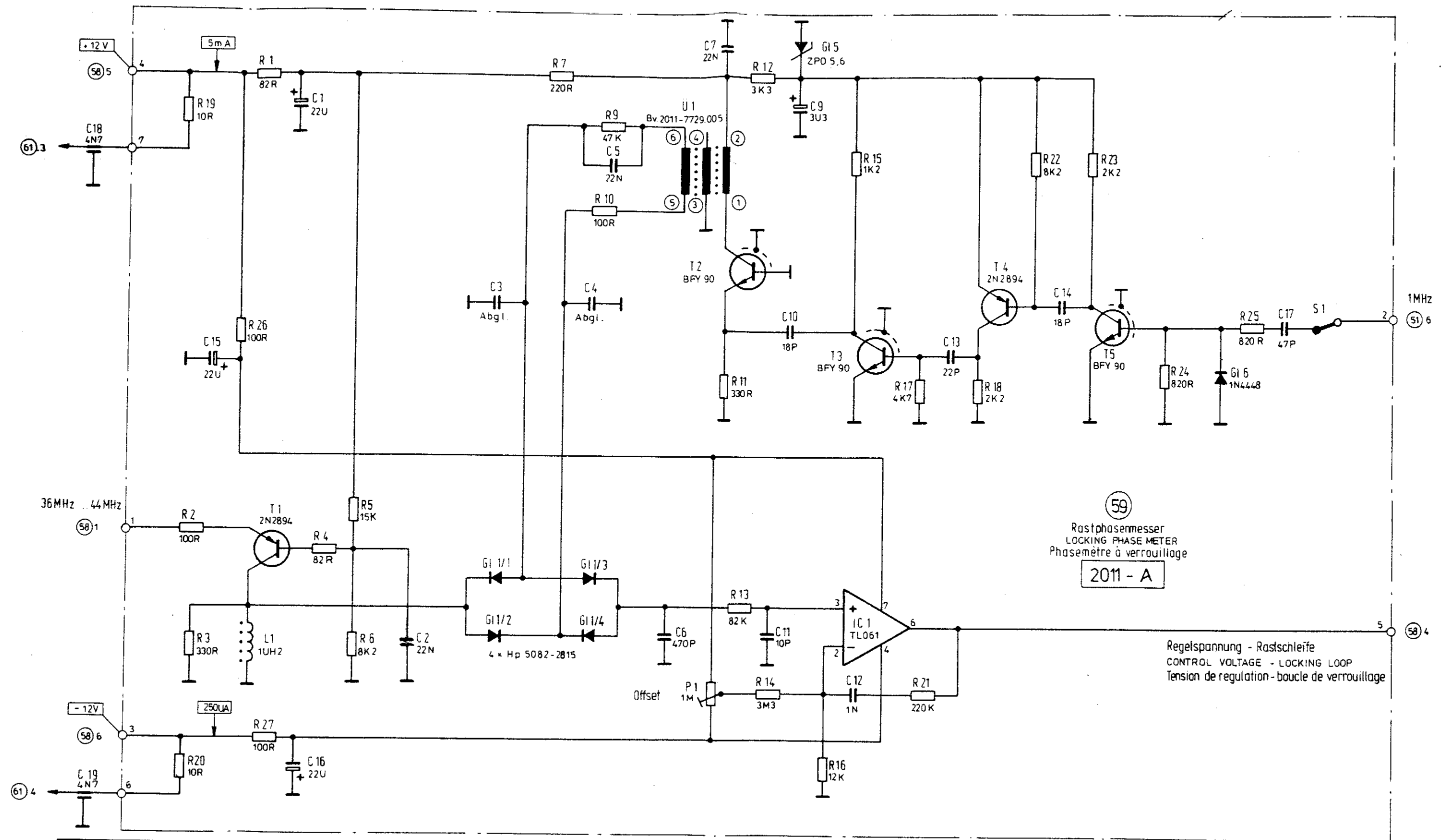
58 U 1  
 Bv. 2011-7728.006/4



58  
 Rastoszillator  
 LOCKING OSCILLATOR  
 Oscillateur de verrouillage  
**2011-N**

Regelspannung - Rastschleife  
 CONTROL VOLTAGE - LOCKING LOOP  
 Tension de regulation - boucle de verrouillage

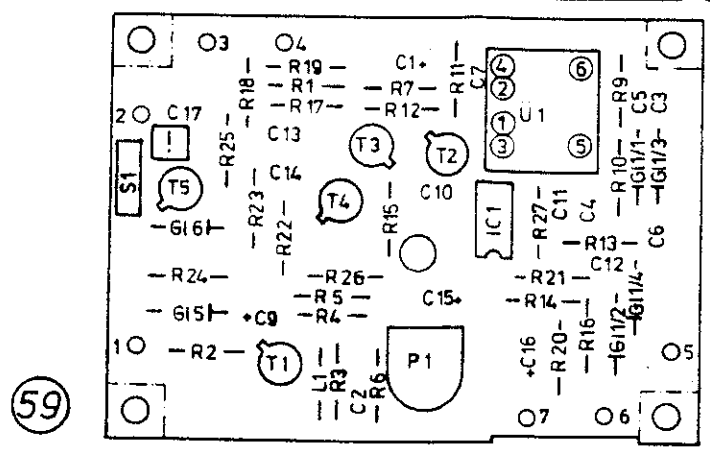
Spannung gegen Masse, Instrument - 100 kΩ, V  
 AL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ, V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ, V



59  
Rastphasenmesser  
LOCKING PHASE METER  
Phasemètre à verrouillage  
2011 - A

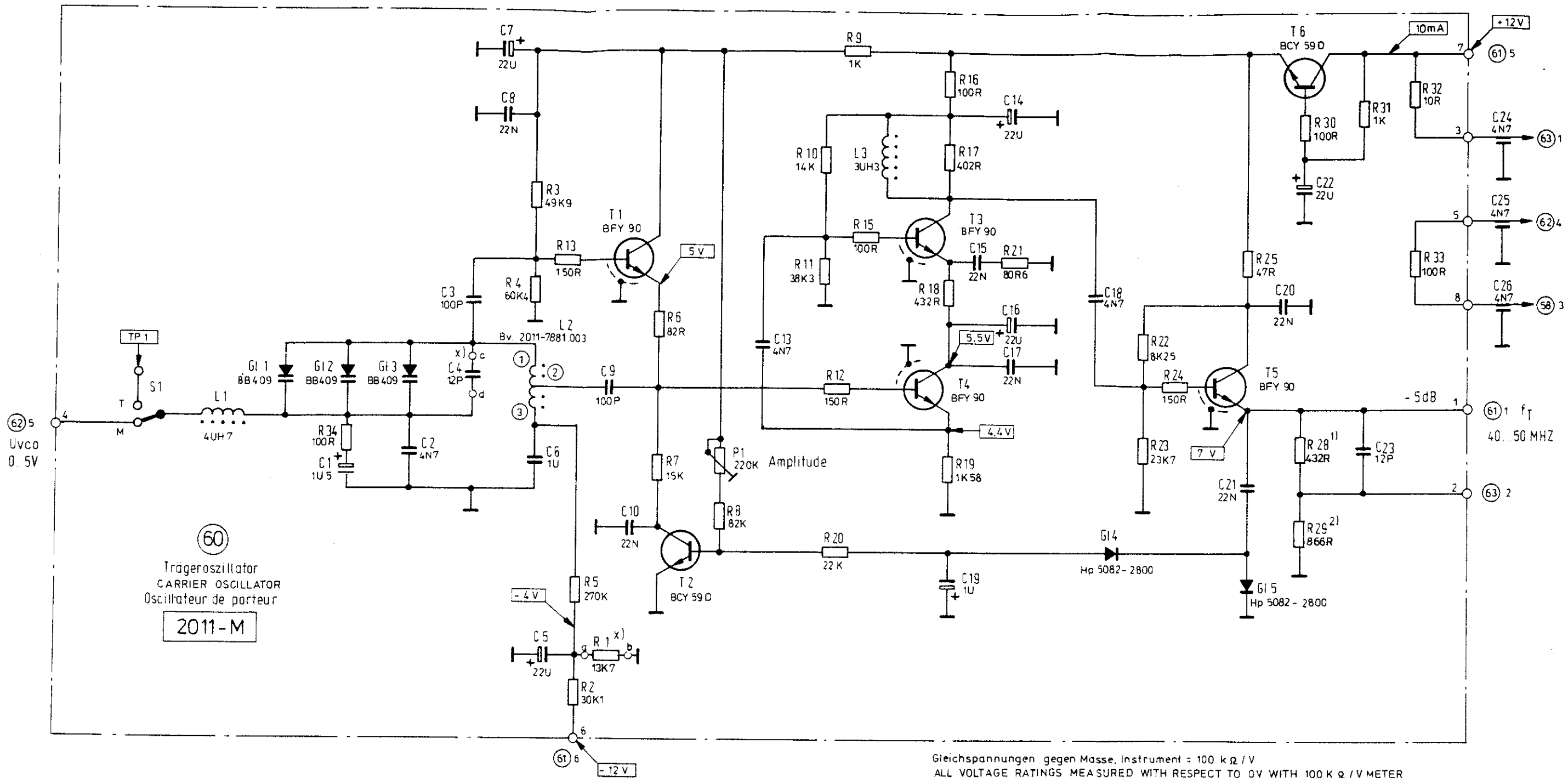
Regelspannung - Rastschleife  
CONTROL VOLTAGE - LOCKING LOOP  
Tension de regulation - boucle de verrouillage

Gleichspannungen gegen Masse, Instrument = 100 kΩ/V  
ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0V. WITH 100 kΩ/V METER  
Toutes les tensions données sont mesurées par rapport à 0V avec un instrument de 100kΩ/V

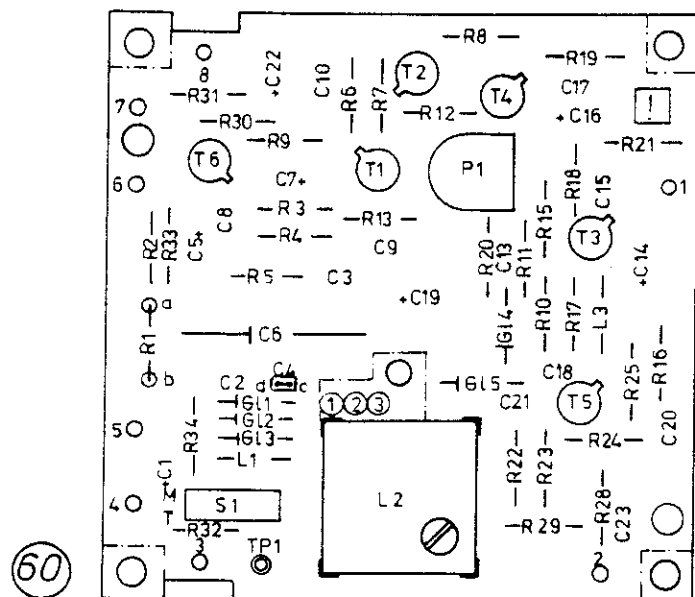


Rastphasenmesser  
LOCKING PHASE METER  
Phasemètre de verrouillage  
2011 - A  
2011-7000.00914  
3

<b>Stromlaufplan</b> Rastphasenmesser LOCKING PHASE METER Phasemètre à verrouillage	für Gerät ..00..15/BN2011.....	Serie A .....	Schaltteilliste :
	59	2011 - 7559.013/3	1a Blatt-Nr. ....



Gleichspannungen gegen Masse, Instrument = 100 k $\Omega$ /V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0V WITH 100 K $\Omega$ /V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100k $\Omega$ /V

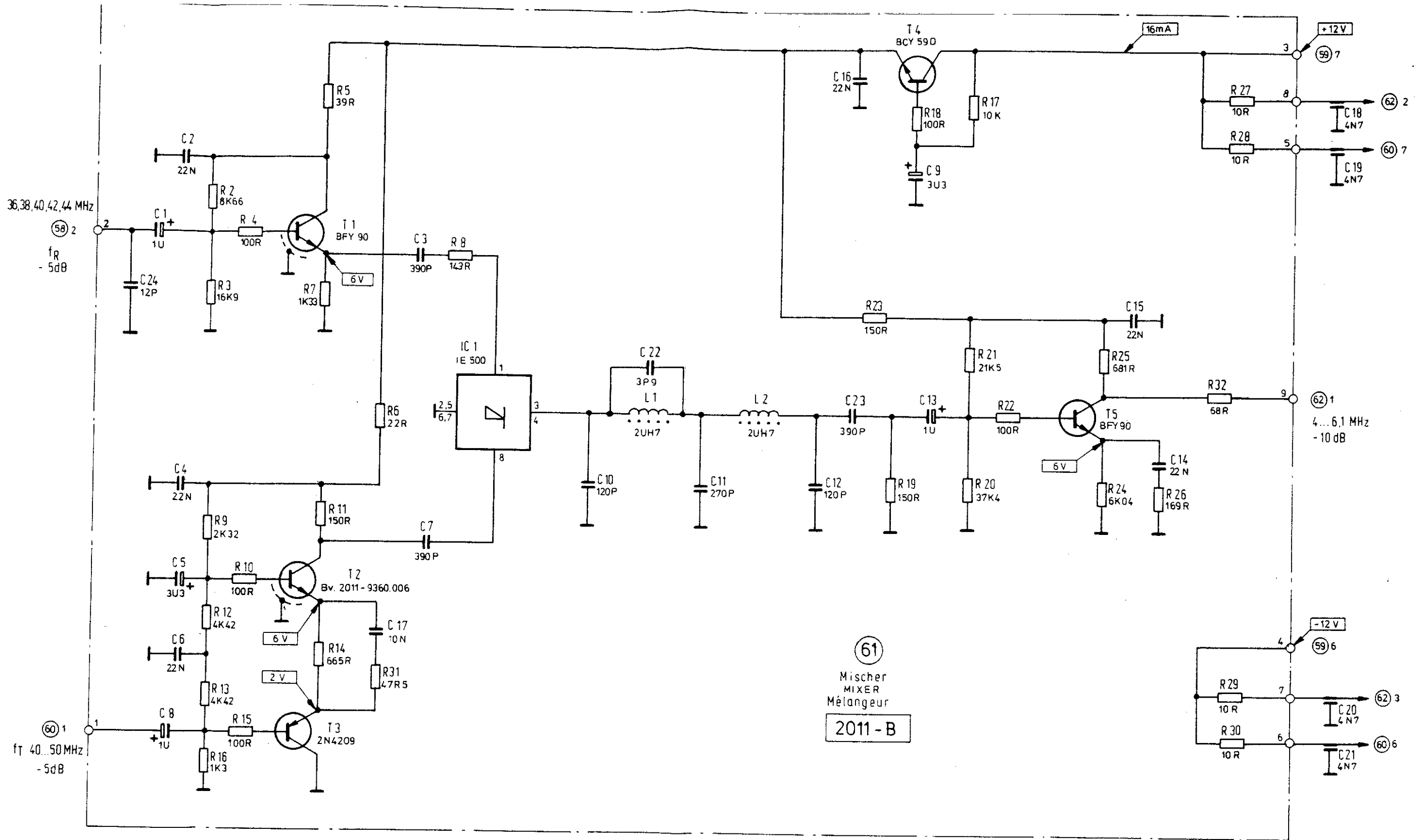


Trägeroszillator  
CARRIER OSCILLATOR  
Oscillateur de porteur  
2011-M  
2011-7011.00114

x) Abgleichwert

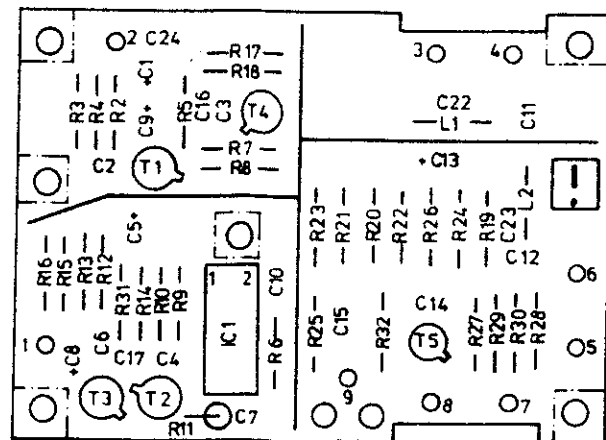
Serienänderungen: Serie A. 1) 649R, 2) 1K3

<b>Stromlaufplan</b> Trägeroszillator CARRIER OSCILLATOR Oscillateur de porteur	für Gerät: 00-15 / BN 2011	Serie A	Schaltteilleiste:
	2011-7560.015 / 3	3	Blatt-Nr.: 3



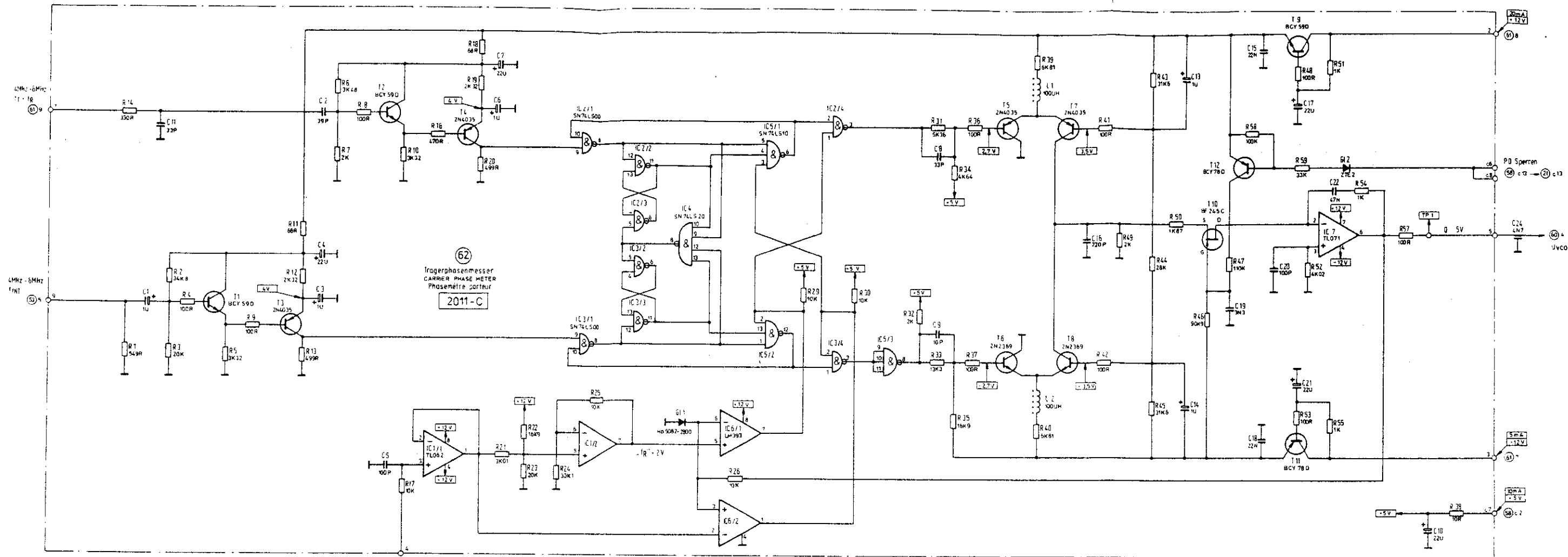
61  
Mischer  
MIXER  
Mélangeur  
2011-B

Gleichspannungen gegen Masse, Instrument = 100 kΩ / V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ / V METER  
 Toutes les tensions données sont mesurées par rapport à 0V avec un instrument de 100 kΩ / V



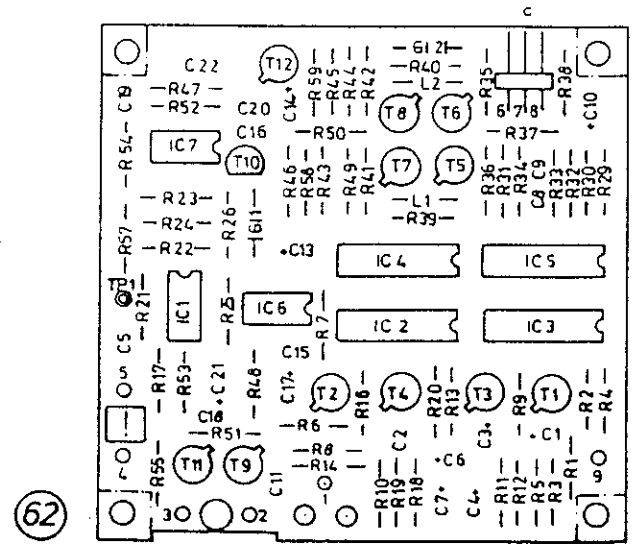
Benennung:  
 Mischer  
 MIXER  
 Mélangeur  
 2011-B  
 2011-7001.00814

<b>Stromlaufplan</b> Mischer MIXER Mélangeur	für Gerät: 00-15 / BN 2011..... 61	Serie A...	Schaltteilliste:	...1. Blatt
		2011-7561.014 / 3		Blatt-Nr...



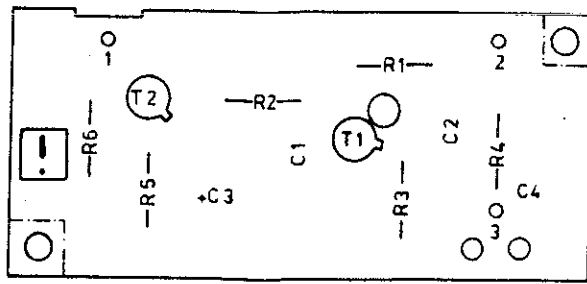
7a	0 DC
36 MHz	0 V
38 MHz	1 V
40 MHz	2 V
42 MHz	3 V
44 MHz	4 V

Gleichspannung gegen Masse, Instrument - 100 kΩ V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V WITH 100 kΩ V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ V



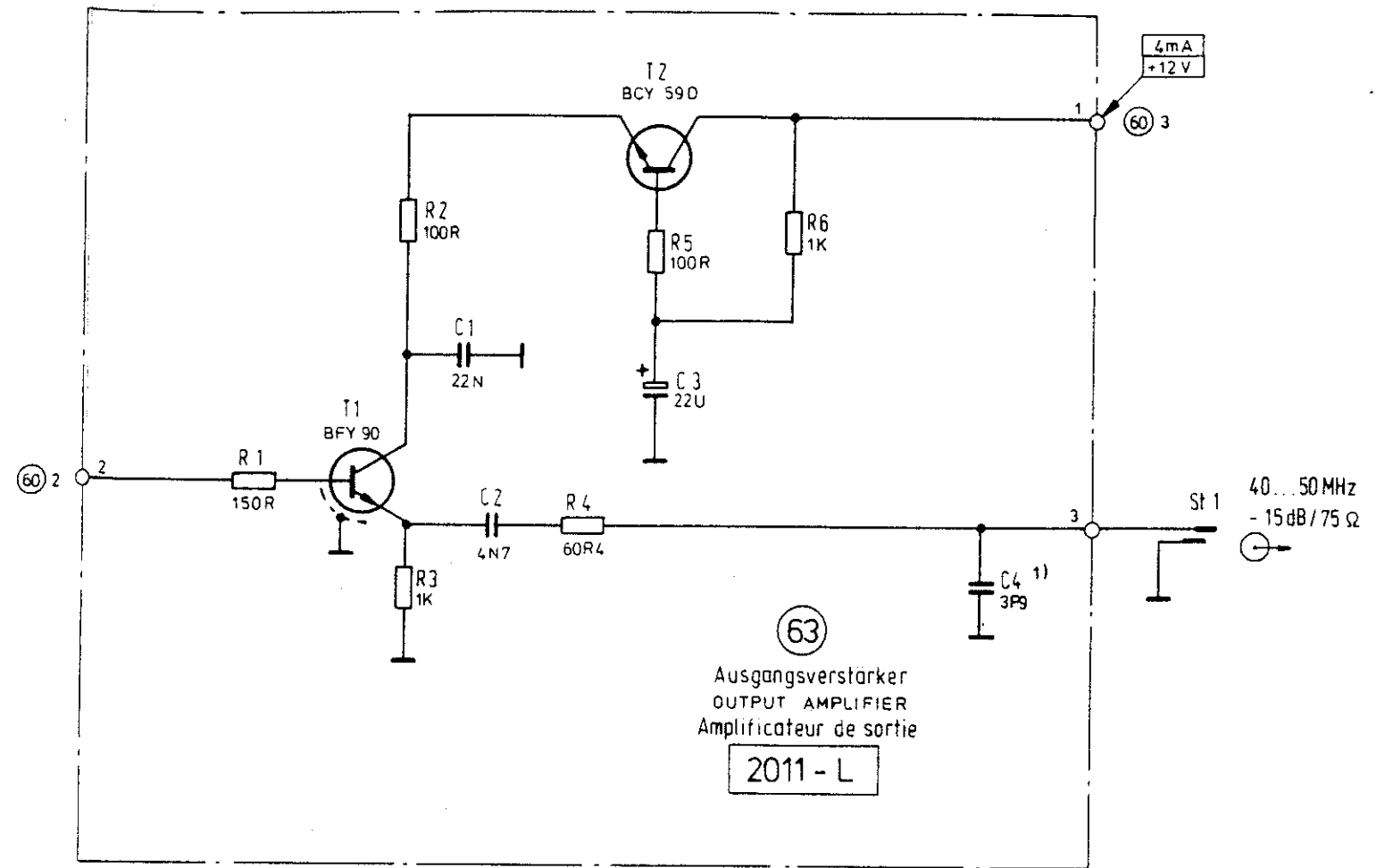
Benennung  
 Trägerphasenmesser  
 CARRIER PHASE METER  
 Phasemètre porteur  
 2011-C  
 2011-7002.007/4

Trägerphasenmesser CARRIER PHASE METER Phasemètre porteur	Serie A	00-15/BN2011	1
	2011 - 7562.013 / 33		



63

Ausgangsverstärker OUTPUT AMPLIFIER Amplificateur de sortie	2011-L
2011-7010.00214	
	2



Gleichspannungen gegen Masse, Instrument = 100 kΩ / V  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0V WITH 100kΩ / V METER  
 Toutes les tensions données sont mesurées par rapport à 0 V avec un instrument de 100 kΩ / V



- 2.1 Batteriezusatz BAZ-15
- 2.1 Battery Pack BAZ-15
- 2.1 Auxiliaire batterie BAZ-15

BN 955/00.01  
BN 955/00.01  
BN 955/00.01

**Option 955/00.01 (Batteriezusatz BAZ-15) siehe unter Stromlaufplan (1) (Netzteil)**

**Option 955/00.01 (BAZ-15 Battery Pack) see under circuit diagram (1) (power supply)**

**Option 955/00.01 (alimentation sur batterie BAZ-15) voir à schéma de principe (1) (alimentation)**

**2.2 Mitlaufsender PSE-15**  
**2.2 Tracking Generator PSE-15**  
**2.2 Générateur suiveur PSE-15**

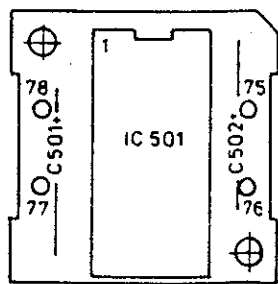
**BN 955/00.02**  
**BN 955/00.02**  
**BN 955/00.02**

Hinweis: Seiten 55 - 57 entfallen

N.B.: pages 55 - 57 omitted

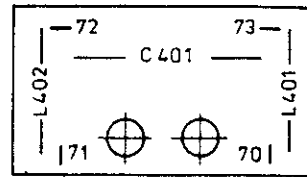
Note: les pages 55 à 57 sont supprimées

23



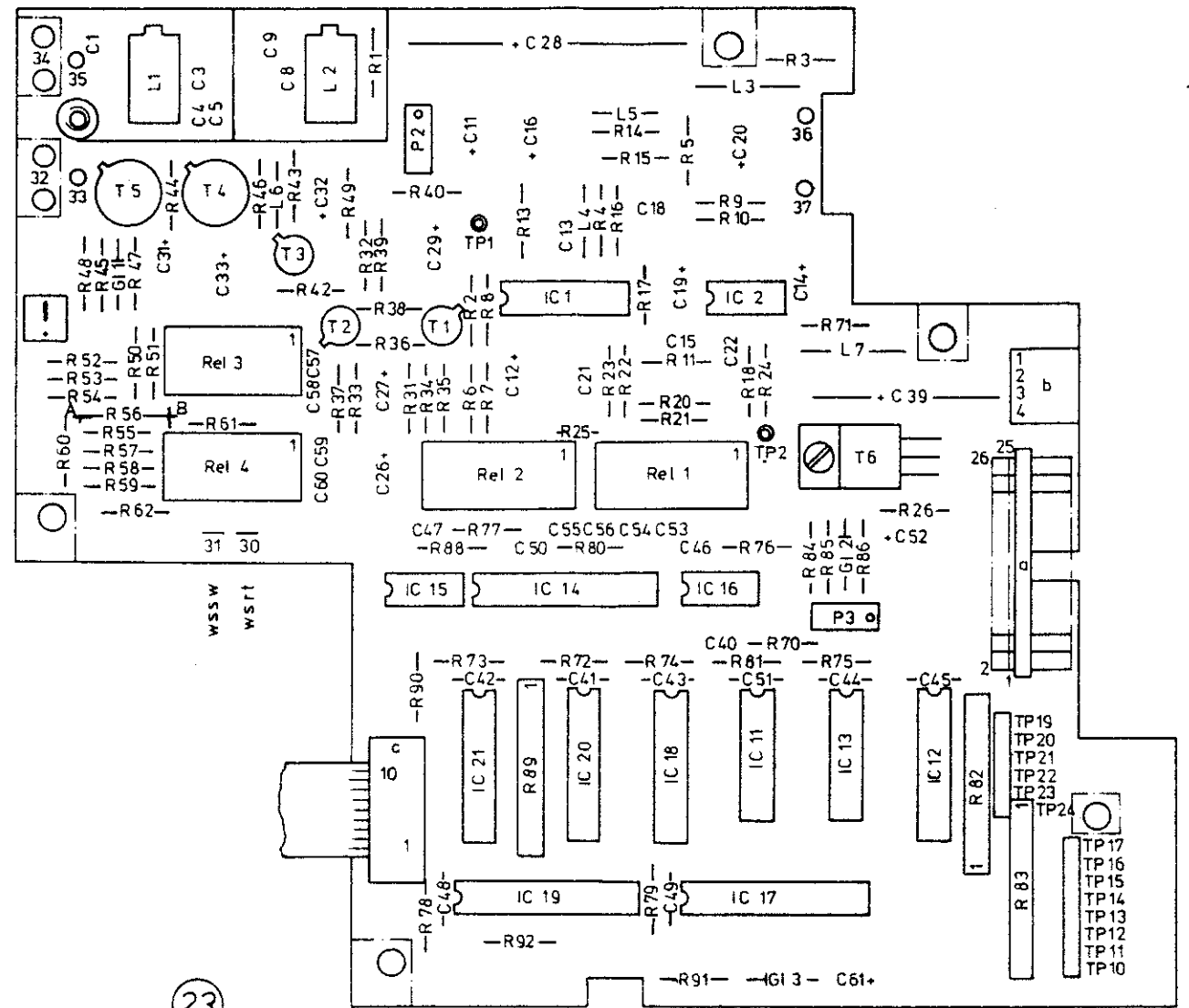
DC-Wandler DC-CONVERTER Convertisseur DC	955-AH
955-7032.00114	
1b	

23

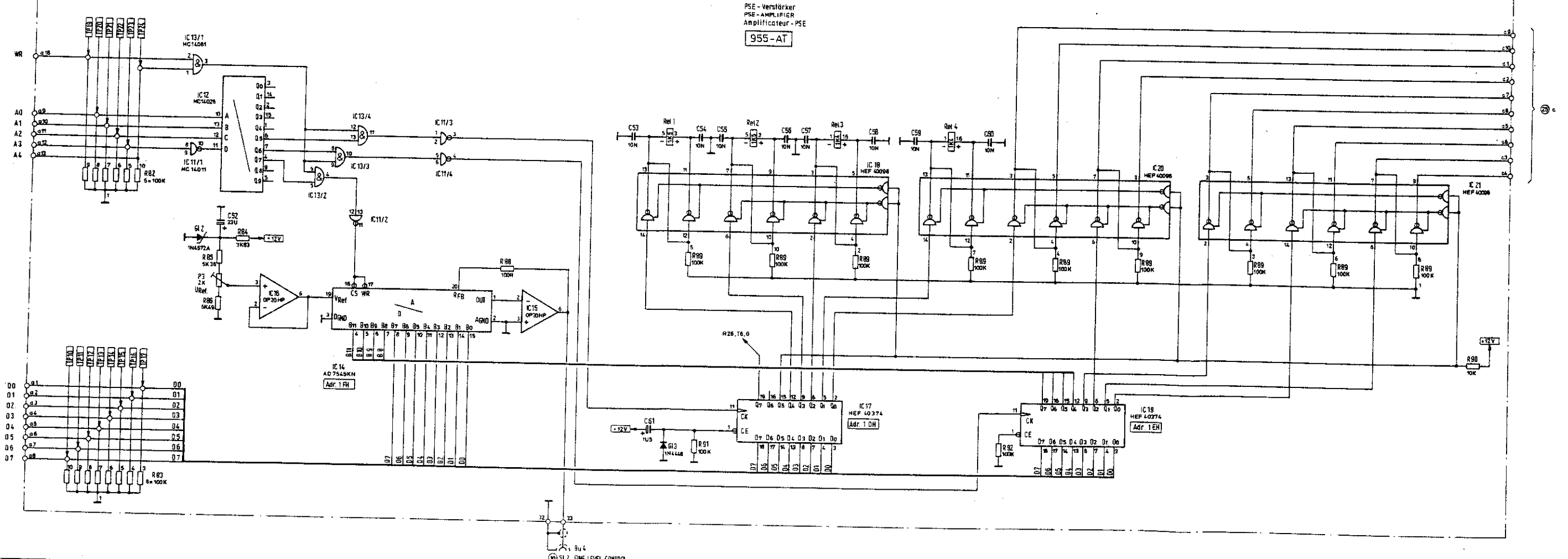
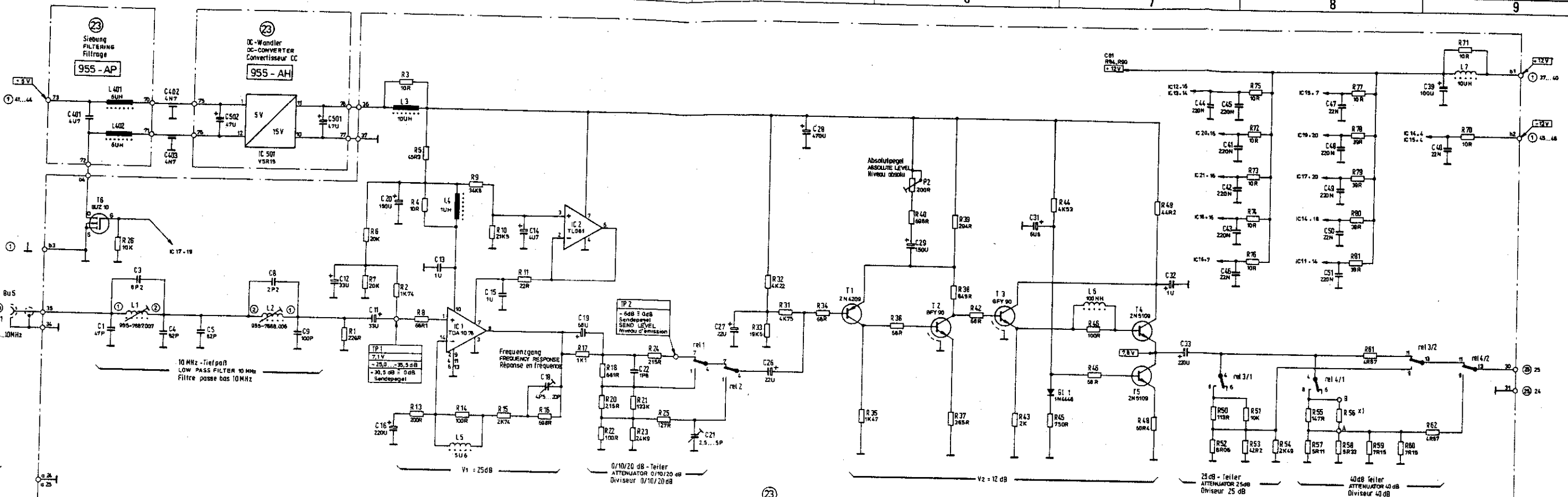


Siebung FILTERING Filtrage	955-AP
955-7039.00414	
1b	

23



PSE -Verstärker PSE AMPLIFIER Amplificateur PSE	955-AT
955-7043.003 / 3	
2	



Serienanmerkung  
 SERIES MODIFICATIONS  
 Modification de série

Baustückzeichnung siehe Serie  
 FOR ASSEMBLY MARKINGS SEE PAGE  
 Schéma d'implantation voir page

Gleichspannungen gegen Masse  
 ALL VOLTAGE RATINGS MEASURED WITH RESPECT TO 0 V  
 Toutes les tensions données sont mesurées par rapport à 0 V

Buchsenbelegung siehe  
 FOR CONNECTOR ARRANGEMENT SEE  
 Câblage des connecteurs voir

Abgleichwert  
 ALIGNMENT VALUE  
 Valeur d'ajustage

PSE - 15/955/00.02 Serie E... Ausg. 1  
 1 Blatt Blatt 1

**23**

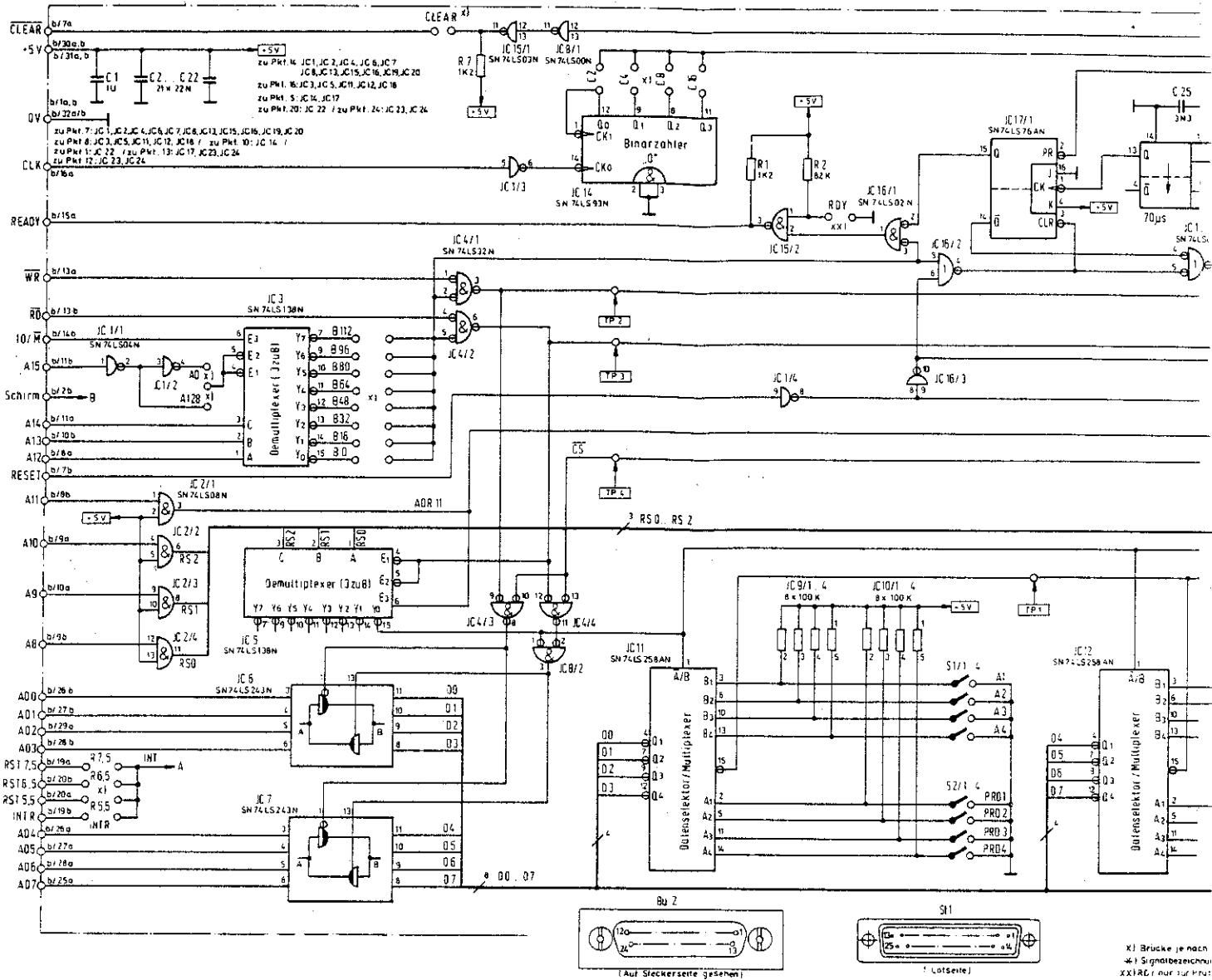
Mitlaufsender  
 TRACKING GENERATOR  
 Générateur suivre

955 - 7523.028 / 3

FF

**2.3 Interface <IEC 625>-Karte**  
**2.3 Interface <IEC 625> Card**  
**2.3 Carte Interface <IEC 625>**

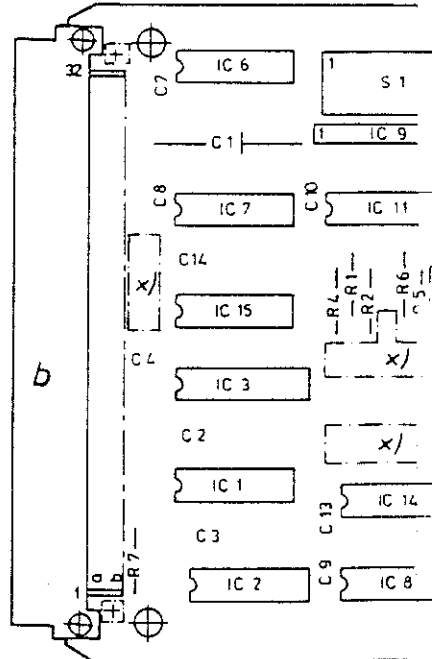
**BN 955/00.03**  
**BN 955/00.03**  
**BN 955/00.03**



Brückenbestückung auf 853-7001.008/3, x 5 bestückt

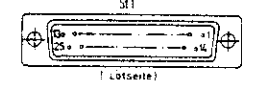
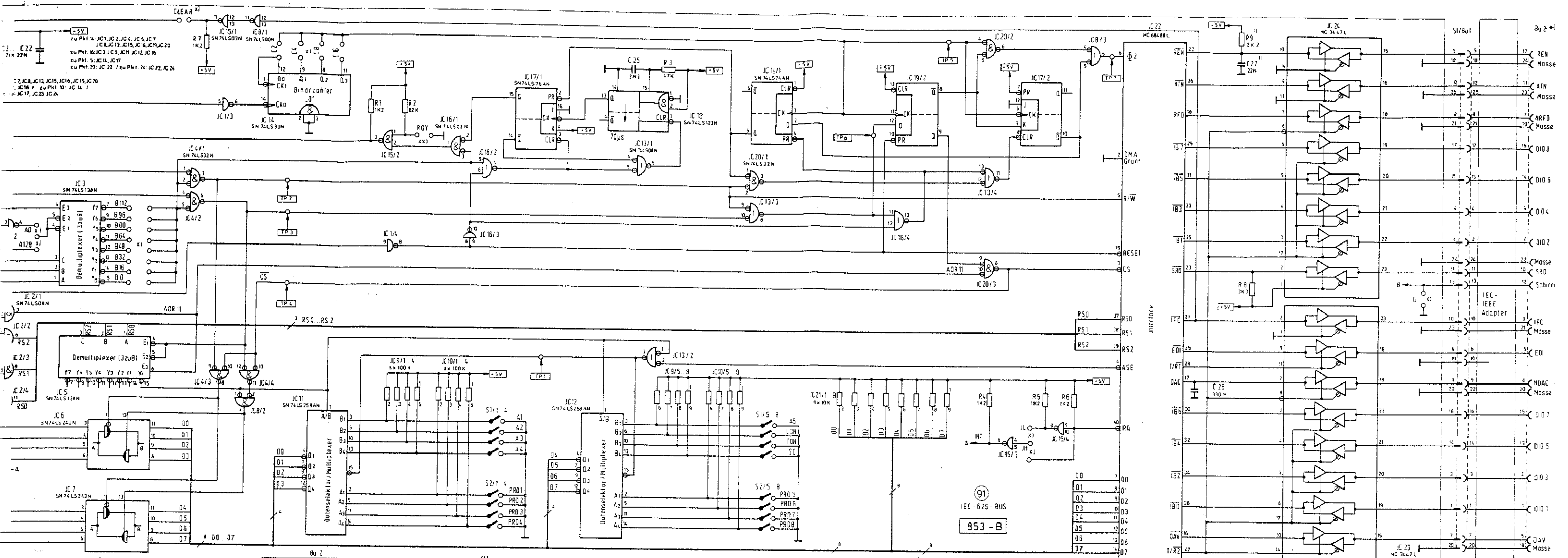
A 0	
A 128	x
B 0	
B 16	
B 32	
B 48	
B 64	
B 80	
B 96	
B 112	x
C 2	
C 4	x
C 8	
C 16	

CLR	
S	x
JH	x
JL	
INTR	
RST 5.5	
RST 6.5	
RST 7.5	x



Ausführung  
IEC - 625 - BUS / BN 853/08  
Bv. 853-8408.008/4





X1 Brücke je nach Ausrüstung eingesetzt, siehe Ausrüstungs-Bv 853-8401.005/4 folgende  
 \*1 Signalbezeichnung an Bu 2 in neg. Logik  
 XX1RG1 nur für Prüfzwecke eingesetzt

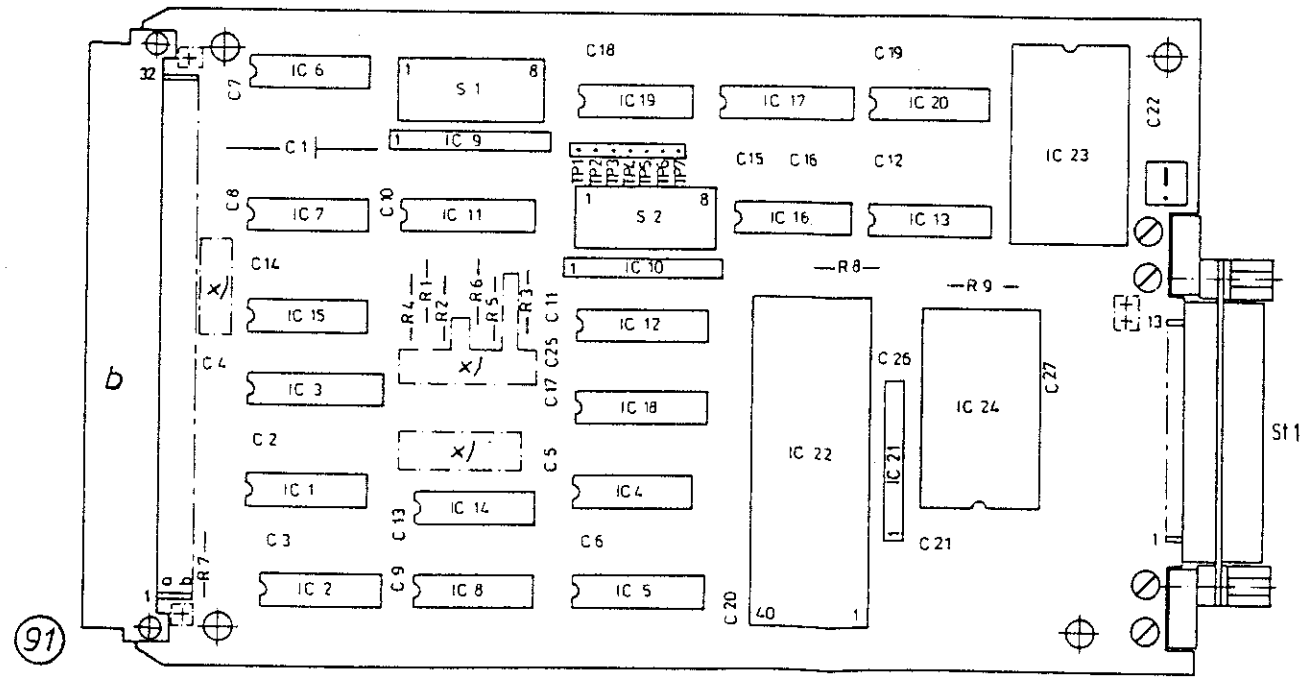
Gleichspannungen gegen Masse, Instrument = 100 kΩ/V.  
 Elektrodenkennzeichnung Dioden, Transistoren u. integrierte Schaltkreise, siehe Bv. 853-9480.009/4

Brückenbestückung auf 853-7001.008/3, x 3 bestückt

A 0		
A 128		X
B 0		
B 16		
B 32		
B 48		
B 64		
B 80		
B 96		
B 112		X
C 2		
C 4		X
C 8		
C 16		

CLR		
G		X
JH		X
JL		
INTR		
RST 5,5		
RST 6,5		
RST 7,5		X

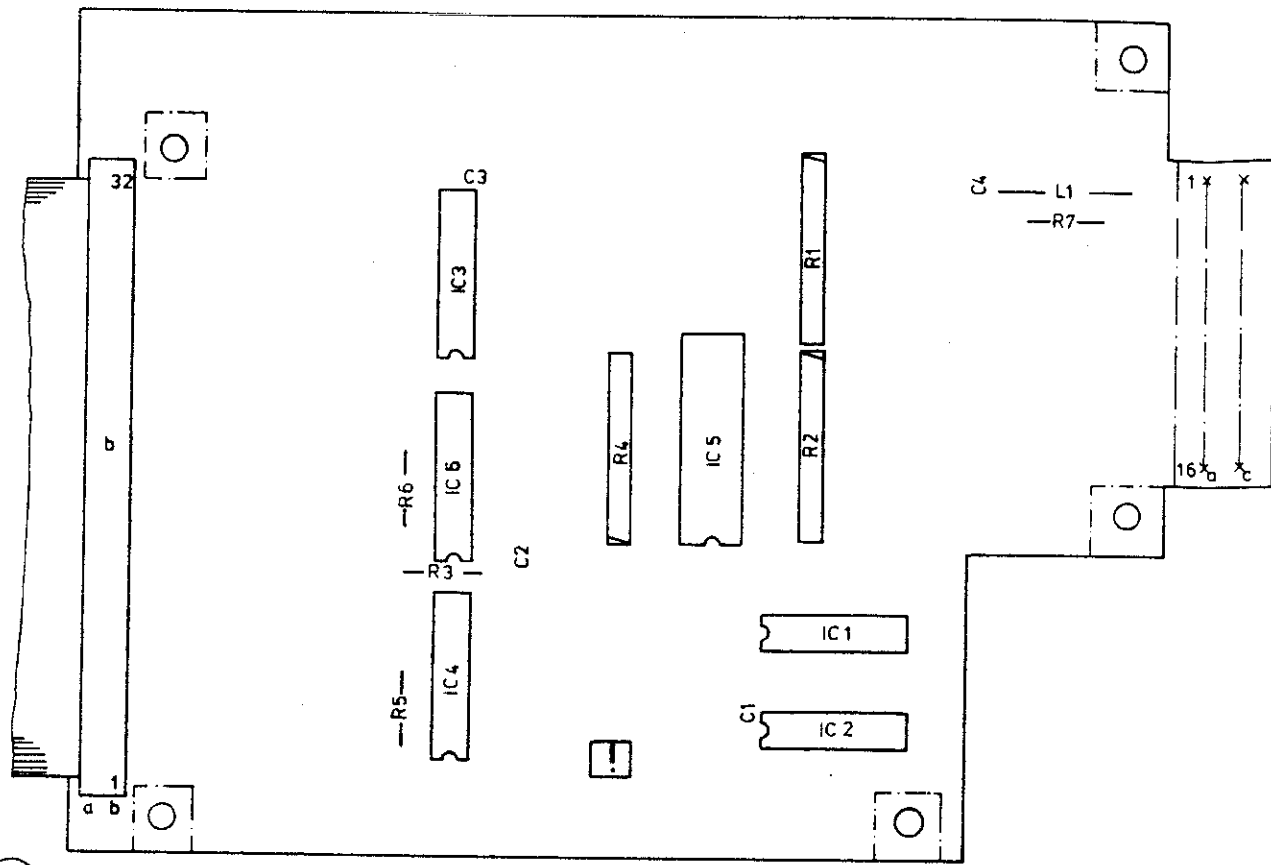
Ausführung  
 IEC - 625 - BUS / BN 853/08  
 Bv. 853-8408.008/4



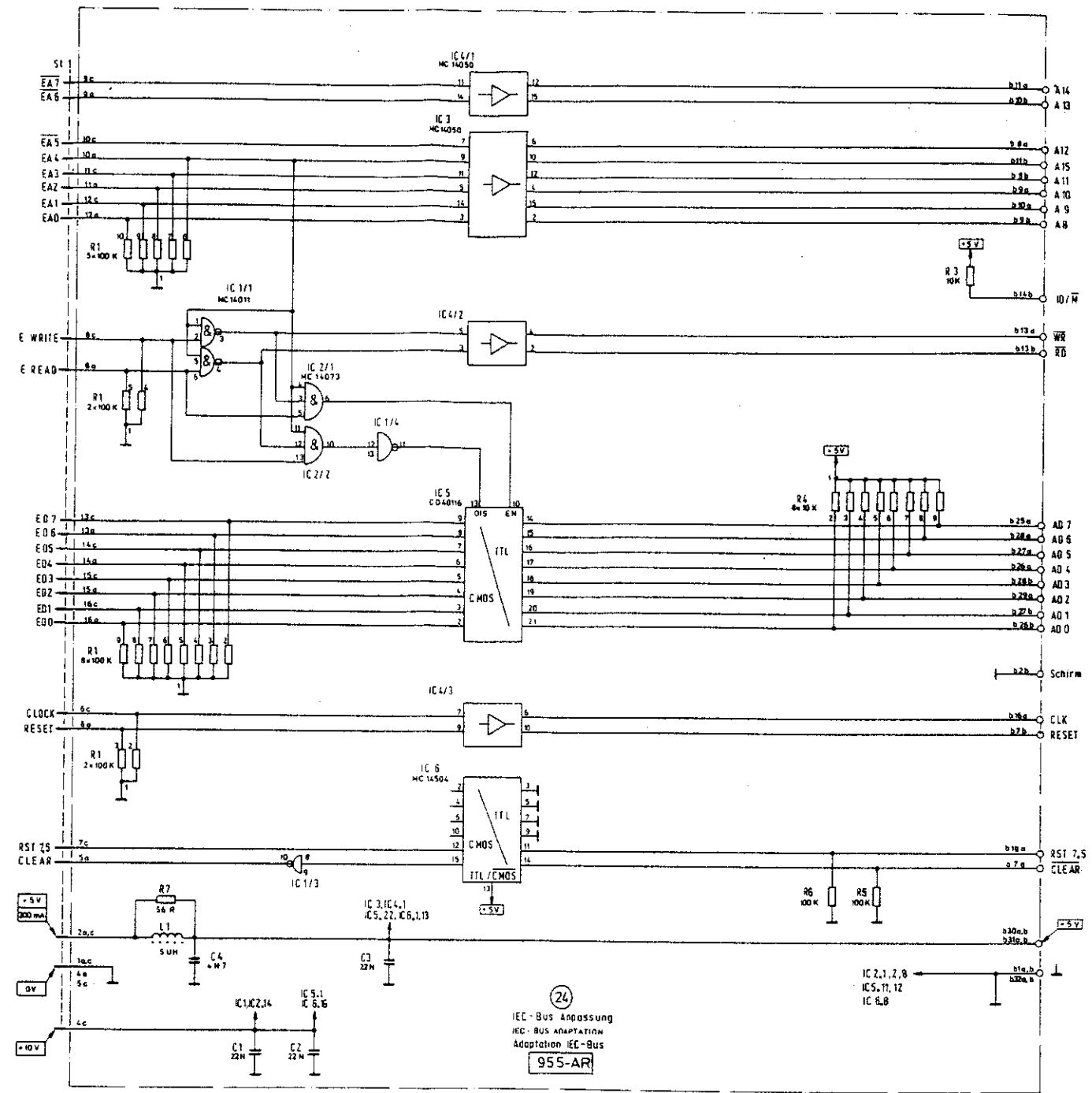
(91) <IEC-625>-Bus, BN 853/50 Auf Steckseite gesehen	(91) <IEC 625> Bus, BN 853/50 Seen from connector side	(91) Bus <IEC 625>, BN 853/50 Vue côté connecteur
bestückt Binärzähler Brücke je nach Ausführung eingesetzt, siehe Aus- führungs-Bv. ... u. folgende	assembled Binary counter Use of strap depends on Version, see Version Bv. and ff	équipé Compteur binaire Straps placé suivant les versions voir Bv. ... et ...
Datenselektor Demultiplexer	Data selector Demultiplexer	Sélecteur de données Démultiplexeur
Interface	Interface	Interface
Lötseite	Soldering side	Côté soudure
Masse Multiplexer	Chassis ground Multiplexer	Masse Multiplexeur
RDY nur für Prüfzwecke eingesetzt	RDY applied only for testing	RDY utilisé uniquement pour le contrôle
Schirm	Screen	Ecran
Serienänderungen: Serie ... entfällt	Series modifications: Series ... omitted	Modifications de séries: série ... supprimé
Signalbezeichnung an Bu ... in neg. Logik	Signal designation at Bu ... in neg. logic	Désignation signal sur Bu ... en logique négative

Benennung:  
**IEC-625-Bus**  
 bestückt 853-B  
 853-7001.008/3

24

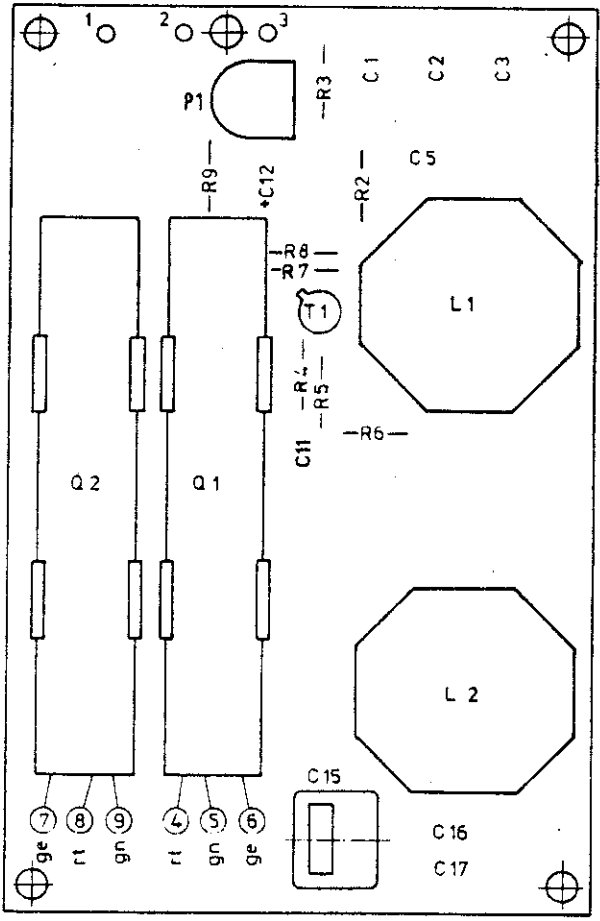
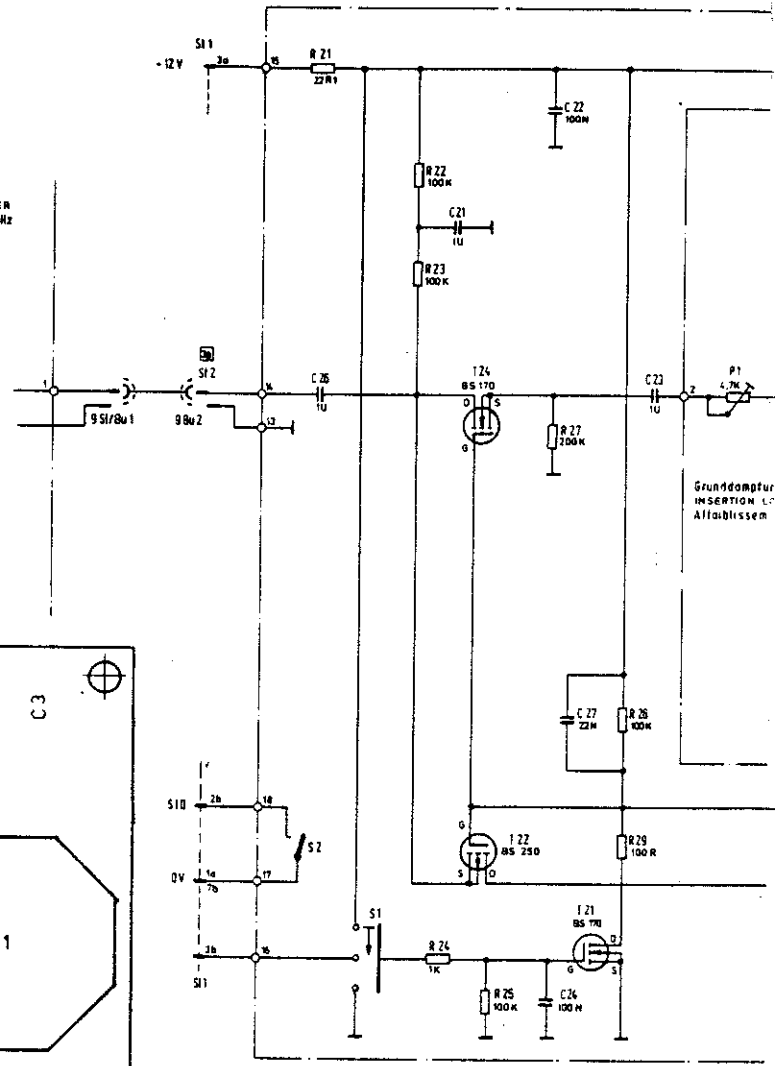


Benennung: IEC-Bus Anpassung IEC-BUS ADAPTATION Adaptation IEC-BUS	955-AR
955-7041.005/3	1a



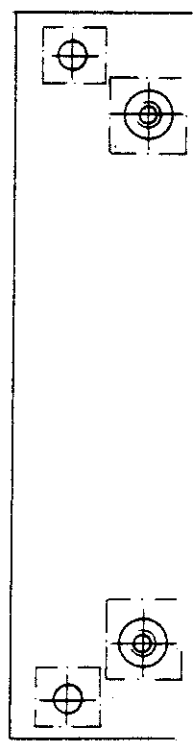
<b>2.4</b>	<b>Zusatzfilter 100 Hz</b>	<b>BN 955/00.06</b>
<b>2.4</b>	<b>100 Hz auxiliary filter</b>	<b>BN 955/00.06</b>
<b>2.4</b>	<b>Filtre auxiliaire 100 Hz</b>	<b>BN 955/00.06</b>

⑨  
 10kHz Bandpass  
 10kHz BANDPASS FILTER  
 Filtre passe bande 10kHz  
 955-8



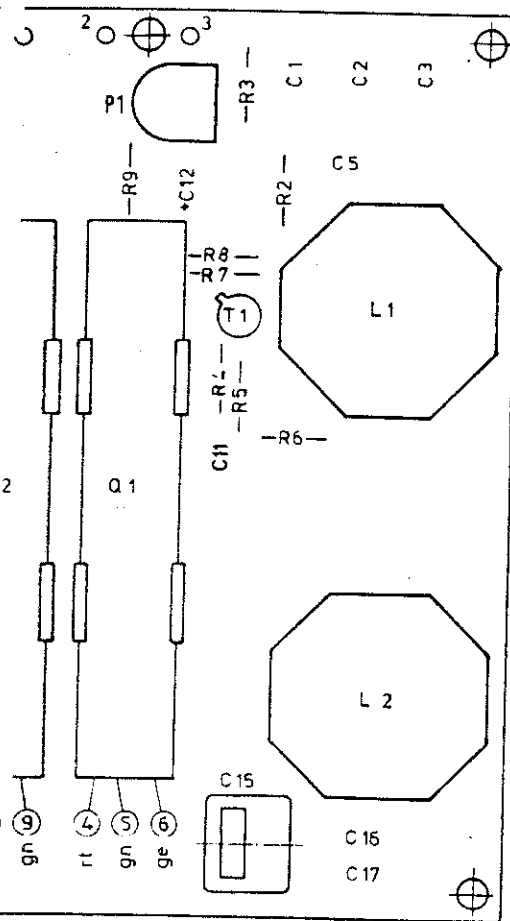
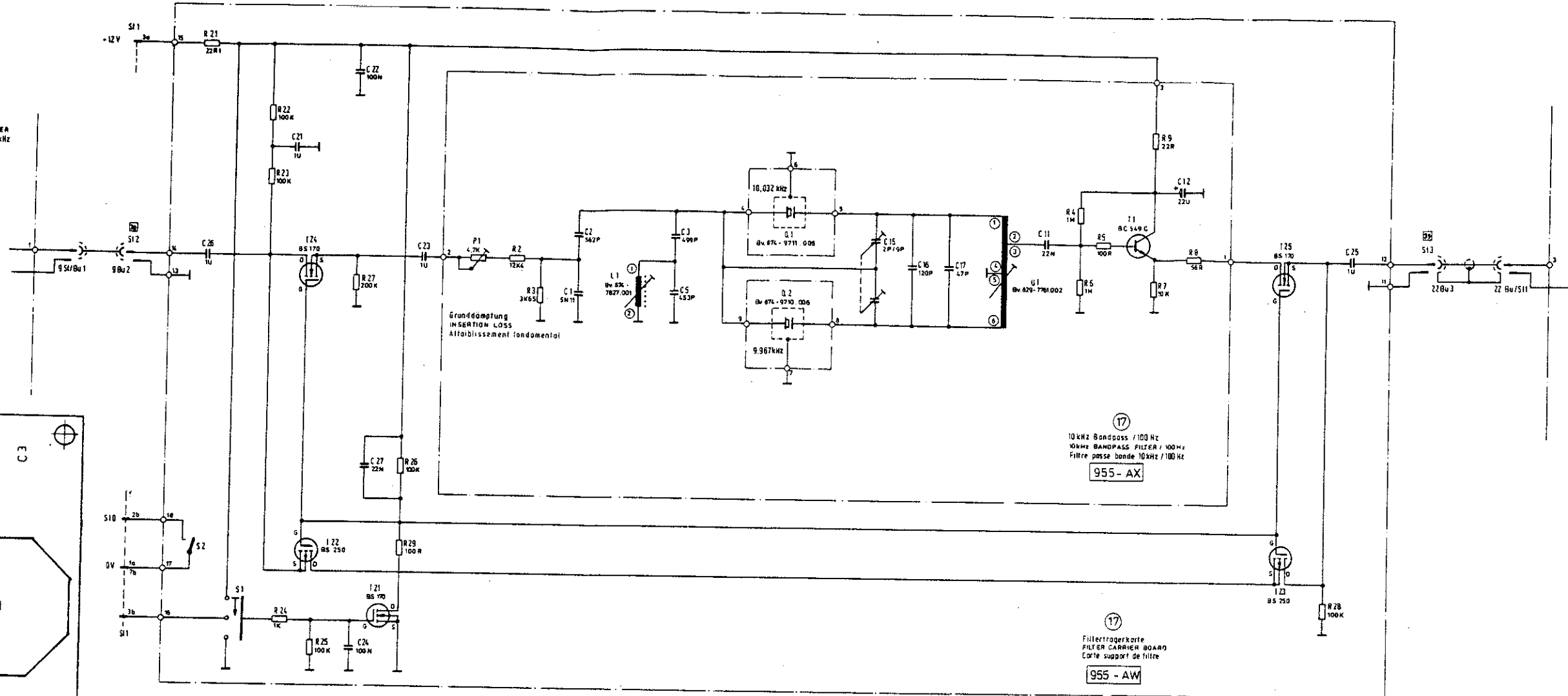
17

10 kHz Bandpass / 100 Hz 955-AX  
 10 kHz BANDPASS FILTER / 100 Hz  
 10 kHz Filtre passe bande / 100 Hz  
 955-7047.009/4

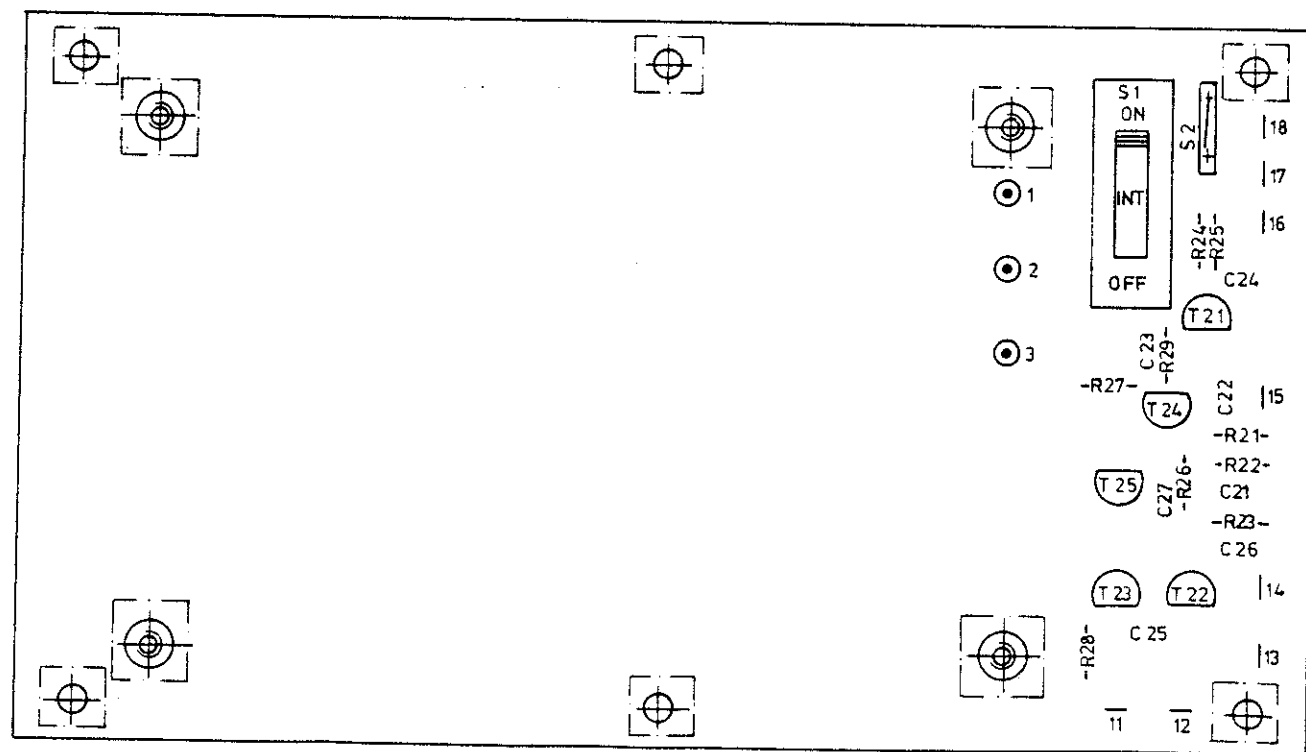


10 kHz Bandpass  
10 kHz BANDPASS FILTER  
Filtre passe bande 10 kHz  
955 - B

10 kHz Bandpass / 25 Hz mech.  
10 kHz BANDPASS FILTER / 25 Hz mec.  
Filtre passe bande 10 kHz / 25 Hz mec.  
955 - K



10 kHz Bandpass / 100 Hz 955-AX  
10 kHz BANDPASS FILTER / 100 Hz  
Filtre passe bande / 100 Hz  
7047 009 / 4



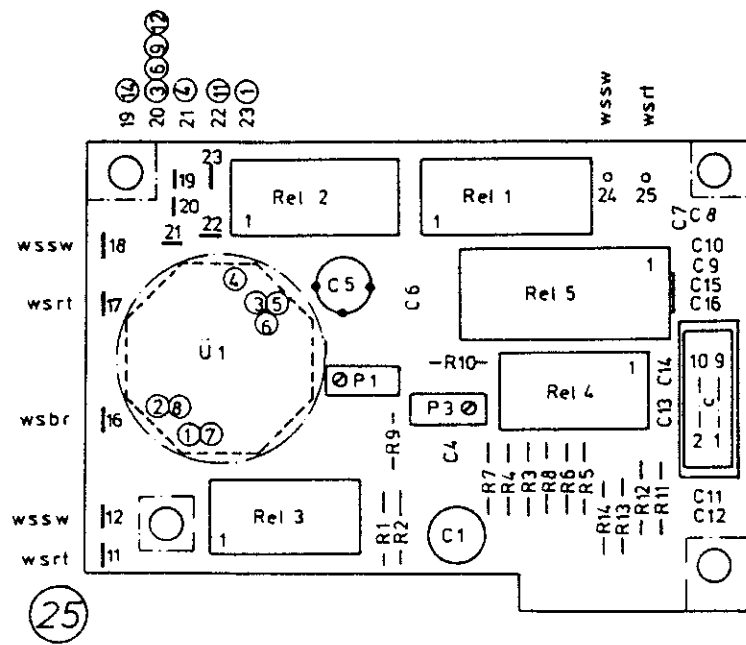
Filterträgerkarte  
FILTER CARRIER BOARD  
Carte support de filtre  
955 - AW  
955-7046.000 / 4

SPM 15 / BN 955/00.06	Serie A...	Ausg. 2
10 kHz Bandpass / 100 Hz 10 kHz BANDPASS FILTER / 100 Hz Filtre passe bande 10 kHz / 100 Hz	17	Blatt 1
L 955 - 7517.018 / 3		FF

**2.5**

**2.6**

<b>2.5</b>	<b>Ausgangsfeld zum PSE-15 für Grundgerät BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.5</b>	<b>Output section for PSE-15 main frame BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.5</b>	<b>Section sortie pour PSE-15 pour appareil de base BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.6</b>	<b>Ausgangsfeld zum PSE-15 für Grundgerät BN 955/02</b>	<b>BN 955/00.22</b>
<b>2.6</b>	<b>Output section for PSE-15 main frame BN 955/02</b>	<b>BN 955/00.22</b>
<b>2.6</b>	<b>Section sortie pour PSE-15 pour appareil de base BN 955/02</b>	<b>BN 955/00.22</b>

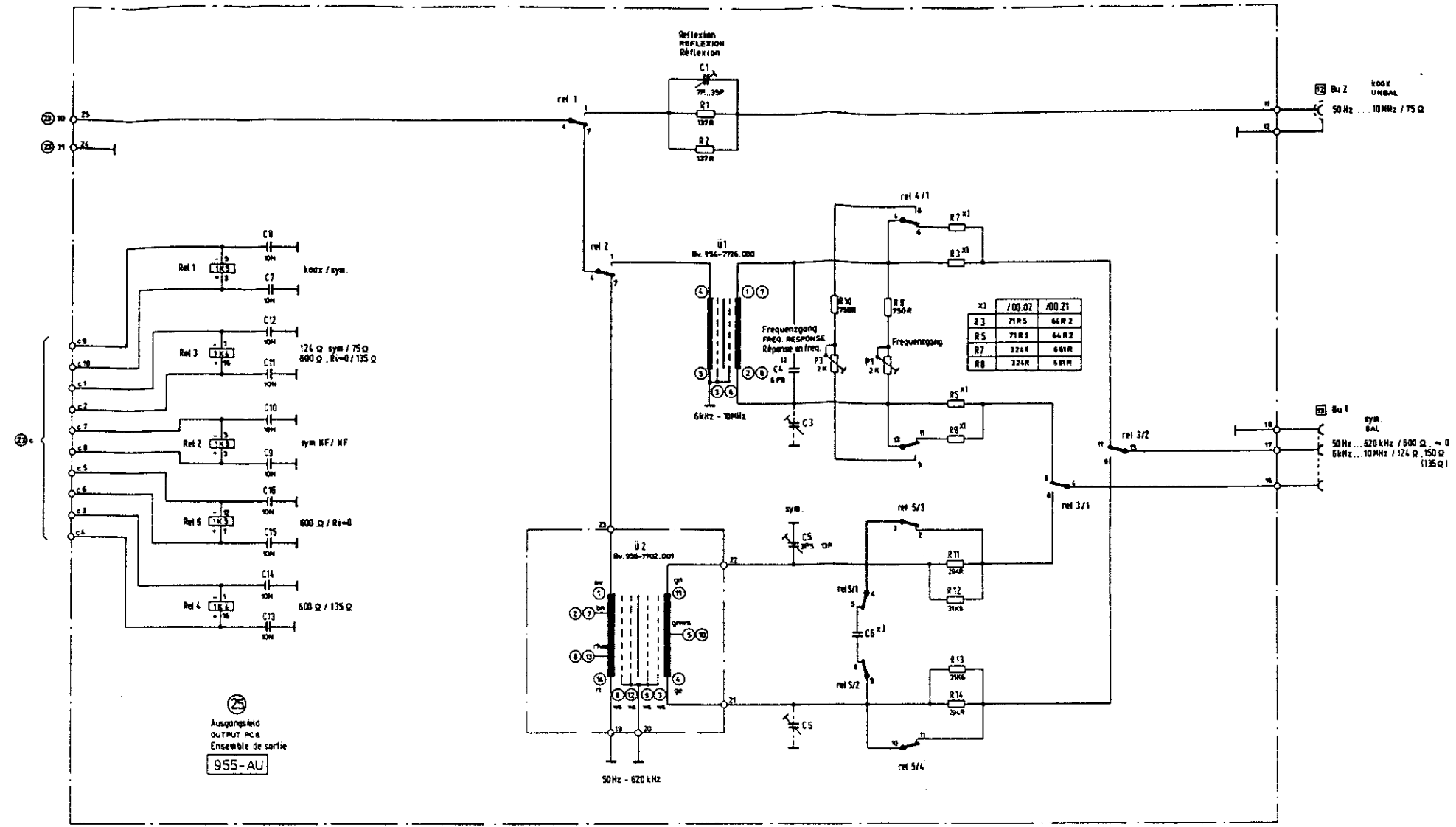


Ausgangsfeld  
 OUTPUT PCB  
 Ensemble de sortie

955-7044.002 14

25

955-AU



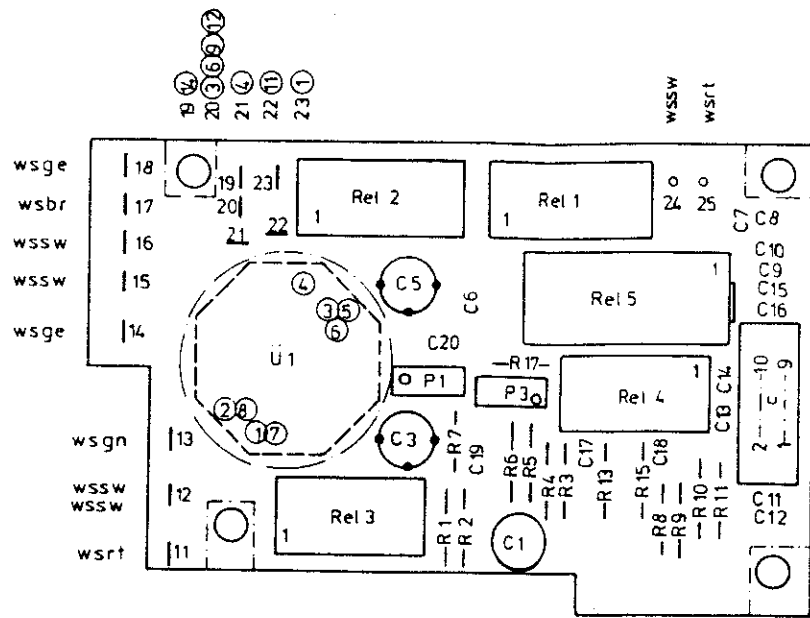
Serienanmerkung  
 SERIES MODIFICATIONS  
 Modification de série

1) Serie E u. C. C4/entfällt

x1) Abgleichwert  
 ALIGNMENT VALUE  
 Valeur d'ajustage

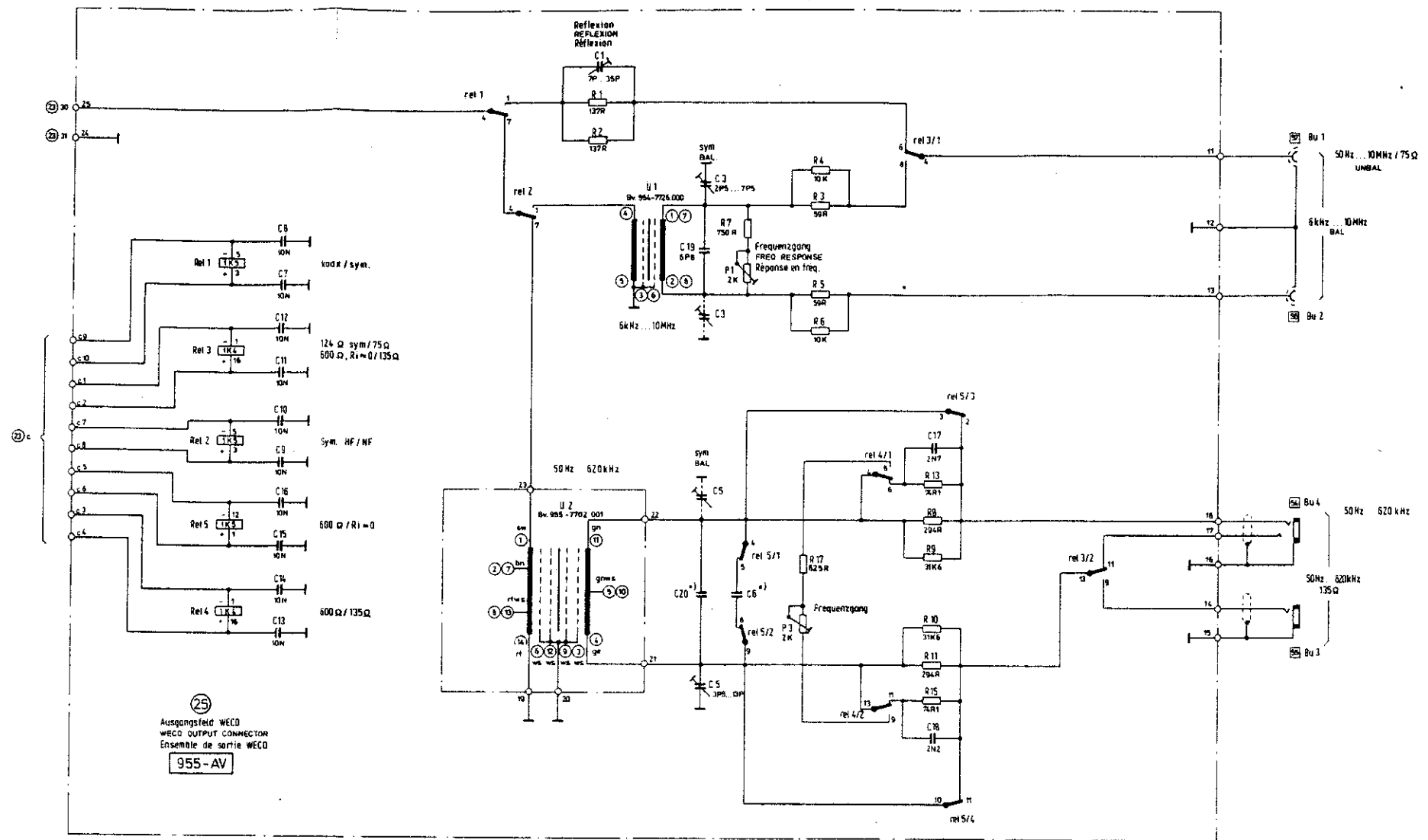
Nur Ausführung 01  
 Only version 01  
 Uniquement pour version 01

BN 955 / 00.07 / 00.21	Serie E...	Ausg.
Ausgangsfeld OUTPUT PCB Ensemble de sortie	25	1 Blatt Blatt 1
		955-7525.013 / 3



Ausgangsfeld WECO  
 WECO OUTPUT CONNECTOR  
 Ensemble de sortie WECO  
 955 - 7045.001 / 4

25  
 955 - AV



Nur Ausführung 02  
 Only version 02  
 Uniquement pour version 02

BN 955 / 00.22	Serie E	Ausg.
Ausgangsfeld WECO WECO OUTPUT CONNECTOR Ensemble de sortie WECO		1 Blatt Blatt 1
955 - 7525 505 / 3		FF



<b>2.7</b>	<b>Geräuschberechnung in dBrnC</b>	<b>BN 955/00.23</b>
<b>2.7</b>	<b>Noise measurements in dBrnC</b>	<b>BN 955/00.23</b>
<b>2.7</b>	<b>Mesure de bruit en dBrnC</b>	<b>BN 955/00.23</b>

Option BN 955/00.23, Bandbreite 1,95 kHz mit Anzeige der Geräuschleistung in dB<sub>BrnC</sub>

Folgende Stromlaufpläne werden geringfügig geändert:

955-7509... 10 kHz Bandpass (955-7026) R 7 ändern in 1K37/1%/Tk50/0207  
 R 8 ändern in 6K49/1%/Tk50/0207  
 (Grunddämpfungsabgleich nach Umbau kontrollieren!)

955-7521... CPU-Karte (955-7005)

S 1	.4	.3	.2	.1	dB <sub>BrnC</sub> in Gerät ...
	OFF	ON	ON	ON	Europa mit PSE
	OFF	ON	OFF	ON	Europa mit PSE, 135 Ω
	OFF	OFF	ON	ON	Europa ohne PSE
	OFF	OFF	OFF	ON	Europa ohne PSE, 135 Ω

Option BN 955/00.23, bandwidth 1.95 kHz, display of noise power level in dB<sub>BrnC</sub>

The following circuit diagrams have been slightly modified:

955-7509... 10 kHz bandpass (955-7026) R 7 changed to 1K37/1%/Tk50/0207  
 R 8 changed to 6K49/1%/Tk50/0207  
 (Check basic attenuation after modification!)

955-7521... CPU board (955-7005)

S 1	.4	.3	.2	.1	dB <sub>BrnC</sub> instruments for ...
	OFF	ON	ON	ON	Europe with PSE fitted
	OFF	ON	OFF	ON	Europe with PSE fitted, 135 Ω
	OFF	OFF	ON	ON	Europe without PSE fitted
	OFF	OFF	OFF	ON	Europe without PSE fitted, 135 Ω

**Option BN 955/00.23, largeur de bande 1,95 kHz avec affichage de puissance de bruit en dBBrnC**

Les schémas suivants sont légèrement modifiés:

955-7509... passe-band 10 kHz (955-7026) R 7 modifiée en 1K37/1%/Tk50/0207

R 8 modifiée en 6K49/1%/Tk50/0207

(Contrôler l'affaiblissement fondamental après modification!)

955-7521... Carte CPU

(955-7005)

S 1	.4	.3	.2	.1	dBBrnC dans appareil...
	OFF	ON	ON	ON	Europe avec PSE
	OFF	ON	OFF	ON	Europe avec PSE, 135 Ω
	OFF	OFF	ON	ON	Europe sans PSE
	OFF	OFF	OFF	ON	Europe sans PSE, 135 Ω

## Erklärung der wichtigsten Abkürzungen und der Darstellung der Daten

Benennung	Bezeichnung 1	Bezeichnung 2	
R-KOHLE	100 5% 0309		Kohleschicht-Widerstand 100 $\Omega$ 5% D x L = 3 x 9 mm Carbon Film Resistor Résistance à couche de carbone
R-METALL	2,77 K 0,1% 0207	TK 50	Metall-Schichtwiderstand 2,77 k $\Omega$ 0,1% TK 50 D x L = 2 x 7 mm Metal Film Resistor Résistance à couche métal
R-DRAHT	47 10% 2 W	WM 50 SKA 2	Drahtwiderstand 47 $\Omega$ 10% 2 Watt Mat.: WM 50, Typ SKA-2 Wirewound Resistor Résistance bobinée
R-TRIMM-CERMET	470 20% 0,5 W 1	150	Trimm-Widerstand Cermet 470 $\Omega$ 20% 0,5 W 1 Umdrehg. TK 150 PPM Adjustment Potentiometer Cermet 1-Turn Potentiomètre d'ajustment Cermet 1 tour
R-TRIM DRAHT SPINDEL	5 K 5% 0,7 W 22	70	Spindel-Trimmer Draht 5 k $\Omega$ 5% 0,7 Watt 22 Umdrehungen TK 70 Rectangular Wirewound adjustment Potentiometer 22 Turns Potentiomètre d'ajustment bobiné 22 tours
R-TRIM DRAHT SQUARE	20 K 5% 0,7 W 25	70	Square-Trimmer Draht 20 k $\Omega$ 5% 0,7 Watt 25 Umdrehungen TK 70 PPM Square Wirewound adjustment Potentiometer 25 Turns Potentiomètre d'ajustment bobiné Square 25 tours
R-VAR KOHLE	100 10/20 0,2 W LIN	260	Kohleschicht-Pot. 100 $\Omega$ - 10/+ 20% 0,2 W linear, Drehwinkel 260° Carbonfilm Potentiometer Potentiomètre à couche de carbone
R-VAR DRAHT	5 K 3% 2 W LIN	3600 0,25%	Drahtpotentiometer 5 k $\Omega$ 3% 2 W Linear 3600° = 10-Gang Linearitätstoleranz 0,25% Wirewound Potentiometer 10-Turns Potentiomètre bobiné 10 tours
ELKO-AL	470 U 10/50 70 V		Aluminium-Elko 470 $\mu$ F - 10/+50% 70 V, gepolt Aluminium Electrolytic Capacitor, polarized Condensateur électrolytique à l'aluminium polarisé
ELKO-AL UNGEPOLT	100 U 40 V	EU 100/40	Aluminium-Elko ungepolt (bipolar) 100 $\mu$ F 40 V Typ EU 100/40 Aluminium Electrolytic Capacitor, unpolarized Condensateur électrolytique à l'aluminium non polarisé
ELKO-TA SINT FEST	6,8 U 20% 6,3 V		Tantal-Elko Sinteranode, fester Elektrolyt 6,8 $\mu$ F 20% 6,3 V Tantalum Electrolytic Capacitor, Sintered Anode dry Condensateur au tantale à électrolyte solide
C-KERAMIK EDPU	120 P 2% 63 V	N 150 1 B	Keramik-Kondensator 120 pF 2% 63 V Keramik: N 150 Typ 1 B EDPU = Kennzeichnung nach DIN 41930 Ceramic Capacitor Condensateur céramique
C-KERAMIK RDLL	88,7 P 1% 25 VEF	N 075 1 B KZK4	Keramik-Kondensator kurzzeitkonstant (10-4) 88,7 pF 1% 25 V <sub>eff</sub> Material N075 Typ 1 B Ceramic Capacitor Short-Term-Stability Condensateur céramique de stabilité de longue durée
C-GLIMMER	487 P 0,5% 500 V	BF 48.10	Glimmer-Kondensator 487 pF 0,5% 500 V Bauform 48.10 Mica Capacitor Type 48.10 Condensateur au mica argenté
C-GLIMMER KNOFF	3900 P 5% 100 V	BF 49.25-3	Glimmer-Knopf-Kondensator 3,9 nF 5% 100 V 49.25-3 Mica Button Capacitor Condensateur bouton au mica argenté
C-KF KS	316 P 0,5% 63 V	KSM	Kunststoff-Folienkondensator Styroflex 316 pF 0,5% 3 V Polystyrene Capacitor Condensateur polystyrène
C-KF MKT	0,068 U 10% 100 V		Metallisierter Polyester Kondensator 68 nF 10% 100 V Metallized Polyester Capacitor Condensateur polyester métallisé
C-DREH	9,0-25,0 P 1-Fachc-LIN	2222 805 90123	Drehkondensator 9-25 pF 1-fach C-Linear Typ... Variable Capacitor, Single-Section, SLC, Type... Condensateur variable, Variation linéaire en capacité
C-DREH SCHMETTERLING			Schmetterling-Kondensator Butterfly variable Capacitor Condensateur papillon

C-TRIM KER SCHEIBE	10,0-60, OP N 1500	xxx...				Keramik Scheibentrimmer 10-60 pF Material N 1500 0,5 Umdrehungen Typ xxx ... Variable Ceramic Disc Capacitor Condensateur ajustable disque céramique
C-TRIM GLAS ROHR	0,5- 3, OP 100PPM 12	xxx...				Glasrohrtrimmer 0,6 - 3 pF TK 100 PPM 12 Umdrehungen Typ xxx... Glass Piston Trimmer Capacitor ... 12 Turns Condensateur ajustable
C-TRIM LUFT	1,75-15, SP 45 PPM 0,5	xxx...				Lufttrimmer (Platten) 1,275 - 15,5 pF RK 45 PPM 0,5 Umdrehg. Typ xxx... Air variable Capacitor Condensateur ajustable
C-PAPIER ENTSTOER						Funkentstörkondensator R.F.-Interference-Suppression Capacitor Condensateur d'antiparasitage
L-FUNKENTSTOER						Funkentstördrossel Microwaves Interference Suppression Choke Self d'antiparasitage pour ondes ultra-courtes
L-FEST	15 u 10%					Festinduktivität 15 µH 10% R.F. Molded Choke Inductance
C-KF KC	13300 P 1% 63 V		KC 1853			Polycarbonat-Kondensator 13300 pF 1% 63 V Typ KC 1853 Polycarbonate-Capacitor Condensateur à film polycarbonate à armatures
C-KF MKC	220000 P 20% 250 V		MKC 1858			Metallisierter Polycarbonat-Kondensator 220000 pF 20% 250 V Typ MKC 1858 Metallized Polycarbonate Capacitor Condensateur à film polycarbonate métallisé
C-KF KT	0,015U % 100 V		KT 1801			Polyester-Kondensator 0,015 µF 5% 100 V Typ KT 1801 Polyester Capacitor Condensateur à film polyester à armatures
C-KF MKU	10 U 10% 63 V		B 32110			Cellulose-Acetat Kondensator 10 µF 10% 63 V Typ B 32110
C-KF KP	183000 P 2% 160 V					Polypropylen-Kondensator 183000 PF 2% 160 V Polypropylene Capacitor Condensateur à film polypropylène à armatures
S-DREH	Werksinterne Daten Ersatz per Sach-Nr. bestellen					Drehschalter Rotary switch Commutateur rotatif
S-KIPP	"					Kippschalter Toggle switch Interrupteur à touche basculante
S-SCHIEBE	"					Schiebeschalter Slide switch Interrupteur à glissière
S-TASTE	"					Tastenschalter Push-button switch Commutateur à touches
S-SCHNAPP	"					Schnappschalter Micro switch Interrupteur à déclic
S-KODIER	"					Kodierschalter Thumb-Wheel switch Roue codeuse
RELAIS						
IC-... TRANS...	"		Mos			mit "Mos" sind alle Halbleiterbauelemente gekennzeichnet, die durch elektrostatische Aufladung gefährdet sind. Die hierfür gültigen Verarbeitungsvorschriften sind unbedingt einzuhalten. All semiconductors subject to damage caused by electrostatic discharge are identified with the letters "Mos". The existing regulations applied to handling these devices are to be uncon- ditionally complied with. Tous les semi-conducteurs pouvant être détériorés par une charge électrostatique sont identifiés avec "MOS". Les consignes con- cernant la manipulation de ces éléments sont absolument à respecter.

- 1 **Selektiver Pegelmesser SPM-15**      **BN 955/01/02**
- 1 **Selective Level Meter SPM-15**      **BN 955/01/02**
- 1 **Mesureur de niveau sélectif SPM-15** **BN 955/01/02**

SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

BN 955/01/02

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF.-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
1PU 1	0960-0000-126	MASSEBUCHSE	3 A1 M OF	LT 4	1	119/07/01		
1PU 2	0001-0032-204	EINEAUEBUCHSE, GESCH.	2200U 10/ 50	MAB 3	1			
1C 1	0000-7500-082	ELKO-AL	4N7 10X	40V	1	ROEDERST.		
1C 3	0001-0004-795	C-KERAMIK EDPT	2200U 10/ 50	63V	1	110/02/10		
1C 4	0000-7500-082	ELKO-AL	47U 10/ 50	40V	1	ROEDERST.		
1C 5	0001-0041-732	ELFO-AL	22N 20/ 80	10V	1	110/05/40		
1C 6	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 7	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 8	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 9	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 10	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 11	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		
1C 12	0001-0041-664	ELKO-AL	10U 10/ 50	40V	1	110/02/10		
1C 13	0001-0041-059	ELKO-TA SINT FEST	47U 20X	63V	1	110/05/40		
1C 14	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/05/61		
1C 15	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		
1C 16	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		
1C 17	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		
1C 18	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		
1C 19	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		
1C 20	0000-7588-143	C-KERAMIK KDPU	1U 20X	50V	1	110/02/10		
1GL 1	0001-0019-405	GLEICHR SI BRUECKE	B 40C3700/2200	BG 4	1	SIEMENS		
1GL 3	0001-0018-480	GLEICHR SI	1 N 4007	P 1	1	ITT		
1GL 5	0001-0018-480	GLEICHR SI	1 N 4007	P 1	1	ITT		
1GL 6	0001-0018-480	GLEICHR SI	1 N 4007	P 1	1	ITT		
1GL 7	0000-7536-881	LED GRUEN 3MM	TLHG 4402	00 35	1	114/03/03		
1GL 8	0001-0019-094	DIODE SI Z-	ZPD 10	00 35	1	ITT		
1GL 9	0000-7536-881	LED GRUEN 3MM	TLHG 4402	00 35	1	114/03/03		
1GL 10	0000-7536-881	LED GRUEN 3MM	TLHG 4402	00 35	1	114/03/03		
1GL 11	0001-0064-104	DIODE SI STABI-	ZTE 2	00 35	1	ITT		
1GL 15	0001-0018-846	DIODE SI REFERENZ	ZPD 5,1 ROT	00 35	1	140/03/02		
1GL 16	0001-0018-493	DIODE SI	1 N 4448	00 35	1	ITT		
1GL 17	0001-0018-493	DIODE SI	1 N 4448	00 35	1	ITT		
1IC 1	0000-7618-615	DC/DC-WANDLER	PSR 54-71	DIP 8	1	MELCHER		
1IC 2	0000-7618-631	DC/DC-WANDLER	FCR 6-1212-6 SPEZ.	1	1	MELCHER		
1IC 3	0001-0014-989	IC-DUAL OP.-VERST.	MC1458CP1	1	1	MOTOROLA		
1P 1	0001-0008-296	R-TRIM CERMET LIEG	2K2 20X	OW5 1	1	TK 100		
1P 2	0001-0008-296	R-TRIM CERMET LIEG	2K2 20X	OW5 1	1	TK 100		
1R 3	0000-7608-816	R-METALL	68R 1X	0204	1	DRALORIC		
1R 4	0000-7519-497	R-METALL	6K81 1X	0204	1	018/04/01		
1R 5	0000-7638-190	R-METALL	243R 1X	0411S	1	018/04/01		
1R 6	0000-7519-484	R-METALL	332R 1X	0204	1	DRALORIC		
1P 7	0001-0004-957	R-KOEHLE	1R 5X	0411	1	018/03/01		
1R 9	0001-0006-861	R-KOEHLE	390R 5X	0207	1	DRALORIC		
1R 10	0001-0006-955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		
1R 11	0001-0006-955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		
1R 12	0001-0007-035	R-KOEHLE	10K 5X	0207	1	DRALORIC		
1R 13	0001-0007-006	R-KOEHLE	5K6 5X	0207	1	DRALORIC		

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote Item No.

SERIE M 0955-8401.000 SPP-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
1R 14	0001-0007.035	R-KOHLE	10K	0207		1		F---	L
1R 15	0001-0007.035	R-KOHLE	10K	0207		1		F---	L
1R 20	0000-7630.020	R-METALL	1K96	TK 50		1		F---	L
1R 21	0000-7632.455	R-METALL	16K2	TK 50		1		B---	L
1R 22	0000-7559.790	R-METALL	4K02	TK 50		1		B---	L
1R 23	0000-7632.471	R-METALL	28K7	TK 50		1		B---	L
1R 24	0000-7585.560	R-METALL	10K	TK 50		1		F---	L
1R 25	0000-7604.182	R-METALL	20K	TK 50		1		F---	L
1R 26	0000-7519.523	R-METALL	41K2	TK 50		1		F---	L
1R 27	0000-7608.874	R-METALL	47R5	TK 50		1		F---	L
1R 30	0000-7630.046	R-METALL	7K87	TK 50		1		F---	L
1R 31	0000-7585.564	R-METALL	1K	TK 50		1		F---	L
1R 32	0001-0002.137	R-METALL	10K	TK 50		1		F---	L
1R 33	0000-7608.887	R-METALL	182R	TK 50		1		F---	L
1S 1	0955-8001.002	S-TASTENSTREIFEN	4 17,5			1	BV.955-8001.002		L
1S 2	0843-8001.000	SPANNUNGSAEHLER				1	BV 843-8001		L
1S 3	0000-7642.898	S-WIPP NETZ-	R-R AG 2-POL	14X12X15		1	57746N.A.VDE+U622	F---	L
1SI 1	0001-0020.588	SICHERUNG SCHMELZ-	T 0,25 /250 35A	5 X20		1	19195	B---	L
1SI 2	0001-0020.863	SICHERUNG SCHMELZ-	T 3,15 /250 D	50M		1	19202 D	B---	L
1ST 1	0001-0033.245	KALTG.AUFSETZSTECKER	2P+E V LT	6A/250		1	DIN 49457B		L
1T 2	0000-7586.323	TRANS SI NPN DARLING	BD 675	A TO 126		1		C---	L
1T 3	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18		1		C---	L
1T 4	0000-7537.945	TRANS SI PNP	BD 136-16	A TO 126		1		F---	L
1T 5	0000-7606.245	TRANS SI NPN	BC 337-25	A TO 92		1		F---	L
1T 6	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18		1		F---	L
1UE 1	0955-7701.015	NETZTRAFO				1		B---	A
Zusätzliche Bauteile für Version 955/11 siehe S. 46 // See n. 46 for extra components for version 955/11 // Voir p. 46 pour les composants supplémentaires pour la version 955/11									
2BU 1	0000-3713.006	TF-BUCHSE	UNI 9M1	LT 4		1	100-3713-006/4		L
2BU 2	0000-2706.001	HF-BUCHSE, ISOLIERT	M EB 75 MA			1	LT FL 23,5		L
2C 1	0001-0004.384	C-KERAMIK EDPT	47P 2X	63V		1	NP 0 1B		L
2C 2	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P	NP1500		1	OR 301427603		L
2C 3	0001-0014.086	C-TRIM KER SCHEIBE	3P5- 13P	N 470		1	BL 301427411		L
2C 4	0000-7619.342	C-KERAMIK EDPU 5	15P	2X 500V		1	NP 0 1B		L
2C 5	0001-0069.400	C-TRIM KER SCHEIBE	2P5- 7P5	NP 0		1	RR 301427125		L
2C 6	0000-7619.339	C-KERAMIK EDPU 5	6P8	OP25 500V		1	NP 0 1B		L
2C 9	0000-7519.866	C-KF MKT	1U	10X 100V		1			L
2C 10	0900-7520.460	ELKO-AL UNGEPOLT	47U 10/ 50	63V		1	MKT1822 NUR ERO		L
2C 11	0000-7535.303	C-TRIM KER SCHEIBE	3P5- 20P	NP 0		1	20 BR 301504114		L
2C 12	0001-0004.650	C-KERAMIK EDPT	330P	2X 63V		1	IN 750 1B		L
2C 13	0001-0004.148	C-KERAMIK EDPT	8P2	OP25		1	NP 0 1B		L
2C 21	0001-0004.818	C-KERAMIK EDPT	10N	20/100		1	IR10000 2		L
2C 22	0001-0004.818	C-KERAMIK EDPT	10N	20/100		1	IR10000 2		L
2C 23	0001-0004.818	C-KERAMIK EDPT	10N	20/100		1	IR10000 2		L
2C 24	0001-0004.818	C-KERAMIK EDPT	10N	20/100		1	IR10000 2		L

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S C H A L T E I L L I S T E / P A R T - L I S T

SERIE N: 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENHUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU REF. DESIG	WERKNORM	BEMERKUNG NOTE	SERIE AF VERSION	C
2C 25	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 26	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 27	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 28	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 29	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 30	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 31	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2C 32	0001-0004-818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	1110/02/10			L
2L 1	0000-7556-010	L-FEST	470N 10X 1025-12	30 25 330 0R35 650MA	1	1117/01/03			L
2L 2	0000-7555-972	L-FEST	220N 10X 1025-04	35 25 510 0R15 1A	1	1117/01/03			L
2L 3	0000-7556-337	L-FEST	2200 10X 1025-76	30 0,8 9 21R 50MA	1	1117/01/03			L
2R 1	0000-7563-854	R-METALL	126R 021	TK 15	1	018/04/01			L
2R 2	0001-0002-179	R-METALL	11F 1X 0207	TK 50	1	DRALORIC			L
2R 3	0000-7563-841	R-METALL	152F 0X1 0411	TK 15	1	018/04/01			L
2R 4	0001-0002-344	R-METALL	17K4 1X 0207	TK 50	1	DRALORIC			L
2R 5	0000-7577-963	R-METALL	612R 0X1 0411S	TK 15	1	DRALORIC			L
2R 6	0001-0002-713	R-METALL	45K3 1X 0207	TK 50	1	DRALORIC			L
2R 7	0000-7617-360	R-METALL	150R 0X1 0411S	TK 15	1	018/04/01			L
2R 8	0000-7563-841	R-METALL	152R 0X1 0411	TK 15	1	018/04/01			L
2R 9	0001-0000-579	R-METALL	127R 1X 0207	TK 50	1	DRALORIC			L
2R 10	0001-0002-195	R-METALL	11K5 1X 0207	TK 50	1	DRALORIC			L
2R 11	0001-0000-993	R-METALL	523R 1X 0207	TK 50	1	DRALORIC			L
2R 12	0001-0000-935	R-METALL	432R 1X 0207	TK 50	1	DRALORIC			L
2R 21	0001-0006-641	R-KOHLE	10P 5X 0207	TK 50	1	DRALORIC			L
2R 22	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 23	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 24	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 25	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 26	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 27	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 28	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 29	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 30	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2R 31	0001-0006-641	R-KOHLE	10P 5X 0207	TK 50	1	DRALORIC			L
2R 32	0001-0006-641	R-KOHLE	10R 5X 0207	TK 50	1	DRALORIC			L
2REL 1	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V 1K5 H6	RSL12V	1	SDS			L
2REL 2	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V 1K5 HD	RSL12V	1	SDS			L
2REL 3	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V 1K5 HD	RSL12V	1	SDS			L
2REL 4	0000-7610-707	RELAIS GEPOLT BISTAB	002 AU 12V 1K4 SD	DSZE-L-12V	1	SDS			L
2REL 5	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V 1K5 HD	RSL12V	1	SDS			L
2REL 6	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V 1K5 HD	RSL12V	1	SDS			L
2UE 1	0829-7727-004	UEBERTPAGER			1				A
2UE 2	0829-7731-003	UEBERTRAGER			1				A
3RU 1	0000-1637-074	WINKELRU. 75 OHM KPL			1				L
3RU 2	0000-1637-074	WINKELRU. 75 OHM KPL			1				L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKSTOFF REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
3C 2	0001-0004.449	C-KERAMIK EDPT	68P	NP 0 1B	1	110/02/09		L
3C 3	0001-0004.287	C-KERAMIK EDPT	22P	NP 0	1	110/02/09		L
3C 4	0001-0004.468	C-TRIM KER SCHEIBE	7P - 35P	NP 0 1B 301427603	1	111/01/06		L
3C 5	0001-0004.478	C-KERAMIK EDPT	82P	NP 0 1B	1	110/02/09		L
3C 7	0001-0004.203	C-KERAMIK EDPT	12P	NP 0 1B	1	110/02/09		L
3C 8	0001-0004.401	C-TRIM KER SCHEIBE	4P5 - 20P	NP 0 1B	1	111/01/06		L
3C 9	0001-0004.287	C-KERAMIK EDPT	22P	NP 0 1B	1	110/02/09		L
3C 10	0001-0004.449	C-KERAMIK EDPT	68P	NP 0 1B	1	110/02/09		L
3C 14	0001-0004.795	C-KERAMIK EDPT	4N7	NP 0 1B	1	110/02/10		L
3C 15	0001-0010.501	C-KF MKT	1U	R 2000 2	1	110/03/07		L
3C 16	0001-0041.059	ELKO-TA SJNT FEST	47U	PKT1822	1	110/05/61		L
3C 17	0001-0004.818	C-KERAMIK EDPT	10N	ETR-3	1	110/05/61		L
3C 20	0001-0004.229	C-KERAMIK EDPT	15P	R10000 2	1	110/02/10		L
3C 21	0001-0004.313	C-KERAMIK EDPT	27P	NP 0 1B	1	110/02/09		L
3C 22	0001-0004.287	C-KERAMIK EDPT	22P	NP 0 1B	1	110/02/09		L
3C 23	0001-0004.391	C-TRIM KER SCHEIBE	3P - 10P	NP 0 1B	1	110/02/09		L
3C 24	0001-0041.211	ELKO-TA SJNT FEST	330U	SW 301427201	1	111/01/06		L
3C 25	0001-0004.401	C-TRIM KER SCHEIBE	4P5 - 20P	ETR-5	1	110/05/61		L
3C 26	0001-0004.575	C-KERAMIK EDPT	150P	NP 0 1B	1	111/01/06		L
3C 27	0001-0004.559	C-KERAMIK EDPT	120P	N 150 1B	1	110/02/09		L
3C 28	0001-0004.468	C-TRIM KER SCHEIBE	7P - 35P	NP 0 1B	1	110/02/09		L
3C 29	0001-0004.203	C-KERAMIK EDPT	12P	NP 0 1B	1	111/01/06		L
3C 30	0001-0004.821	C-KERAMIK EDPT	22N	NP 0 1B	1	110/02/09		L
3C 31	0001-0040.966	ELKO-TA SJNT FEST	22U	R10000 2	1	110/02/10		L
3C 40	0001-0004.229	C-KERAMIK EDPT	15P	ETR-3	1	110/05/61		L
3C 41	0001-0004.313	C-KERAMIK EDPT	27P	NP 0 1B	1	110/02/09		L
3C 42	0001-0004.287	C-KERAMIK EDPT	22P	NP 0 1B	1	110/02/09		L
3C 43	0001-0041.211	ELKO-TA SJNT FEST	330U	ETR-5	1	110/05/61		L
3C 44	0001-0004.229	C-KERAMIK EDPT	15P	NP 0 1B	1	110/02/09		L
3C 45	0001-0004.106	C-KERAMIK EDPT	5P6	NP 0 1B	1	110/02/09		L
3C 47	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 50	0001-0041.059	ELKO-TA SJNT FEST	47U	ETR-3	1	110/05/61		L
3C 51	0001-0041.185	ELKO-TA SJNT FEST	150U	ETR-4	1	110/05/61		L
3C 52	0001-0004.821	C-KERAMIK EDPT	22N	R10000 2	1	110/02/10		L
3C 53	0001-0040.966	ELKO-TA SJNT FEST	22U	ETR-3	1	110/02/10		L
3C 55	0001-0004.384	C-KERAMIK EDPT	47P	ETR-3	1	110/05/61		L
3C 56	0000-7594.425	C-KERAMIK EDPT	220N	NP 0 1B	1	110/02/09		L
3C 57	0001-0004.821	C-KERAMIK EDPT	22N	ETR-3	1	110/02/15		L
3C 58	0001-0004.821	C-KERAMIK EDPT	22N	NP 0 1B	1	110/02/10		L
3C 70	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 71	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 72	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 73	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 74	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 75	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 76	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 77	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 78	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 79	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 80	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L
3C 81	0001-0004.818	C-KERAMIK EDPT	10N	R10000 2	1	110/02/10		L

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SERIAL N 0055-8401-000 SPM-15 955/G1 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
3C 82	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3C 83	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3C 84	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3C 35	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3C 86	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3C 87	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10			L
3GL 1	0001-0018.493	DIODE SI	1 N 4448		1	ITT			L
3GL 2	0001-0018.493	DIODE SI	1 N 4448		1	ITT			L
3GL 3	0001-0064.159	DIODE SI STABI--	ZTE 1,5		1	ITT			L
3GL 4	0001-0018.493	DIODE SI	1 N 4448		1	ITT			L
3GL 5	0001-0018.493	DIODE SI	1 N 4448		1	ITT			L
3IC 1	0000-7583.067	IC-OP.-VERST. FET	ICL7615DCPA		1	INTERSIL			L
3L 2	0000-7556.214	L-FEST	220 10X	45 2,5	1	117/01/03			L
3L 3	0000-7556.175	L-FEST	100 10X	55 7,9	1	117/01/03			L
3L 4	0000-7556.133	L-FEST	407 10X	42 7,9	1	117/01/03			L
3L 5	0000-7556.117	L-FEST	303 10X	40 7,9	1	117/01/03			L
3L 6	0000-7556.117	L-FEST	303 10X	40 7,9	1	117/01/03			L
3L 7	0000-7556.191	L-FEST	150 10X	45 2,5	1	117/01/03			L
3P 1	0001-0008.225	R-TRIM CERMET	LIEG. 100R 20X	TK 100	1	017/02/15			L
3P 2	0001-0008.306	R-TRIM CERMET	LIEG. 4K7 20X	TK 100	1	017/02/15			L
3P 3	0001-0008.270	R-TRIM CERMET	LIEG. 1K 20X	TK 100	1	017/02/15			L
3P 4	0001-0008.241	R-TRIM CERMET	LIEG. 220R 20X	TK 100	1	017/02/15			L
3P 5	0001-0008.335	R-TRIM CERMET	LIEG. 47K 20X	TK 100	1	017/02/15			L
3P 6	0001-0008.225	R-TRIM CERMET	LIEG. 100R 20X	TK 100	1	017/02/15			L
3P 8	0001-0008.225	R-TRIM CERMET	LIEG. 100R 20X	TK 100	1	017/02/15			L
3R 1	0001-0000.456	R-METALL	75R 1X	TK 50	1	DRALORIC			L
3R 2	0001-0006.683	R-KOEHLE	22R 5X	TK 50	1	DRALORIC			L
3R 3	0000-7601.512	R-METALL	9K 0X1	TK 15	1	018/04/01			L
3R 4	0000-7601.402	R-METALL	1K11 0X1	TK 15	1	018/04/01			L
3R 5	0000-7601.512	R-METALL	9K 0X1	TK 15	1	018/04/01			L
3R 6	0000-7601.402	R-METALL	1K11 0X1	TK 15	1	018/04/01			L
3R 7	0001-0006.683	R-KOEHLE	22K 5X	TK 50	1	DRALORIC			L
3R 8	0001-0002.276	R-METALL	14K7 1X	TK 50	1	DRALORIC			L
3R 9	0000-7585.418	R-METALL	10R 1X	TK 50	1	DRALORIC			L
3R 10	0000-7519.471	R-METALL	100R 1X	TK 50	1	DRALORIC			L
3R 12	0001-0007.116	R-KOEHLE	47K 5X	TK 50	1	018/03/01			L
3R 13	0001-0006.751	R-KOEHLE	68R 5X	TK 50	1	DRALORIC			L
3R 14	0001-0006.722	R-KOEHLE	47R 5X	TK 50	1	DRALORIC			L
3R 15	0001-0003.592	R-METALL	365R 1X	TK 50	1	DRALORIC			L
3R 16	0001-0001.345	R-METALL	1K47 1X	TK 50	1	DRALORIC			L
3R 17	0001-0006.751	R-KOEHLE	68P 5X	TK 50	1	DRALORIC			L
3R 18	0001-0007.116	R-KOEHLE	47K 5X	TK 50	1	DRALORIC			L
3R 19	0001-0006.942	R-KOEHLE	1K8 5X	TK 50	1	018/03/01			L
3R 20	0001-0006.722	R-KOEHLE	47F 5X	TK 50	1	DRALORIC			L
3R 21	0001-0007.116	R-KOEHLE	47K 5X	TK 50	1	DRALORIC			L
3R 22	0001-0007.116	R-KOEHLE	47K 5X	TK 50	1	018/03/01			L

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SERI M 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
3P 23	0001-0007-158	R-KOEHLE	100K	0207	1	018/03/01		L
3P 24	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3P 29	0001-0001-138	R-METALL	768R	0207	1	DRALORIC		L
3R 30	0001-0006-858	R-KOEHLE	330R	TK 50	1	DRALORIC		L
3R 31	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 32	0001-0003-770	R-METALL	511R	0207	1	DRALORIC		L
3P 33	0001-0006-861	R-KOEHLE	390R	TK 50	1	DRALORIC		L
3R 34	0001-0001-361	R-METALL	1K54	0207	1	DRALORIC		L
3R 35	0001-0000-896	R-METALL	392R	TK 50	1	DRALORIC		L
3R 36	0001-0006-887	P-KOEHLE	560R	TK 50	1	DRALORIC		L
3R 37	0001-0000-485	R-METALL	84R5	0207	1	DRALORIC		L
3R 38	0001-0006-751	R-KOEHLE	68R	TK 50	1	DRALORIC		L
3R 39	0001-0000-799	R-METALL	301R	0207	1	DRALORIC		L
3R 40	0001-0006-722	R-KOEHLE	47R	TK 50	1	DRALORIC		L
3P 41	0000-7642-665	R-METALL	19R3	TK 50	1	018/04/01		L
3P 42	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 43	0001-0006-968	R-KOEHLE	2K7	0207	1	DRALORIC		L
3R 44	0001-0007-190	P-KOEHLE	220K	0207	1	DRALORIC		L
3R 50	0001-0006-751	R-KOEHLE	68R	0207	1	018/03/01		L
3R 51	0001-0018-587	R-METALL	845R	TK 50	1	DRALORIC		L
3R 52	0001-0006-858	R-KOEHLE	330R	0207	1	DRALORIC		L
3R 53	0001-0003-767	R-METALL	576R	0207	1	DRALORIC		L
3R 54	0001-0006-751	R-KOEHLE	68R	TK 50	1	DRALORIC		L
3R 55	0001-0006-861	R-KOEHLE	390R	0207	1	DRALORIC		L
3P 56	0001-0059-232	R-METALL	1K65	0207	1	DRALORIC		L
3R 57	0001-0000-922	R-METALL	422R	TK 50	1	DRALORIC		L
3R 58	0001-0006-887	R-KOEHLE	560R	TK 50	1	DRALORIC		L
3R 59	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 60	0001-0018-532	R-METALL	115K	0207	1	DRALORIC		L
3P 61	0001-0000-841	R-METALL	340R	TK 50	1	DRALORIC		L
3R 62	0001-0000-647	R-METALL	174R	TK 50	1	DRALORIC		L
3R 63	0001-0000-294	R-METALL	37R4	TK 50	1	DRALORIC		L
3P 64	0001-0006-722	R-KOEHLE	47R	0207	1	DRALORIC		L
3R 65	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
3R 66	0001-0007-158	R-KOEHLE	100K	0207	1	018/03/01		L
3R 70	0001-0006-942	R-KOEHLE	1K8	0207	1	DRALORIC		L
3P 71	0001-0006-900	R-KOHLF	820R	0207	1	DRALORIC		L
3R 72	0001-0006-939	R-KOEHLE	1K5	0207	1	DRALORIC		L
3R 73	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3P 74	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 75	0001-0003-657	R-METALL	105R	TK 50	1	DRALORIC		L
3P 76	0001-0003-657	R-METALL	105R	TK 50	1	DRALORIC		L
3R 77	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 78	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3P 79	0001-0020-067	R-METALL	147R	TK 50	1	DRALORIC		L
3R 80	0001-0020-067	R-METALL	147R	TK 50	1	DRALORIC		L
3R 81	0001-0003-563	R-METALL	124R	TK 50	1	DRALORIC		L
3R 82	0001-0006-777	R-KOEHLE	82R	0207	1	DRALORIC		L
3R 83	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC		L
3R 84	0001-0006-968	R-KOEHLE	2K7	0207	1	DRALORIC		L
3R 85	0001-0007-190	P-KOEHLE	220K	0207	1	018/03/01		L

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
3P 90	0001-0006.887	R-KOEHLE	560R	5X 0207	1	DRALORIC		L
3P 91	0001-0006.641	R-KOEHLE	10R	5X 0207	1	DRALORIC		L
3P 92	0001-0007.103	R-KOEHLE	39K	5X 0207	1	018/03/01		L
3P 93	0001-0007.048	R-KOEHLE	12K	5X 0207	1	DRALORIC		L
3P 94	0001-0007.284	R-KOEHLE	1M	5X 0207	1	DRALORIC		L
3P 99	0000-7555.228	0-OHM WIDERSTAND		0,6	1	VITROHM		S
3REL 1	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 2	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 3	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 4	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 5	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 6	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 7	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 8	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3REL 9	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU	12V 1K5 HD	1	SDS		L
3S 1	0000-7567.999	S-DUAL-IN-LINE	1 100 AU SCHIEBE-	09 10000 39	1	013/06/06		L
3S 2	0000-7567.999	S-DUAL-IN-LINE	1 100 AU SCHIEBE-	09 10000 39	1	013/06/06		L
3ST 1	0855-0007.005	STECKER	BN 855	A 2 KPL	1			L
3T 1	0829-9365.008	TRANS SI NPN	2 N 930	A T0 18	1			L
3T 2	0829-9365.008	TRANS SI NPN	2 N 930	A T0 18	1			L
3T 3	0000-7619.287	TRANS SI N VMO5	BS 170	6 T0 92	1	ITT		L
3T 4	0000-7598.971	TRANS SI P DMO5	BS 250	G T0 92	1	ITT		L
3T 5	0829-9365.008	TRANS SI NPN	2 N 930	A T0 18	1			L
3T 6	0001-0016.712	TRANS SI PNP	2 N 4035 (PFX48)	A T0 18	1	SGS		L
3T 7	0001-0016.903	TRANS SI NPN	EFY 90	A T0 18	1	SIEMENS		L
3T 8	0001-0016.518	TRANS SI NPN	ECY 59 X (D)	A T0 18	1	TFK		L
3T 9	0001-0016.903	TRANS SI NPN	BFY 90	A T0 18	1	SIEMENS		L
3T 10	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48)	A T0 18	1	SGS		L
3T 11	0001-0016.903	TRANS SI NPN	EFY 90	A T0 18	1	SIEMENS		L
3T 12	0000-7564.219	TRANS SI N VMO5	2 N 6660	G T0 39	1	SILICONIX		L
3T 13	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48)	A T0 18	1	SGS		L
3T 14	0000-7525.698	TRANS SI NPN	2 N 3227	A T0 18	1	MOTOROLA		L
3T 15	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48)	A T0 18	1	SGS		L
3T 16	0000-7525.698	TRANS SI NPN	2 N 3227	A T0 18	1	MOTOROLA		L
3T 17	0001-0016.518	TRANS SI NPN	ECY 59 X (D)	A T0 18	1	TFK		L
4C 1	0001-0069.468	C-TRIM KLR SCHEIBE	7P - 35P	N1500 0,5	1			L
4C 2	0001-0004.148	C-KERAMIK EDPT	8P25	63V	1		OR 301427603	L
4C 3	0001-0059.274	C-TRIM KER SCHEIBE	1P - 3P	NP 0	1		INF 0 1B	L
4C 4	0001-0004.410	C-KERAMIK EDPT	56P	63V	1		3 BR 301504121	L
4C 5	0001-0004.313	C-KERAMIK EDPT	27F	2X 63V	1		NP 0 1B	L
4C 6	0001-0068.401	C-TRIM KER SCHEIBE	4P5 - 20P	N 750 0,5	1		INF 0 1B	L
4C 7	0001-0004.122	C-KERAMIK EDPT	6P8	63V	1		VI 301427502	L
4C 8	0001-0004.410	C-KERAMIK EDPT	56P	2X 63V	1		INF 0 1B	L
4C 9	0001-0004.229	C-KERAMIK EDPT	15P	2X 63V	1		INF 0 1B	L
4C 10	0001-0068.401	C-TRIM KER SCHEIBE	4P5 - 20P	N 750 0,5	1		VI 301427502	L

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SERIE M 0955-84.01.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKSTOFF REF.-DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
6R 1	0001-0006.735	R-KOEHLE	56R	0207	1	DRALORIC		L
6R 2	0001-0006.667	R-KOEHLE	15R	0207	1	DRALORIC		L
6R 5	0001-0001.921	R-METALL	6K04	0207	1	DRALORIC		L
6R 6	0001-0002.085	R-METALL	8K87	0207	1	DRALORIC		L
6P 7	0001-0003.563	R-METALL	124R	0207	1	DRALORIC		L
6R 9	0001-0000.621	R-METALL	158R	0207	1	DRALORIC		L
6R 11	0001-0003.563	R-METALL	124R	0207	1	DRALORIC		L
6P 12	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
6R 13	0001-0001.921	R-METALL	6K04	0207	1	DRALORIC		L
6R 14	0001-0002.085	R-METALL	8K87	0207	1	DRALORIC		L
6R 16	0001-0006.939	R-KOEHLE	1K5	0207	1	DRALORIC		L
6R 17	0001-0001.154	R-METALL	825R	0207	1	DRALORIC		L
6R 20	0001-0003.563	R-METALL	124R	0207	1	DRALORIC		L
6R 21	0001-0001.714	R-METALL	3K74	0207	1	DRALORIC		L
6R 22	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
6R 23	0001-0001.604	R-METALL	2K87	0207	1	DRALORIC		L
6R 24	0001-0000.980	R-METALL	499R	0207	1	DRALORIC		L
6R 26	0001-0001.112	R-METALL	732R	0207	1	DRALORIC		L
6P 28	0001-0000.980	R-METALL	499R	0207	1	DRALORIC		L
6R 29	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
6R 30	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
6R 31	0001-0001.714	R-METALL	3K74	0207	1	DRALORIC		L
6R 32	0001-0001.604	R-METALL	2K87	0207	1	DRALORIC		L
6R 33	0001-0005.323	R-METALL	95R3	0207	1	DRALORIC		L
6T 1	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
6T 2	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
6T 3	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
6T 4	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
6T 5	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
6T 6	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
7C 1	0001-0004.041	C-KERAMIK EDPT	3P3	OP25 63V	1	110/02/09		L
7C 2	0001-0004.083	C-KERAMIK EDPT	4P7	OP25 63V	1	110/02/09		L
7C 3	0001-0004.834	C-KERAMIK EDPT	1P	OP25 63V	1	110/02/09		L
7C 4	0001-0004.106	C-KERAMIK EDPT	5P6	OP25 63V	1	110/02/09		L
7C 5	0001-0004.261	C-KERAMIK EDPT	18P	2X 63V	1	110/02/09		L
7C 6	0000-7547.223	C-TRIM KER SCHEIBE	2P5- 5P	NP 0 0,5	1	111/01/05		L
7C 7	0000-7547.223	C-TRIM KER SCHEIBE	2P5- 5P	NP 0 0,5	1	111/01/05		L
7C 8	0001-0004.261	C-KERAMIK EDPT	18P	2X 63V	1	110/02/09		L
7C 9	0001-0004.009	C-KERAMIK EDPT	2P2	OP25 63V	1	110/02/09		L
7C 10	0001-0004.834	C-KERAMIK EDPT	1F	OP25 63V	1	110/02/09		L
7C 11	0001-0004.025	C-KERAMIK EDPT	2F7	OP25 63V	1	110/02/09		L
7L 1	0000-7564.167	L-FEST	1U8 10X	1537-18	1	117/01/02		L
7L 2	0829-7827.001	SPULE	1U8 10X	1537-18	1	117/01/02		A
7L 3	0000-7564.167	L-FEST	1U8 10X	1537-18	1	117/01/02		L
7L 4	0000-7564.167	L-FEST	1U8 10X	1537-18	1	117/01/02		L
7L 5	0829-7827.001	SPULE			1	117/01/02		A
7L 6	0000-7564.170	L-FEST	ANGLEICHW.	1537--	1	117/01/02		A

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	WGRKORNR QU REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
7q 1	0829-9702.001	FILTERQUARZ	39.995,500KHZ	HC267U	1			L
7q 2	0829-9702.001	FILTERQUARZ	39.995,500KHZ	HC267U	1			L
7q 3	0829-9701.002	FILTERQUARZ	40.020,000KHZ	HC267U	1			L
7UE 1	0829-7730.004	UEBERTRAGER			1			A
7UE 2	0829-7730.004	UEBERTRAGER			1			A
8C 1	0001-0004.698	C-KERAMIK EDPT	1N	63V	1			L
8C 2	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 3	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 4	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 5	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 6	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 8	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 9	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1			L
8C 10	0001-0004.114	ELKO-TA SINT FEST	63U	20x	1			L
8C 11	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 12	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 16	0855-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	1			L
8C 18	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1			L
8C 19	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 20	0001-0004.775	ELKO-TA SINT FEST	30J3	20x	1			L
8C 21	0001-0004.672	C-KERAMIK EDPT	56JP	10x	1			L
8C 22	0001-0004.198	ELKO-TA SINT FEST	150U	20x	1			L
8C 23	0001-0004.672	C-KERAMIK EDPT	56OP	10x	1			L
8C 24	0001-0004.775	ELKO-TA SINT FEST	30J3	20x	1			L
8C 26	0001-0004.559	C-KERAMIK EDPT	120P	2x	1			L
8C 28	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 29	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1			L
8C 30	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 31	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1			L
8C 32	0001-0004.818	C-KERAMIK EDPT	10N	20/100	1			L
8C 33	0001-0004.698	C-KERAMIK EDPT	1N	10x	1			L
8C 34	0001-0004.504	C-KERAMIK EDPT	100P	2x	1			L
8IC 1	0001-0016.330	IC-DUAL HF-VERST.	CA3049T	T0 101	1			L
8IC 2	0000-7600.623	IC-DUAL DIFF.-VERST.	CA3102E	DIP 14	1			L
8L 1	0000-7556.146	L-FEST	506 10x	1025-38	1			L
8L 2	0000-7556.146	L-FEST	506 10x	1025-38	1			L
8L 5	0000-7556.146	L-FEST	506 10x	1025-38	1			L
8L 6	0001-0043.125	L-FEST	10CN 10x	1025-94	1			L
8L 7	0000-7556.146	L-FEST	506 10x	1025-38	1			L
8P 1	0000-7511.097	R-TRIM DRAHT SQUARE	200R	5x 0W7 25	1			L
8R 1	0001-0065.323	R-METALL	95R3	1x 0207	1			L
8R 2	0001-0001.714	R-METALL	3K74	1x 0207	1			L
8R 3	0001-0001.604	R-METALL	2K87	1x 0207	1			L
8R 4	0001-0006.751	R-KOEHLE	6ER	5x 0207	1			L

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TEILE-NR PART NO	SACH-NR ITEM NO	BEZEICHNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
8P 5	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC			L
8R 6	0001-0000-980	P-METALL	499R	0207	1	DRALORIC			L
8R 7	0001-0003-563	R-METALL	124P	0207	1	DRALORIC			L
8R 8	0001-0001-112	R-METALL	732R	0207	1	DRALORIC			L
8R 9	0001-0000-980	R-METALL	499R	0207	1	DRALORIC			L
8R 10	0001-0006-751	R-KOEHLE	68R	0207	1	DRALORIC			L
8R 11	0001-0001-714	R-METALL	3F74	0207	1	DRALORIC			L
8R 12	0001-0001-604	P-METALL	2K87	0207	1	DRALORIC			L
8R 13	0001-0001-154	R-METALL	825R	0207	1	DRALORIC			L
8R 14	0001-0001-358	R-METALL	1K5	0207	1	DRALORIC			L
8P 15	0001-0001-921	R-METALL	6K04	0207	1	DRALORIC			L
8R 16	0001-0002-085	R-METALL	8K87	0207	1	DRALORIC			L
8R 17	0001-0006-751	P-KOEHLE	68R	0207	1	DRALORIC			L
8P 18	0001-0003-563	R-METALL	124R	0207	1	DRALORIC			L
8R 19	0001-0000-621	R-METALL	158R	0207	1	DRALORIC			L
8R 20	0001-0006-735	R-KOEHLE	56R	0207	1	DRALORIC			L
8R 21	0001-0006-667	P-KOEHLE	15R	0207	1	DRALORIC			L
8R 22	0001-0003-563	R-METALL	124R	0207	1	DRALORIC			L
8R 23	0001-0001-921	R-METALL	6K04	0207	1	DRALORIC			L
8R 24	0001-0002-085	R-METALL	8K87	0207	1	DRALORIC			L
8R 25	0001-0006-683	R-KOEHLE	22R	0207	1	DRALORIC			L
8R 26	0001-0062-300	R-METALL	24R3	0207	1	DRALORIC			L
8R 27	0001-0001-497	R-METALL	2K21	0207	1	DRALORIC			L
8R 28	0001-0001-578	R-METALL	2K67	0207	1	DRALORIC			L
8R 29	0001-0001-549	R-METALL	2K49	0207	1	DRALORIC			L
8R 30	0001-0001-510	R-METALL	2K32	0207	1	DRALORIC			L
8R 31	0000-7608-900	R-METALL	274P	0204	1	018/04/01			L
8R 32	0000-7608-845	R-METALL	22R1	0204	1	018/04/01			L
8R 33	0000-7585-544	R-METALL	1K	0204	1	018/04/01			L
8R 34	0001-0000-317	R-METALL	49R9	0207	1	DRALORIC			L
8R 35	0000-7585-544	R-METALL	1K	0204	1	018/04/01			L
8R 36	0001-0000-317	R-METALL	49R9	0207	1	DRALORIC			L
8R 37	0001-0000-676	R-METALL	49R9	0207	1	DRALORIC			L
8R 38	0000-7608-845	R-METALL	22R1	0204	1	018/04/01			L
8R 39	0000-7608-845	R-METALL	22R1	0204	1	018/04/01			L
8R 40	0000-7593-109	R-METALL	68R1	0204	1	018/04/01			L
8R 41	0001-0000-841	R-METALL	200R	0207	1	DRALORIC			L
8R 42	0001-0000-731	R-METALL	340R	0207	1	DRALORIC			L
8R 43	0001-0000-676	R-METALL	243R	0207	1	DRALORIC			L
8R 44	0001-0000-841	R-METALL	200R	0207	1	DRALORIC			L
8R 45	0000-7593-109	R-METALL	68R1	0204	1	018/04/01			L
8R 46	0001-0000-676	R-METALL	124R	0207	1	DRALORIC			L
8R 47	0001-0000-841	R-METALL	22R1	0204	1	018/04/01			L
8R 48	0001-0000-731	R-METALL	124R	0207	1	DRALORIC			L
8R 49	0000-7593-109	R-METALL	68R1	0204	1	018/04/01			L
8R 50	0001-0003-563	R-METALL	124R	0207	1	DRALORIC			L
8R 51	0001-0000-919	R-METALL	412R	0207	1	DRALORIC			L
8R 52	0001-0000-511	R-METALL	90R9	0207	1	DRALORIC			L
8R 53	0000-7593-109	R-METALL	68R1	0204	1	018/04/01			L
8R 54	0000-7608-913	R-METALL	392R	0204	1	018/04/01			L
8R 55	0001-0003-576	R-METALL	267R	0207	1	DRALORIC			L
8R 56	0000-7519-471	R-METALL	100R	0204	1	018/04/01			L
8R 57	0001-0001-895	R-METALL	5K62	0207	1	DRALORIC			L
8R 58	0001-0002-179	P-METALL	11F	0207	1	DRALORIC			L

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
8R 63	0001-0000.977	R-METALL	487R	1X 0207	56	DRALORIC		L
8T 1	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		SIEMENS		L
8T 2	0001-0016.903	TRANS SI MPN	BFY 90	A TO 72		SIEMENS		L
8UE 1	0955-7728.001	UEBERTRAGER						A
8UE 2	0829-7733.001	UEDERTRAGER						A
9BU 1	0000-1637.074	WINKELBU. 75 OHM KPL						L
9BU 2	0000-1637.074	WINKELBU. 75 OHM KPL						L
9C 1	0000-7559.745	C-KF KS	6N49	0X5	56	SIEMENS		L
9C 2	0000-7559.729	C-KF KS	3N79	0X5	56	SIEMENS		L
9C 3	0000-7551.565	C-KF KS	10N9	0X5	56	SIEMENS		L
9C 4	0000-7563.618	C-KF KS	6N57	0X5	56	SIEMENS		L
9C 5	0000-7562.376	C-KF KS	2N8	0X5	56	SIEMENS		L
9C 6	0000-7561.377	C-KF KS	3N24	0X5	56	SIEMENS		L
9C 7	0000-7563.621	C-KF KS	4N22	0X5	56	SIEMENS		L
9C 8	0000-7559.761	C-KF KS	9N65	0X5	56	SIEMENS		L
9C 9	0000-7563.634	C-KF KS	3N61	0X5	56	SIEMENS		L
9C 10	0000-7563.647	C-KF KS	8N66	0X5	56	SIEMENS		L
9C 11	0000-7563.650	C-KF KS	9N31	0X5	56	SIEMENS		L
9C 12	0000-7559.936	C-KF KS	8N16	0X5	56	SIEMENS		L
9C 13	0000-7563.663	C-KF KS	2N1	0X5	56	SIEMENS		L
9C 14	0000-7563.676	C-KF KS	4N99	0X5	56	SIEMENS		L
9C 15	0000-7562.716	C-KF KS	1N87	0X5	56	SIEMENS		L
9C 16	0000-7560.226	C-KF KS	13N2	0X5	56	SIEMENS		L
9C 17	0000-7563.689	C-KF KS	18N9	0X5	56	SIEMENS		L
9C 18	0000-7563.692	C-KF KS	2N43	0X5	56	SIEMENS		L
9C 20	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	SIEMENS		L
9C 21	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	SIEMENS		L
9C 22	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	SIEMENS		L
9C 23	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	SIEMENS		L
9C 25	0000-7563.702	C-KF KS	1N1	0X5	56	SIEMENS		L
9C 26	0000-7563.715	C-KF KS	25N5	0X5	56	SIEMENS		L
9C 27	0001-0040.966	ELKO-TA SINT FEST	22U	20X	56	SIEMENS		L
9C 28	0001-0010.378	C-KF MKT	100N	20X	56	SIEMENS		L
9C 29	0001-0010.378	C-KF MKT	100N	20X	56	SIEMENS		L
9C 30	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	SIEMENS		L
9C 31	0001-0004.384	C-KERAMIK EDPT	22U	20X	56	SIEMENS		L
9C 32	0001-0040.966	ELKO-TA SINT FEST	47P	2X	56	SIEMENS		L
9C 33	0001-0040.966	ELKO-TA SINT FEST	22U	20X	56	SIEMENS		L
9C 34	0001-0010.378	C-KF MKT	22U	20X	56	SIEMENS		L
9C 35	0001-0010.378	C-KF MKT	22U	20X	56	SIEMENS		L
9C 36	0001-0010.378	C-KF MKT	22U	20X	56	SIEMENS		L
9C 37	0001-0041.790	ELKO-AL	100U	10/ 50	56	SIEMENS		L
9C 38	0855-0025.003	C-KERAMIK DDMZ	4N7	20/ 80	04	SIEMENS		L
9C 39	0855-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	04	SIEMENS		L
9C 40	0855-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	04	SIEMENS		L
9C 41	0855-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	04	SIEMENS		L
9C 42	0855-0025.003	C-KERAMIK DDMZ	4N7	20/ 80	04	SIEMENS		L

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	REMERKUNG NOTE	SERIE AF VERSION
10C 60	0001-0041.059	ELKO-TA SINT FEST	47U 20X	ETR-3	1	110/05/61		E-...
10C 61	0001-0041.114	ELKO-TA SINT FEST	68U 20X	ETR-4	1	110/05/61		E-...
10C 62	0001-0041.059	ELKO-TA SINT FEST	47U 20X	ETR-3	1	110/05/61		E-...
10C 63	0001-0004.821	C-KERAMIK EDFT	22N 20/ 80	R10000 2	1	110/02/10		F-...
10C 64	0001-0041.185	ELKO-TA SINT FEST	150U 20X	ETR-4	1	110/05/61		E-...
10C 65	0001-0004.737	C-KERAMIK EDFT	2N2 10X	R 2000 2	1	110/02/10		E-...
10GL 1	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	D0 35 = 1N5713	1	HPA		
10GL 2	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	D0 35 = 1N5713	1	HPA		
10GL 3	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	D0 35 = 1N5713	1	HPA		
10GL 4	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	D0 35 = 1N5713	1	HPA		
10GL 5	0000-7531.860	DIODE SI REFERENZ	1 N 4572 A	D0 7	1	140/03/03		
10GL 6	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 7	0000-7531.860	DIODE SI REFERENZ	1 N 4572 A	D0 7	1	140/03/03		
10GL 8	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 9	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 10	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 11	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 13	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10GL 14	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		
10IC 1	0001-0067.431	IC-CMOS	4047BE	DIP 14	1	RCA		
10IC 2	0001-0067.554	IC-CMOS	4066BCP	DIP 14	1	MOTOROLA		
10IC 3	0001-0070.761	IC-CMOS	4538ECP	DIP 16	1	MOTOROLA		
10IC 4	0001-0072.390	IC-LOCOS	40098BP	DIP 16	1	VALVO		
10IC 5	0001-0070.761	IC-CMOS	4538RCP	DIP 16	1	MOTOROLA		
10IC 7	0000-7556.777	IC-OP.-VERST.	UA714HC	TO 99	1	FSC		
10L 1	0000-7556.052	L-FEST	1U 10X	1025-20	1	117/01/03		B-...
10L 2	0000-7556.007	L-FEST	390N 10X	1025-10	1	117/01/03		
10L 3	0829-7835.006	SPULE	20GR 10X	TK 100	1	017/04/06		
10L 4	0829-7835.006	SPULE	100R 10X	TK 100	1	017/04/06		
10P 1	0000-7571.710	R-TRIM: CERMET SQUARE	2K7 5X	0207	1	DRALORIC		
10P 2	0000-7571.707	R-TRIM: CERMET SQUARE	220K 5X	0207	1	DRALORIC		
10P 3	0001-0006.190	R-KOHL	10R 5X	0207	1	DRALORIC		
10P 4	0001-0006.641	R-KOHL	5K6 5X	0207	1	DRALORIC		
10P 5	0001-0006.955	R-KOHL	2K2 5X	0207	1	DRALORIC		
10P 6	0001-0006.971	R-KOHL	3K3 5X	0207	1	DRALORIC		
10P 7	0001-0006.816	R-KOHL	150R 5X	0207	1	DRALORIC		
10P 8	0001-0006.913	R-KOHL	1K 5X	0207	1	DRALORIC		
10P 9	0001-0006.913	R-KOHL	1K 5X	0207	1	DRALORIC		
10P 10	0001-0006.751	R-KOHL	68K 5X	0207	1	DRALORIC		
10P 11	0001-0006.751	R-KOHL	68R 5X	0207	1	DRALORIC		
10P 12	0001-0006.751	R-KOHL	68R 5X	0207	1	DRALORIC		
10P 13	0001-0006.845	R-KOHL	270R 5X	0207	1	DRALORIC		
10P 14	0001-0006.829	R-KOHL	180R 5X	0207	1	DRALORIC		
10P 15	0001-0006.890	R-KOHL	680R 5X	0207	1	DRALORIC		

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SEFIE M 0955-6401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACHF-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM PFF.-DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
10R 16	0001-0006-690	R-KOEHLE	680F	0207	56	1 DRALORIC			L
10R 17	0001-0007-132	R-KOEHLE	68K	0207	56	1 018/03/01			L
10R 18	0001-0006-971	R-KOEHLE	3F3	0207	56	1 DRALORIC			L
10R 19	0001-0006-751	R-KOEHLE	68R	0207	56	1 DRALORIC			L
10P 20	0001-0007-080	R-KOEHLE	27A	0207	56	1 018/03/01			L
10R 21	0001-0006-955	R-KOEHLE	2K2	0207	56	1 DRALORIC			L
10R 22	0001-0006-751	R-KOEHLE	68R	0207	56	1 DRALORIC			L
10R 23	0001-0006-829	R-KOEHLE	68R	0207	56	1 DRALORIC			L
10R 24	0001-0006-751	R-KOEHLE	180R	0207	56	1 DRALORIC			L
10R 25	0001-0006-751	R-KOEHLE	68R	0207	56	1 DRALORIC			L
10R 26	0001-0006-913	R-KOEHLE	1A	0207	56	1 DRALORIC			L
10R 27	0001-0007-006	R-KOEHLE	5K6	0207	56	1 DRALORIC			L
10R 28	0001-0006-926	R-KOEHLE	1K2	0207	56	1 DRALORIC			L
10R 29	0001-0006-913	R-KOEHLE	1K	0207	56	1 DRALORIC			L
10R 30	0001-0007-006	R-KOEHLE	5K6	0207	56	1 DRALORIC			L
10R 31	0001-0000-456	R-METALL	75R	0207	56	1 DRALORIC			L
10P 32	0001-0000-333	R-METALL	53K6	TK 50	56	1 DRALORIC			L
10R 33	0001-0000-540	R-METALL	107R	TK 50	56	1 DRALORIC			L
10R 34	0001-0000-605	R-METALL	143R	TK 50	56	1 DRALORIC			L
10R 35	0001-0000-605	R-METALL	143R	TK 50	56	1 DRALORIC			L
10R 36	0001-0000-210	R-METALL	28R	TK 50	56	1 DRALORIC			L
10R 37	0001-0002-263	R-METALL	14V	TK 50	56	1 DRALORIC			L
10R 38	0001-0001-620	R-METALL	3K01	TK 50	56	1 DRALORIC		E---	L
10R 39	0001-0001-620	R-METALL	3K01	TK 50	56	1 DRALORIC		E---	L
10R 40	0001-0001-620	R-METALL	3K01	TK 50	56	1 DRALORIC		E---	L
10R 41	0001-0001-659	R-METALL	3K24	TK 50	56	1 DRALORIC		E---	L
10R 42	0001-0002-360	R-METALL	18K2	TK 50	56	1 DRALORIC		E---	L
10R 43	0001-0002-263	R-METALL	14K	TK 50	56	1 DRALORIC		E---	L
10R 44	0001-0000-663	R-METALL	162R	TK 50	56	1 DRALORIC		E---	L
10R 45	0001-0000-812	R-METALL	316R	TK 50	56	1 DRALORIC		E---	L
10R 46	0001-0006-722	R-KOHL	47R	TK 50	56	1 DRALORIC		E---	L
10R 47	0001-0001-921	R-METALL	6K04	TK 50	56	1 DRALORIC		E---	L
10R 48	0001-0006-942	R-KOEHLE	1K8	0207	56	1 DRALORIC		E---	L
10R 49	0001-0006-913	R-KOEHLE	1K	0207	56	1 DRALORIC		E---	L
10R 50	0001-0006-997	R-KOEHLE	1K	0207	56	1 DRALORIC		E---	L
10R 51	0001-0006-942	R-KOEHLE	4F7	0207	56	1 DRALORIC		E---	L
10R 52	0001-0006-751	R-KOEHLE	1F8	0207	56	1 DRALORIC		E---	L
10R 53	0001-0006-777	R-KOEHLE	68R	0207	56	1 DRALORIC		E---	L
10R 54	0001-0006-777	R-KOEHLE	82R	0207	56	1 DRALORIC		E---	L
10P 55	0001-0006-751	R-KOEHLE	68R	0207	56	1 DRALORIC		E---	L
10P 56	0001-0006-751	R-KOEHLE	68R	0207	56	1 DRALORIC		E---	L
10R 57	0001-0006-751	R-KOEHLE	390R	0207	56	1 DRALORIC		E---	L
10R 58	0001-0006-751	R-KOEHLE	2K2	0207	56	1 DRALORIC		E---	L
10R 59	0001-0006-861	R-KOEHLE	68R	0207	56	1 DRALORIC		E---	L
10R 60	0001-0006-955	R-KOEHLE	3F3	0207	56	1 DRALORIC		E---	L
10R 61	0001-0006-751	R-KOEHLE	330P	0207	56	1 DRALORIC		E---	L
10R 62	0001-0006-858	R-KOEHLE	68K	0207	56	1 DRALORIC		E---	L
10R 63	0001-0007-132	R-KOEHLE	27K	0207	56	1 DRALORIC		E---	L
10P 64	0001-0007-080	R-KOEHLE	68A	0207	56	1 018/03/01			L
10P 65	0001-0006-751	R-KOEHLE	68A	0207	56	1 G18/03/01			L
10P 66	0001-0007-006	R-METALL	167R	TK 50	56	1 DRALORIC		E---	L
10R 67	0001-0007-006	R-METALL	6K8	0207	56	1 DRALORIC		E---	L
10R 68	0001-0007-006	R-METALL	6K8	0207	56	1 DRALORIC		E---	L
10P 69	0001-0007-006	R-METALL	6K8	0207	56	1 DRALORIC		E---	L
10P 70	0001-0007-006	R-METALL	6K8	0207	56	1 DRALORIC		E---	L
10R 71	0001-0007-006	R-METALL	6K8	0207	56	1 DRALORIC		E---	L

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SERIE M 0955-8401-000 SPM-15 9.55/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG WERKFORM QU REF-DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
10R 72	0001-0006.913	R-KOEHLE	1K	0207	1		L
10R 73	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC	L
10R 74	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC	L
10R 75	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 76	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 77	0001-0000.980	R-METALL	499R	TK 50	1	DRALORIC	L
10R 78	0001-0000.731	R-METALL	243R	TK 50	1	DRALORIC	L
10R 79	0001-0006.641	R-KOEHLE	10R	0207	1	DRALORIC	L
10R 80	0001-0006.968	R-KOEHLE	2K7	0207	1	DRALORIC	L
10R 81	0001-0007.190	R-KOEHLE	220K	0207	1	DRALORIC	L
10R 83	0001-0018.561	R-KOEHLE	3R9	0207	1	018/03/01	L
10R 84	0000-7644.838	R-METALL	13K7	TK 50	1	DRALORIC	L
10R 85	0000-7608.874	R-METALL	47R5	TK 50	1	018/04/01	L
10R 86	0001-0006.984	R-KOEHLE	3K9	0207	1	DRALORIC	L
10R 87	0001-0007.239	R-KOEHLE	470K	0207	1	018/03/01	L
10R 88	0000-7547.799	R-MODUL	5X100K	TK250	1	018/06/01	L
10R 89	0001-0001.743	R-METALL	4K02	TK 50	1	DRALORIC	L
10R 90	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 100	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 102	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC	L
10R 103	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC	L
10R 104	0001-0007.190	R-KOEHLE	220K	0207	1	DRALORIC	L
10R 106	0001-0007.158	R-KOEHLE	100K	0207	1	018/03/01	L
10R 107	0001-0007.158	R-KOEHLE	100K	0207	1	018/03/01	L
10R 118	0001-0000.430	R-METALL	69R8	TK 50	1	DRALORIC	L
10R 119	0001-0072.248	R-NIC	500R	TK11	1	DRALORIC	L
10R 120	0001-0006.751	R-KOEHLE	68R	0207	1	SIEMENS	L
10R 121	0001-0001.002	R-METALL	549R	TK 50	1	DRALORIC	L
10R 122	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 123	0001-0000.511	R-METALL	90R9	TK 50	1	DRALORIC	L
10R 124	0001-0001.002	R-METALL	549R	TK 50	1	DRALORIC	L
10R 125	0001-0000.993	R-METALL	523R	TK 50	1	DRALORIC	L
10R 126	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC	L
10R 127	0001-0006.683	R-KOEHLE	22R	0207	1	DRALORIC	L
10R 128	0001-0003.686	R-METALL	453R	TK 50	1	DRALORIC	L
10R 129	0001-0000.537	R-METALL	100R	TK 50	1	DRALORIC	L
10R 130	0001-0003.958	R-METALL	162R	TK 50	1	DRALORIC	L
10R 131	0001-0003.738	R-METALL	118R	TK 50	1	DRALORIC	L
10R 132	0001-0000.676	R-METALL	200R	TK 50	1	DRALORIC	L
10REL 1	0000-7619.326	RELAIS GEPOLT F15TAB	1001 AU	1K5 HD	1	SDS	L
10REL 2	0000-7588.813	RELAIS GEPOLT DISTAB	1220 AU	1K5 HD	1	SDS	L
10S 1	0000-1832.015	S-DUAL-IN-LINE	1	100 SN HAKEN-	1	SIEMENS	L
10S 2	0000-1832.015	S-DUAL-IN-LINE	1	100 SN HAKEN-	1	SIEMENS	L
10ST 1	0855-0006.006	STECKER	EN 855	A 1 KPL	1		L
10ST 2	0855-0007.005	STECKER	EN 855	A 2 KPL	1		L
10T 1	0001-0016.518	TRANS SI NPN	TECY 59 X	(D) A TO 18	1		L
10T 2	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	TFK	L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNOHM REF.-DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
10T 3	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 4	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 5	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 6	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 7	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 8	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS			L
10T 11	0000-7536.153	TRANS SI PNP	2 N 4209	A TO 52	1	FSC		B-...	L
10T 12	0000-7536.153	TRANS SI PNP	2 N 4209	A TO 52	1	FSC		B-...	L
10T 13	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT			L
10T 14	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
10T 15	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
10T 16	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
10T 17	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
10T 18	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK			L
10T 20	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		E-...	L
10T 21	0000-7536.153	TRANS SI PNP	2 N 4209	A TO 52	1	FSC		E-...	L
10T 22	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		E-...	L
10UE 1	0955-7729.000	UEBERTRAGER			1				A
10UE 2	0955-7730.002	UEBERTRAGER			1				A
11BU 1	0000-7598.696	HF-BUCHSE	BNC	50 M D 5,0	1	ROSENBERG	CR EL 26,7 551K504-106A4		L
11C 1	0001-0004.698	C-KERAMIK EDPT	1N	63V	1		R 2000 2		L
11C 2	0001-0004.821	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 3	0001-0004.779	C-KERAMIK EDPT	3N3	63V	1		R 2000 2		L
11C 5	0001-0004.148	C-KERAMIK EDPT	8P2	63V	1		NP 0 1B		L
11C 6	00C1-0069.468	C-TRIM KER SCHEIBE	7P - 35P	0,5	1		OR 301427603		L
11C 7	0001-0004.203	C-KERAMIK EDPT	12P	63V	1		NP 0 1B		L
11C 8	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P	0,5	1		OR 301427603		L
11C 9	0001-0004.148	C-KERAMIK EDPT	8P2	63V	1		NP 0 1B		L
11C 11	0001-0004.737	C-KERAMIK EDPT	2N2	63V	1		R 2000 2		L
11C 12	0001-0004.821	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 15	0001-0040.966	ELKO-TA SAINT FEST	22U	16V	1		ETR-3		L
11C 16	0001-0004.821	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 17	0001-0004.821	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 18	0001-0004.821	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 19	0001-0004.818	C-KERAMIK EDPT	22N	40V	1		R10000 2		L
11C 20	0001-0004.698	C-KERAMIK EDPT	10N	20/100	1		R10000 2		L
11C 21	0001-0004.698	C-KERAMIK EDPT	1N	10X	1		R 2000 2		L
11C 22	0001-0004.698	C-KERAMIK EDPT	1N	10X	1		R 2000 2		L
11L 1	0000-7555.998	L-FEST	330N	10X 10,25-08	1		30 25 410 OR22 815MA		L
11L 2	0000-7555.998	L-FEST	330N	10X 10,25-08	1		30 25 410 OR22 815MA		L
11R 1	0001-0007.048	R-KOEHLE	12K	5X 0207	1				L
11R 2	0001-0007.035	R-KOEHLE	10K	5X 0207	1				L
11R 3	0001-0006.751	R-KOEHLE	68R	5X 0207	1				L
11R 4	0001-0006.890	R-KOEHLE	680R	5X 0207	1				L
11R 5	0001-0006.939	R-KOEHLE	1K5	5X 0207	1				L
11R 6	0001-0006.803	R-KOEHLE	120R	5X 0207	1				L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
11P 7	0001-0006.722	R-KOEHLE	47R	5X		1		
11P 10	0001-0006.900	R-KOEHLE	820R	5X	56	1	DRALORIC	
11P 11	0001-0007.064	R-KOEHLE	18K	5X	56	1	DRALORIC	
11P 12	0001-0007.051	R-KOEHLE	15K	5X	56	1	DRALORIC	
11P 13	0001-0006.751	R-KOEHLE	68R	5X	56	1	DRALORIC	
11P 14	0001-0006.861	R-KOEHLE	390R	5X	56	1	DRALORIC	
11P 15	0001-0006.858	R-KOEHLE	330R	5X	56	1	DRALORIC	
11P 16	0001-0006.926	R-KOEHLE	1K2	5X	56	1	DRALORIC	
11P 20	0001-0006.751	R-KOEHLE	68R	5X	56	1	DRALORIC	
11P 21	0001-0006.971	R-KOEHLE	3K3	5X	56	1	DRALORIC	
11P 22	0001-0006.751	R-KOEHLE	68R	5X	56	1	DRALORIC	
11P 23	0001-0006.751	R-KOEHLE	68P	5X	56	1	DRALORIC	
11P 25	0001-0006.722	R-KOEHLE	47R	5X	56	1	DRALORIC	
11P 26	0001-0006.858	R-KOEHLE	330R	5X	56	1	DRALORIC	
11P 27	0001-0006.722	R-KOEHLE	47R	5X	56	1	DRALORIC	
11P 28	0001-0006.887	R-KOEHLE	560R	5X	56	1	DRALORIC	
11P 30	0001-0006.706	R-KOEHLE	33R	5X	56	1	DRALORIC	
11P 31	0001-0006.706	R-KOEHLE	33R	5X	56	1	DRALORIC	
11P 32	0001-0006.751	R-KOEHLE	68R	5X	56	1	DRALORIC	
11P 33	0001-0006.751	R-KOEHLE	68R	5X	56	1	DRALORIC	
11T 1	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		1	SIEMENS	
11T 2	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		1	SIEMENS	
11T 3	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		1	SIEMENS	
11T 4	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		1	SIEMENS	
11T 5	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72		1	SIEMENS	
12BU 1	0000-1637.074	WINKELBU. 75 OHM KPL				1		
12BU 2	0000-1637.074	WINKELBU. 75 OHM KPL				1		
12BU 3	0000-1637.074	WINKELBU. 75 OHM KPL				1		
12BU 4	0000-1637.074	WINKELBU. 75 OHM KPL				1		
12C 1	0001-0004.737	C-KERAMIK EDPT	2N2	10X	56	1	110/02/10	
12C 2	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	1	110/02/10	
12C 3	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	1	110/02/10	
12C 4	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P	M1500	21	1	111/01/06	
12C 6	0001-0004.410	C-KERAMIK EDPT	56P	2X	56	1	110/02/09	
12C 7	0001-0004.818	C-KERAMIK EDPT	10N	20/100	56	1	110/02/10	
12C 8	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	1	110/02/10	
12C 9	0001-0004.818	C-KERAMIK EDPT	10N	20/100	56	1	110/02/10	
12C 10	0001-0004.672	C-KERAMIK EDPT	560P	10X	56	1	110/02/10	
12C 12	0001-0004.449	C-KERAMIK EDPT	68P	2X	56	1	110/02/10	
12C 13	0001-0004.478	C-KERAMIK EDPT	82P	2X	56	1	110/02/09	
12C 14	0001-0004.106	C-KERAMIA EDPT	516	0P25	56	1	110/02/09	
12C 15	0001-0004.410	C-KERAMIK EDPT	56P	2X	56	1	110/02/09	
12C 16	0001-0004.698	C-KERAMIK EDPT	1N	10X	56	1	110/02/10	
12C 17	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	56	1	110/02/10	
12C 19	0001-0041.745	ELKO-AL	47U	10/ 50	56	1	110/02/10	
12C 20	0001-0004.698	C-KERAMIK EDPT	1N	10X	56	1	110/05/40	
12C 21	0055-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	04	1	110/02/10	

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	LEZEICHNUNG 1 MARKING 1	LEZEICHNUNG 2 MARKING 2	WERKNORM REF-DESIGN	BEWPKUNG NOTE	SERIE AF C VERSION
12C 22	0855-0022.006	C-KERAMIK DDPZ	4N7 20/ 80	D 6000 2	1		
12C 23	0001-0004.795	C-PERAMIK EDPT	4N7 10x	F 2000 2	1		
12C 27	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 30	0001-0004.737	C-KERAMIK EDPT	2N2 10x	F 2000 2	1		
12C 31	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 32	0001-0040.704	ELKO-TA SINT FEST	1U 20x	ETR-1	1		
12C 33	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	F10000 2	1		
12C 34	0001-0004.698	C-KERAMIK EDPT	1N 10x	R 2000 2	1		
12C 35	0001-0040.966	ELKO-TA SINT FEST	22U 20x	ETR-3	1		
12C 36	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1		
12C 37	0001-0040.704	ELKO-TA SINT FEST	1U 20x	ETR-1	1		
12C 38	0001-0004.779	C-KERAMIK EDPT	3N3 10x	R 2000 2	1		
12C 39	0001-0004.669	C-KERAMIK EDPT	470P 10x	R 2000 2	1		
12C 40	0001-0010.268	C-KF MKT	22N 20x	MKT1822	1		
12C 44	0855-0022.006	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1		
12C 45	0001-0004.122	C-KERAMIK EDPT	6P8 0P25	NP 0 1R	1		
12C 46	0001-0041.790	ELKO-AL	100U 10/ 50	B41588	1		
12C 47	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 48	0001-0004.698	C-KERAMIK EDPT	1N 10x	R 2000 2	1		
12C 49	0001-0004.698	C-KERAMIK EDPT	1N 10x	R 2000 2	1		
12C 50	0001-0004.575	C-KERAMIK EDPT	150P 2x	N 150 1B	1		
12C 51	0001-0004.559	C-KERAMIK EDPT	120P 2x	NP 0 1B	1		
12C 52	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 53	0001-0004.106	C-KERAMIK EDPT	5P6 0P25	NP 0 1R	1		
12C 54	0001-0004.449	C-KERAMIK EDPT	68P 2x	NP 0 1B	1		
12C 55	0001-0004.575	C-KERAMIK EDPT	150P 2x	N 150 1B	1		
12C 56	0001-0004.779	C-KERAMIK EDPT	3N3 10x	R 2000 2	1		
12C 57	0001-0004.779	C-KERAMIK EDPT	3N3 10x	R 2000 2	1		
12C 58	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 59	0001-0004.601	C-KERAMIK EDPT	220P 2x	N 750 1B	1		
12C 60	0001-0004.410	C-KERAMIK EDPT	56P 2x	NP 0 1B	1		
12C 62	0000-7563.605	C-KF KS	4N99 2x5	R31521	1		
12C 63	0001-0004.122	C-KERAMIK EDPT	6P6 0P25	NP 0 1B	1		
12C 64	0001-0014.086	C-TRIM KER SCHEIBE	3P5- 13P N 470 0,5	BL 301427411	1		
12C 65	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		
12C 66	0001-0004.384	C-KERAMIK EDPT	47P 2x	NP 0 1R	1		
12C 67	0001-0004.384	C-KERAMIK EDPT	47P 2x	NP 0 1B	1		
126L 1	0001-0018.493	DIODE SI	1 N 4448	D 0 35	1	ITT	
126L 2	0001-0018.493	DIODE SI	1 N 4448	D 0 35	1	ITT	
126L 9	0001-0018.493	DIODE SI	1 N 4448	D 0 35	1	ITT	
126L 10	0001-0018.493	DIODE SI	1 N 4448	D 0 35	1	ITT	
126L 11	0000-7574.982	DIODE SI C-	BF 329	D 0 35	1	ITT	
121C 1	0001-0068.359	IC-TRANS ARRAY	CA3083	DIC 16	1	RCA	
121C 4	0000-7545.597	RINGMISCHER	SRA-1		1	MINICIRC-	
121C 5	0000-7590.173	IC-KOMPAKTOR DUAL	LM393N	DIP 8	1	NSC	
121C 6	0001-0070.761	IC-CMOS	45386CP	DIP 16	1	MOS	
121C 7	0001-9067.554	IC-CMOS	4066RCP	DIP 14	1	MOTOROLA	
121C 9	0000-7583.067	IC-OP.-VERST. FET	ICL76150CPA	DIP 8	1	INTERFIL	

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
12L 1	0000-7556.104	L-FEST	2U7 10X	10E5-30	1	117/01/03		L
12L 2	0829-7847.007	SPULE			1			A
12L 3	0829-7847.007	SPULE			1			A
12L 4	0829-7847.007	SPULE			1			A
12L 5	0829-7847.007	SPULE			1			A
12L 6	0829-7847.007	SPULE			1			A
12Q 1	0829-9705.008	STEUERQUARZ	13.336,700KHZ	M 4 A	1			L
12R 1	0001-0006.874	R-KOEHLE	470R	5X 0207	1	DRALORIC		L
12R 2	0001-0007.019	R-KOEHLE	6K8	5X 0207	1	DRALORIC		L
12R 3	0000-7570.902	R-MODUL	9X 4K7	5X 0W1	1	DRALORIC		L
12R 4	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 5	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 6	0001-0006.971	R-KOEHLE	3K3	5X 0207	1	DRALORIC		L
12R 7	0001-0006.887	R-KOEHLE	560R	5X 0207	1	DRALORIC		L
12R 8	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 9	0001-0006.641	R-KOEHLE	10R	5X 0207	1	DRALORIC		L
12R 10	0001-0006.900	R-KOEHLE	820R	5X 0207	1	DRALORIC		L
12R 11	0001-0007.006	R-KOEHLE	5K6	5X 0207	1	DRALORIC		L
12R 12	0001-0006.926	R-KOEHLE	1K2	5X 0207	1	DRALORIC		L
12R 13	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 14	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 15	0001-0006.955	R-KOEHLE	2K2	5X 0207	1	DRALORIC		L
12R 16	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 17	0001-0006.683	R-KOEHLE	22R	5X 0207	1	DRALORIC		L
12R 18	0001-0006.557	R-KOEHLE	1R	5X 0207	1	DRALORIC		L
12R 19	0000-7585.528	R-METALL	2K21	1X 0204	1	DRALORIC		L
12R 20	0000-7519.471	R-METALL	100R	1X 0204	1	DRALORIC		L
12R 21	0001-0006.706	R-KOEHLE	33R	5X 0207	1	DRALORIC		L
12R 22	0001-0006.874	R-KOEHLE	470R	5X 0207	1	DRALORIC		L
12R 23	0001-0006.641	R-KOEHLE	10R	5X 0207	1	DRALORIC		L
12R 24	0001-0006.777	R-KOEHLE	82R	5X 0207	1	DRALORIC		L
12R 25	0001-0006.793	R-KOEHLE	100R	5Y 0207	1	DRALORIC		L
12R 26	0001-0006.722	R-KOEHLE	47R	5X 0207	1	DRALORIC		L
12P 47	0001-0006.955	R-KOEHLE	5K6	5X 0207	1	DRALORIC		L
12R 48	0001-0007.006	R-KOEHLE	47R	5X 0207	1	DRALORIC		L
12R 49	0001-0006.722	R-KOEHLE	47R	5X 0207	1	DRALORIC		L
12R 50	0001-0006.955	R-KOEHLE	2K2	5X 0207	1	DRALORIC		L
12R 51	0001-0006.722	R-KOEHLE	47R	5X 0207	1	DRALORIC		L
12R 52	0001-0007.116	R-KOEHLE	47K	5X 0207	1	DRALORIC		L
12R 53	0001-0007.116	R-KOEHLE	47K	5X 0207	1	DRALORIC		L
12R 54	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 55	0001-0006.968	R-KOEHLE	2K7	5X 0207	1	DRALORIC		L
12R 56	0001-0006.751	R-KOEHLE	68R	5X 0207	1	DRALORIC		L
12R 57	0001-0007.022	R-KOEHLE	8K2	5X 0207	1	DRALORIC		L
12R 58	0001-0007.051	R-KOEHLE	15K	5X 0207	1	DRALORIC		L
12R 59	0001-0006.861	R-KOEHLE	390R	5X 0207	1	DRALORIC		L
12R 60	0001-0006.997	R-KOEHLE	4K7	5X 0207	1	DRALORIC		L
12R 61	0001-0007.006	R-KOEHLE	5K6	5X 0207	1	DRALORIC		L
12R 62	0001-0006.832	R-KOEHLE	22CR	5X 0207	1	DRALORIC		L
12R 63	0001-0002.043	R-METALL	8K06	1X 0207	1	DRALORIC		L
12P 64	0001-0007.077	R-KOEHLE	22K	5X 0207	1	DRALORIC		L
12P 65	0001-0007.921	R-METALL	6K04	1X 0207	1	DRALORIC		L
12P 66	0001-0007.921	R-METALL	TK 50		1	DRALORIC		L
12P 67	0001-0007.921	R-METALL	TK 50		1	DRALORIC		L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIF AF VERSION
12R 68	0001-0001.921	R-METALL	6K04	TK 50	1	DRALORIC		L
12P 69	0001-0006.557	R-KOEHLE	1P	0207	1	DRALORIC		L
12R 72	0001-0006.706	R-KOEHLE	33R	0207	1	DRALORIC		L
12R 73	0001-0006.968	R-KOEHLE	2K7	0207	1	DRALORIC		L
12R 74	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
12P 75	0001-0006.722	R-KOEHLE	47P	0207	1	DRALORIC		L
12R 76	0001-0006.997	R-KOEHLE	4K7	0207	1	DRALORIC		L
12R 77	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC		L
12R 78	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC		L
12R 79	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
12R 80	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
12R 81	0001-0006.955	R-KOEHLE	2K2	0207	1	DRALORIC		L
12R 82	0001-0006.926	R-KOEHLE	1K2	0207	1	DRALORIC		L
12P 83	0001-0006.722	R-KOEHLE	47R	0207	1	DRALORIC		L
12R 84	0001-0006.900	R-KOEHLE	820R	0207	1	DRALORIC		L
12R 85	0001-0006.942	R-KOEHLE	1K8	0207	1	DRALORIC		L
12P 86	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		L
12R 87	0001-0007.064	R-KOEHLE	18K	0207	1	DRALORIC		L
12P 88	0001-0007.048	R-KOEHLE	12K	0207	1	DRALORIC		L
12R 89	0001-0006.890	R-KOEHLE	680R	0207	1	DRALORIC		L
12P 90	0001-0006.722	R-KOEHLE	47R	0207	1	DRALORIC		L
12R 91	0001-0006.955	R-KOEHLE	2K2	0207	1	DRALORIC		L
12P 92	0001-0007.051	R-KOEHLE	15K	0207	1	DRALORIC		L
12F 93	0001-0007.048	R-KOEHLE	12K	0207	1	DRALORIC		L
12R 96	0001-0006.722	R-KOEHLE	47K	0207	1	DRALORIC		L
12P 97	0001-0002.360	P-METALL	18K2	TK 50	1	DRALORIC		L
12R 98	0001-0002.137	R-METALL	10K	TK 50	1	DRALORIC		L
12R 99	0001-0007.116	R-KOEHLE	47K	0207	1	018/03/01		L
12ST 1	0855-0007.005	STECKER	BN 855	A 2 KPL	1			L
12ST 2	0855-0007.005	STECKER	BN 855	A 2 KPL	1			L
12T 1	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 10	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 11	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 14	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 15	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 16	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
12T 17	0001-0016.903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
13C 1	0001-0004.821	C-KERAMIK EDFT	22N	R10000 2	1	110/02/10		L
13C 2	0001-0041.525	ELKO-TA SINT FLUOSS	100U	ETAN-3	1	ERO-TANTAL		L
13C 3	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		L
13C 5	0001-0004.818	C-KERAMIK EDFT	10N	R10000 2	1	110/02/10		L
13C 10	0001-0040.720	ELKO-TA SINT FEST	1U5	ETR-1	1	110/05/61		L
13GL 5	0001-0018.493	DIODE SI	1 N 4448	D0 35	1	ITT		L
13IC 1	0001-0067.567	IC-CMOS	4028FCP	DIP 16	1	MOTOROLA		L
13IC 2	0001-0072.390	IC-LOC'POS	40098EP	DIP 16	1	VALVO		L

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SEFIE W 0955-8401-000 SPM-15 955/01 AUSF.:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG WERKNORM QU REF-DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
131C 3	0001-0072-390	IC-LOGMOS	40098BP	DIP 16	1		
131C 4	0001-0070-884	IC-CMOS	4081BCP	DIP 14	1		
131C 5	0000-7580-918	IC-LOGMOS	40373BP	DIP 20	1		
131C 6	0001-0072-390	IC-LOGMOS	40098BP	DIP 16	1		
131C 7	0000-7580-918	IC-LOGMOS	40373BP	DIP 20	1		
13R 1	0001-0006-557	R-KOEHLE	1R	0207	1		
13R 2	0000-7541-494	R-MODUL	9X100K	5X 0207	1		
13R 3	0000-7576-896	R-MODUL	5X100K	5X 0M1	1		
13R 4	0000-7541-494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1		
13R 5	0001-0006-557	R-KOEHLE	1R	TK250 EXB-F10E-104J	1		
13R 6	0001-0006-874	R-KOEHLE	470R	56	1		
13R 10	0001-0007-035	R-KOEHLE	10K	56	1		
14BU 1	0000-7604-904	FEDERLEISTE C/2	48	3 2,54X2,54 S1 AU C143-012A-48S(C) #41612T2	1		M-..
15BU 103	0000-1637-074	WINKELBU. 75 OHM KPL	ENC	50 M D 5,0 CR EL 26,7 551K504-106A4	1		
15BU 104	0000-7598-696	HF-BUCHSE	2+E M EB	LT 4 100-3713-006/4	1		
15BU 201	0000-3713-006	TF-BUCHSE	2+E M EB	LT 4 100-3713-006/4	1		
15BU 401	0000-3713-006	TF-BUCHSE	2+E M EB	LT 4 100-3713-006/4	1		
15C 1	0001-0010-378	C-KF MKT	100N	20X 100V	1		
15C 2	0001-0004-384	C-KERAMIK EDPT	47P	2X 63V	1		
15C 4	0001-0010-323	C-KF MKT	47N	20X 250V	1		
15C 6	0001-0004-591	C-KERAMIK EDPT	180P	2X 63V	1		
15C 7	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 8	0001-0010-323	C-KF MKT	47N	20X 250V	1		
15C 10	0001-0004-591	C-KERAMIK EDPT	180P	2X 63V	1		
15C 12	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 14	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 16	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 17	0001-0004-384	C-KERAMIK EDPT	47P	2X 63V	1		
15C 18	0001-0041-114	ELKO-TA SINT FEST	68U	20X 16V	1		
15C 19	0001-0041-185	ELKO-TA SINT FEST	150U	20X 6V3	1		
15C 22	0001-0004-821	C-KERAMIK EDPT	22N	20/80 40V	1		
15C 23	0001-0041-842	ELKO-AL	220U	10/50 16V	1		
15C 101	0001-0004-821	C-KERAMIK EDPT	22N	20/80 40V	1		
15C 102	0001-0004-821	C-KERAMIK EDPT	22N	20/80 40V	1		
15C 103	0001-0040-775	ELKO-TA SINT FEST	3U3	20X 16V	1		
15C 104	0001-0040-775	ELKO-TA SINT FEST	3U3	20X 16V	1		
15C 105	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 106	0001-0041-156	ELKO-TA SINT FEST	100U	20X 10V	1		
15C 107	0001-0041-114	ELKO-TA SINT FEST	68U	20X 16V	1		
15C 108	0001-0004-834	C-KERAMIK EDPT	1P	OP25 63V	1		
15C 109	0001-0004-025	C-KERAMIK EDPT	2P7	OP25 63V	1		
15C 110	0000-7547-223	C-TRIK. KER SCHEIDE	2P5-5P NP 0	0,51 PPKY BR 301504111	1		
15C 111	0001-0004-818	C-KERAMIK EDPT	10N	20/100 40V	1		
15C 112	0001-0040-966	ELKO-TA SINT FEST	22U	20X 16V	1		
15C 114	0001-0041-842	ELKO-AL	220U	10/50 16V	1		

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SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BEZEICHNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG WERKNORM QU REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
15C 115	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 116	0000-7619-274	C-KERAMIK KDPD	470N 20%	X7R	1			L
15C 117	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	VP436Y474MAA		L
15C 118	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 119	0001-0040-704	ELKO-TA SINT FEST	1U 20%	ETR-1	1			L
15C 120	0001-0041-156	ELKO-TA SINT FEST	100U 20%	ETR-4	1		C---	L
15C 121	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1		G---	L
15C 122	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 124	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 125	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 126	0000-7535-303	C-TRIM KER SCHEIBE	3P5- 20P NP 0	20 BR 301504114	21			L
15C 127	0001-0004-067	C-KERAMIK EDPT	3F9 0P25	NP 0 1B	1			L
15C 129	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 130	0001-0004-449	C-KERAMIK EDPT	68P 2%	NP 0 1R	1			L
15C 131	0001-0010-378	C-KF MKT	100M 20%	MKT1822	1			L
15C 132	0001-0004-384	C-KERAMIK EDPT	47P 2%	NP 0 1B	1			L
15C 133	0001-0004-504	C-KERAMIK EDPT	100P 2%	NP 0 1B	1			L
15C 134	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 136	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 137	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 139	0001-0040-856	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 140	0001-0010-417	C-KF MKT	6U8 20%	ETR-3	1			L
15C 141	0001-0040-966	ELKO-TA SINT FEST	22U 20%	MKT1822	1			L
15C 142	0001-0010-297	C-KF MKT	22U 20%	ETR-3	1			L
15C 143	0001-0040-830	ELKO-TA SINT FEST	33N 20%	MKT1822	1			L
15C 145	0001-0004-818	C-KERAMIK EDPT	6U8 20%	ETR-1	1			L
15C 146	0001-0004-818	C-KERAMIK EDPT	10N 20/100	R10000 2	1			L
15C 147	0001-0004-818	C-KERAMIK EDPT	10N 20/100	R10000 2	1			L
15C 148	0001-0004-818	C-KERAMIK EDPT	10N 20/100	R10000 2	1			L
15C 202	0001-0010-378	C-KF MKT	100N 20%	R10000 2	1			L
15C 206	0001-0040-966	ELKO-TA SINT FEST	100N 20%	MKT1822	1			L
15C 207	0001-0004-821	C-KERAMIK EDPT	22U 20%	ETR-3	1			L
15C 208	0001-0040-966	ELKO-TA SINT FEST	22N 20/ 80	R10000 2	1			L
15C 209	0001-0004-821	C-KERAMIK EDPT	22U 20%	ETR-3	1			L
15C 210	0001-0040-966	ELKO-TA SINT FEST	22N 20/ 80	R10000 2	1			L
15C 211	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 402	0001-0010-501	C-KF MKT	1U 10%	R10000 2	1			L
15C 405	0001-0040-775	ELKO-TA SINT FEST	3U3 20%	ETR-1	1			L
15C 406	0001-0040-775	ELKO-TA SINT FEST	3U3 20%	ETR-1	1			L
15C 407	0000-7586-080	C-KF KP	9N31 1%	R33531	1			L
15C 408	0000-7568-040	C-KF KP	16N5 1%	R33531	1			L
15C 409	0000-7618-987	C-KF KP	1M4 1%	R33531	1			L
15C 411	0000-7575-774	C-KF KP	24N9 1%	R33531	1			L
15C 412	0000-7618-990	C-KF KP	576P 1%	R33531	1			L
15C 414	0001-0010-417	C-KF MKT	220M 20%	MKT1822	1			L
15C 415	0001-0040-801	ELKO-TA SINT FEST	4U7 20%	ETR-1	1			L
15C 416	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 417	0001-0040-966	ELKO-TA SINT FEST	22U 20%	ETR-3	1			L
15C 418	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1			L
15C 419	0001-0010-378	C-KF MKT	100H 20%	MKT1822	1			L
15C 420	0001-0041-790	ELKO-TA	100U 10/ 50	R41588	1			L

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BLATT 27 07.05.87

SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BEFENNRUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
151C 211	0000-7609.585	IC-D/A-WANDLER	AD7545KN	DIP 20	MOS	1	ANAL. DEV		L
151C 212	0000-7579.602	IC-OP.-VERST.	UA714LHC	TO 99		1	FSC		L
151C 213	0001-0061.987	IC-CMOS	4042BCP	DIP 16	MOS	1	MOTOROLA		L
151C 225	0001-0015.836	IC-OP.-VERST.	UA776TC	DIP 8		1	FSC		L
151C 226	0001-0068.359	IC-TRANS ARRAY	CA3083	DIP 16		1	RCA		L
151C 227	0001-0061.987	IC-CMOS	4042BCP	DIP 16	MOS	1	MOTOROLA		L
151C 229	0000-7580.109	IC-OP.-VERST. FET	TL061CP	DIP 8		1	TEXAS		L
151C 230	0000-7580.109	IC-OP.-VERST. FET	TL061CP	DIP 8		1	TEXAS		L
151C 231	0000-7576.650	IC-OP.-VERST.	OP20HF	DIP 8		1	PMI	B---	L
151C 232	0000-7580.109	IC-OP.-VERST. FET	TL061CP	DIP 8		1	TEXAS		L
151C 233	0001-0067.554	IC-CMOS	4066BCP	DIP 14	MOS	1	MOTOROLA		L
151C 234	0000-7580.109	IC-OP.-VERST. FET	TL061CP	DIP 8		1	TEXAS		L
151C 401	0001-0067.156	IC-TTL	74LS04N	DIP 14		1	TEXAS		L
151C 402	0001-0065.695	IC-TTL	74LS00N	DIP 14		1	TEXAS		L
151C 403	0000-7619.300	IC-DUAL OP.-VERST.	UA747PC	DIP 14		1	FSC		L
151C 404	0001-0067.554	IC-CMOS	4066BCP	DIP 14	MOS	1	MOTOROLA		L
151C 405	0001-0016.042	IC-CMOS	4027BCP	DIP 16	MOS	1	MOTOROLA		L
151C 406	0000-7555.901	IC-TTL	74LS93N	DIP 14		1	TEXAS		L
151C 407	0000-7641.051	IC-DUAL OP.-VERST.	TE E235B	DIP 8	DARLINGTON EINGANG	1	SIEMENS	B---	L
151C 408	0000-7619.300	IC-DUAL OP.-VERST.	UA747PC	DIP 14		1	FSC		L
151C 409	0001-0068.498	IC-CMOS	4520BCP	DIP 16	MOS	1	MOTOROLA		L
15L 1	0001-0066.898	L-FEST	56U 5%	1537-64	40 2,5	1	117/01/02		L
15L 102	0000-7556.117	L-FEST	303 10%	1025-32	40 7,9 90	1	117/01/03		L
15L 401	0000-7556.337	L-FEST	220U 10%	1025-76	30 0,8 9 21R	1	117/01/03		L
15LSF401	0000-7607.969	LAUTSPRECHER	25 OHM	0,3W 310	A00198Z25	1	VALVO		L
15P 1	0000-7537.916	R-TRIM GERMET SQUARE	5K 10%	0W2 20	TV 100	1	1017/04/06		L
15P 1	0000-7604.959	R-VAR KOHLE KNOPF-	10K 20%	0W15 LIN	240 61500-003	1	PREH	---	L
15P 101	0001-0008.270	R-TRIM GERMET LIEG	1K 20%	0W5 1	TK 100	1	1017/02/15		L
15P 102	0001-0008.322	R-TRIM GERMET LIEG	22K 20%	0W5 1	TK 100	1	1017/02/15		L
15P 103	0000-7571.723	R-TRIM GERMET SQUARE	1K 10%	0W2 20	TK 100	1	1017/04/06		L
15P 201	0000-7518.252	R-TRIM GERMET SPIND.	100K 10%	0W5 15	TK 100	1	CONTELEC	K---	L
15P 202	0001-0007.569	R-TRIM DRAHT SPINDEL	20P 10%	0W7 20	TK 100	1	1017/04/04		L
15P 203	0001-0007.491	R-TRIM DRAHT SPINDEL	200P 10%	0W7 20	TK 100	1	1017/04/04		L
15P 205	0001-0007.530	R-TRIM DRAHT SPINDEL	2K 10%	0W7 20	TK 100	1	1017/04/04		L
15P 206	0001-0007.556	R-TRIM DRAHT SPINDEL	10K 10%	0W7 20	TK 100	1	1017/04/04		L
15P 210	0001-0007.527	R-TRIM DRAHT SPINDEL	1K 10%	0W7 20	TK 100	1	1017/04/04		L
15P 211	0001-0007.527	R-TRIM DRAHT SPINDEL	1K 10%	0W7 20	TK 100	1	1017/04/04		L
15P 401	0001-0008.267	R-TRIM GERMET LIEG	1470R 20%	0W5 1	TK 100	1	1017/02/15		L
15P 402	0001-0008.319	R-TRIM GERMET LIEG	10K 20%	0W5 1	TK 100	1	1017/02/15		L
15Q 401	0955-9707.004	STUEFKWARTZ	12.134,400KHZ	M 4 C		1			L
15Q 402	0955-9706.005	STUEFKWARTZ	8.345,600KHZ	M 4 C		1			L
15R 1	0001-0002.137	R-METALL	10K 1%	0207	TV 50	1	DRALORIC		L
15R 2	0001-0001.840	R-METALL	4K99 1%	0207	TV 50	1	DRALORIC		L
15P 3	0001-0002.030	R-METALL	7F87 1%	0207	TV 50	1	DRALORIC		L
15R 5	0000-7608.366	R-METALL	1F91 0%	0207	TV 15	1	1018/04/01		L
15R 6	0000-7559.046	R-METALL	604R 0%	0207	TV 15	1	1018/04/01		L

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SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
15R 7	0000-7622-737	R-METALL	191R	0207	TK 15	1	018/04/01		L
15R 8	0000-7610-325	R-METALL	101R	0207	TK 15	1	018/04/01		L
15R 9	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 10	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 11	0001-0007-336	R-KOEHLE	3K3	0207		1	DRALORIC		L
15R 12	0001-0007-336	R-KOEHLE	3M3	0207		1	DRALORIC		L
15R 13	0000-7514-298	R-METALL	150R	0207	TK 15	1	018/04/01		L
15R 14	0001-0003-219	R-METALL	1K	0207	TK 50	1	DRALORIC		L
15R 15	0001-0062-326	R-METALL	34K8	0207	TK 50	1	DRALORIC		L
15R 17	0000-7608-366	R-METALL	1K91	0207	TK 15	1	018/04/01		L
15R 18	0000-7559-046	R-METALL	604R	0207	TK 15	1	018/04/01		L
15R 19	0000-7622-737	R-METALL	191R	0207	TK 15	1	018/04/01		L
15R 20	0000-7610-325	R-METALL	101R	0207	TK 15	1	018/04/01		L
15R 21	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 22	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 23	0001-0007-336	R-KOEHLE	3M3	0207		1	DRALORIC		L
15R 24	0001-0007-336	R-KOEHLE	3M3	0207		1	DRALORIC		L
15R 25	0000-7514-298	R-METALL	150R	0207	TK 15	1	018/04/01		L
15R 26	0001-0001-219	R-METALL	1K	0207	TK 50	1	DRALORIC		L
15R 27	0001-0062-326	R-METALL	34K8	0207	TK 50	1	DRALORIC		L
15R 28	0001-0006-722	R-KOEHLE	47R	0207		1	DRALORIC		L
15R 29	0001-0002-438	R-METALL	21K5	0207	TK 50	1	DRALORIC		L
15R 30	0001-0001-565	R-METALL	2K61	0207	TK 50	1	DRALORIC		L
15R 31	0001-0006-971	R-KOEHLE	3K3	0207		1	DRALORIC		L
15R 32	0001-0006-719	R-KOEHLE	39R	0207		1	DRALORIC		L
15R 33	0001-0002-137	R-METALL	10K	0207	TK 50	1	DRALORIC		L
15R 34	0001-0002-137	R-METALL	10K	0207	TK 50	1	DRALORIC		L
15R 35	0001-0006-447	R-METALL	14K3	0207	TK 50	1	DRALORIC		L
15R 38	0001-0006-641	R-KOEHLE	10R	0207		1	DRALORIC		L
15R 39	0000-7541-494	R-MODUL	9X100K	5X 0W1	TK250	1	018/06/01		L
15R 40	0000-7541-494	R-MODUL	9X100K	5X 0W1	TK250	1	018/06/01		L
15R 41	0000-7599-048	R-METALL	172R	0207	TK 15	1	018/04/01		L
15R 42	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 45	0000-7599-048	R-METALL	172R	0207	TK 15	1	018/04/01		L
15R 46	0000-7511-136	R-METALL	100R	0207	TK 15	1	018/04/01		L
15R 101	0001-0006-557	R-KOEHLE	1R	0207		1	DRALORIC		L
15R 102	0001-0007-116	R-KOEHLE	47K	0207		1	DRALORIC		L
15R 103	0001-0007-158	R-KOEHLE	100K	0207		1	DRALORIC		L
15R 104	0001-0000-456	R-METALL	75R	0207	TK 50	1	DRALORIC		L
15R 105	0001-0000-456	R-METALL	75R	0207	TK 50	1	DRALORIC		L
15R 106	0000-7618-974	R-MODUL	5X 1M	5X 0W1	TK250	1	MATSUSHIT		L
15R 107	0001-0000-537	R-METALL	100R	0207	TK 50	1	DRALORIC		L
15R 108	0001-0000-537	R-METALL	100R	0207	TK 50	1	DRALORIC		L
15R 109	0001-0007-035	R-KOEHLE	10K	0207		1	DRALORIC		L
15R 110	0001-0007-284	R-KOEHLE	1M	0207		1	DRALORIC		L
15R 112	0001-0001-219	R-METALL	1K	0207	TK 50	1	DRALORIC		L
15R 113	0000-7555-228	0-OHM WIDERSTAND	0,6	0207	100-902	1	VITROHM		S
15R 114	0001-0002-991	R-METALL	100K	0207	TK 50	1	DRALORIC		L
15R 115	0001-0002-425	R-METALL	21K	0207	TK 50	1	DRALORIC		L
15R 116	0001-0002-522	R-METALL	27K4	0207	TK 50	1	DRALORIC		L
15R 117	0001-0006-829	R-KOEHLE	180R	0207		1	DRALORIC		L

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SERIE M 0955-8401-000 SPM-T5 9.55/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE A F VERSION	C
15R 118	0001-0001-329	R-METALL	1K37	TK 50	1	DRALORIC			L
15R 119	0001-0065-103	R-METALL	12R1	TK 50	1	DRALORIC			L
15R 120	0001-0002-195	R-METALL	11K5	TK 50	1	DRALORIC			L
15R 121	0001-0006-683	R-KOEHLE	22R	TK 50	1	DRALORIC			L
15R 122	0001-0002-108	R-METALL	9K31	TK 50	1	DRALORIC			L
15R 126	0001-0003-327	R-METALL	422K	TK 50	1	DRALORIC			L
15R 127	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15R 128	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15R 129	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15R 130	0001-0006-793	R-KOEHLE	100R	TK 50	1	DRALORIC			L
15R 131	0001-0007-048	R-KOEHLE	12K	TK 50	1	DRALORIC			L
15R 132	0001-0006-586	R-KOEHLE	2R2	TK 50	1	DRALORIC			L
15R 133	0001-0006-719	R-KOEHLE	39R	TK 50	1	DRALORIC			L
15R 134	0001-0001-426	R-METALL	1K87	TK 50	1	DRALORIC			L
15R 135	0001-0006-683	R-KOEHLE	22R	TK 50	1	DRALORIC			L
15R 136	0001-0007-190	R-KOEHLE	220K	TK 50	1	DRALORIC			L
15R 137	0001-0002-629	R-METALL	36K5	TK 50	1	DRALORIC			L
15R 138	0001-0006-586	R-KOEHLE	2R2	TK 50	1	DRALORIC			L
15P 139	0001-0001-798	R-METALL	4K53	TK 50	1	DRALORIC			L
15R 140	0001-0001-277	R-METALL	1K21	TK 50	1	DRALORIC			L
15R 141	0001-0006-751	R-KOEHLE	68R	TK 50	1	DRALORIC			L
15P 142	0001-0006-751	R-KOEHLE	68R	TK 50	1	DRALORIC			L
15R 143	0001-0065-242	R-METALL	43R2	TK 50	1	DRALORIC			L
15R 144	0001-0000-443	R-METALL	71R5	TK 50	1	DRALORIC			L
15R 145	0001-0000-456	R-METALL	75R	TK 50	1	DRALORIC			L
15R 146	0001-0007-132	R-KOEHLE	68K	TK 50	1	DRALORIC			L
15R 147	0001-0007-116	R-KOEHLE	47K	TK 50	1	DRALORIC			L
15R 150	0001-0006-696	R-KOEHLE	27R	TK 50	1	DRALORIC			L
15R 151	0001-0006-722	R-KOEHLE	47R	TK 50	1	DRALORIC			L
15R 152	0001-0006-793	R-KOEHLE	100R	TK 50	1	DRALORIC			L
15R 153	0001-0006-683	R-KOEHLE	22R	TK 50	1	DRALORIC			L
15R 154	0001-0006-997	R-KOEHLE	4K7	TK 50	1	DRALORIC			L
15R 155	0001-0001-125	R-METALL	750R	TK 50	1	DRALORIC			L
15R 156	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC			L
15R 157	0001-0006-887	R-KOEHLE	560R	TK 50	1	DRALORIC			L
15P 158	0001-0065-158	R-METALL	20R	TK 50	1	DRALORIC			L
15R 159	0001-0006-874	R-KOEHLE	470R	TK 50	1	DRALORIC			L
15R 160	0001-0006-926	R-KOEHLE	1K2	TK 50	1	DRALORIC			L
15R 161	0001-0007-255	R-KOEHLE	560K	TK 50	1	DRALORIC			L
15R 162	0001-0006-793	R-KOEHLE	100R	TK 50	1	DRALORIC			L
15R 163	0001-0007-239	R-KOEHLE	470K	TK 50	1	DRALORIC			L
15R 164	0001-0001-125	R-METALL	750R	TK 50	1	DRALORIC			L
15R 165	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC			L
15R 166	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC			L
15R 170	0001-0006-683	R-KOEHLE	22R	TK 50	1	DRALORIC			L
15R 171	0001-0000-524	R-METALL	93R1	TK 50	1	DRALORIC			L
15R 172	0001-0006-997	R-KOEHLE	4K7	TK 50	1	DRALORIC			L
15P 173	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 174	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 175	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15P 176	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L

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SEPIE M 0955-8401-000

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	PG QU	WERKNORM REF.-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
15F 177	0001-0006.751	R-KOHL	68R	0207	1	DRALORIC		L
15R 180	0001-0007.035	R-KOHL	10K	0207	1	DRALORIC		L
15R 181	0001-0007.239	R-KOHL	470K	0207	1	018/03/01		L
15R 182	0001-0001.293	R-METALL	1K 27	TK 50	1	DRALORIC		L
15R 183	0001-0001.219	R-METALL	1K	TK 50	1	DRALORIC		L
15R 184	0001-0006.751	R-KOHL	68R	0207	1	DRALORIC		L
15P 185	0001-0002.111	R-METALL	9K53	TK 50	1	DRALORIC		L
15R 203	0000-7576.896	R-MODUL	5X100K	TK250 EXB-F6E-104J	1	MATSUSHITA		L
15R 204	0001-0002.182	R-METALL	1K 3	TK 50	1	DRALORIC		L
15R 205	0001-0001.675	R-METALL	3K4	TK 50	1	DRALORIC		L
15R 207	0001-0002.247	R-METALL	13K3	TK 50	1	DRALORIC		L
15R 208	0000-7572.078	R-METALL	16K	TK 15	1	DRALORIC		L
15P 209	0000-7512.698	R-METALL	4K02	TK 15	1	018/04/01		L
15R 211	0000-7559.059	R-METALL	887R	TK 15	1	018/04/01		L
15R 212	0000-7503.270	R-METALL	10K	TK 15	1	018/04/01		L
15R 213	0000-7608.353	R-METALL	1K93	TK 15	1	018/04/01		L
15R 214	0000-7577.756	R-METALL	5K11	TK 15	1	018/04/01		L
15R 215	0000-7622.643	R-METALL	2K05	TK 15	1	018/04/01		L
15R 216	0000-7550.317	R-METALL	12K3	TK 15	1	018/04/01		L
15R 217	0000-7548.510	R-METALL	3K24	TK 15	1	018/04/01		L
15R 218	0000-7519.620	R-METALL	2K	TK 15	1	018/04/01		L
15R 219	0001-0000.537	R-METALL	100R	TK 50	1	DRALORIC		L
15R 220	0000-7563.812	R-METALL	2K8	TK 15	1	018/04/01		L
15R 221	0000-7572.049	R-METALL	7K15	TK 15	1	018/04/01		L
15R 240	0000-7503.173	R-METALL	1K05	TK 15	1	018/04/01		L
15R 241	0000-7604.674	R-METALL	1K38	TK 15	1	018/04/01		L
15R 242	0000-7609.297	R-METALL	14K7	TK 15	1	018/04/01		L
15R 243	0000-7608.230	R-METALL	13K0	TK 15	1	018/04/01		L
15R 244	0000-7608.243	R-METALL	11K8	TK 15	1	018/04/01		L
15R 245	0000-7598.227	R-METALL	11K	TK 15	1	018/04/01		L
15R 247	0001-0007.268	R-KOHL	680K	TK 15	1	018/03/01		L
15R 250	0000-7609.310	R-METALL	19K6	TK 15	1	018/04/01		L
15R 251	0000-7609.310	R-METALL	19K6	TK 15	1	018/04/01		L
15R 252	0000-7609.310	R-METALL	19K6	TK 15	1	018/04/01		L
15R 253	0000-7609.310	R-METALL	19K6	TK 15	1	018/04/01		L
15R 255	0000-7512.795	R-METALL	18K7	TK 15	1	018/04/01		L
15R 256	0000-7609.307	R-METALL	15K2	TK 15	1	018/04/01		L
15R 257	0000-7519.808	R-METALL	12K4	TK 15	1	018/04/01		L
15P 258	0000-7503.270	R-METALL	10K	TK 15	1	018/04/01		L
15R 260	0000-7510.140	R-METALL	100K	TK 15	1	018/04/01		L
15R 261	0000-7503.270	R-METALL	10K	TK 15	1	018/04/01		L
15R 262	0000-7503.270	R-METALL	10K	TK 15	1	018/04/01		L
15R 263	0000-7503.270	R-METALL	10K	TK 15	1	018/04/01		L
15R 264	0000-7555.011	R-METALL	20K	TK 15	1	018/04/01		L
15P 265	0001-0002.056	R-METALL	8K25	TK 15	1	DRALORIC		L
15R 266	0000-7503.270	R-METALL	10K	TK 50	1	DRALORIC		L
15R 272	0000-7555.011	R-METALL	20K	TK 15	1	018/04/01		L
15R 273	0000-7572.120	R-METALL	23K7	TK 15	1	018/04/01		L
15R 274	0000-7512.630	R-METALL	1K3	TK 15	1	018/04/01		L
15P 276	0000-7588.570	R-METALL	49K9	TK 15	1	018/04/01		L
15P 277	0000-7568.998	R-METALL	22K1	TK 15	1	018/04/01		L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF., DESIG	BEMERKUNG NOTE	SERIE AT VERSION	C
15R 280	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15R 282	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC			L
15P 283	000C-7555-011	R-METALL	20K	TK 15	1	018/04/01			L
15P 284	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC			L
15R 285	0001-0002-043	R-METALL	8K06	TK 50	1	DRALORIC			L
15R 286	0001-0001-675	K-METALL	3K4	TK 50	1	DRALORIC			L
15R 287	0001-0001-714	R-METALL	3K74	TK 50	1	DRALORIC			L
15R 290	0001-0000-812	R-METALL	316R	TK 50	1	DRALORIC			L
15R 291	0001-0001-840	R-METALL	4K99	TK 50	1	DRALORIC			L
15P 292	0001-0002-014	R-METALL	7K5	TK 50	1	DRALORIC			L
15P 293	0001-0007-035	R-KOEHLE	10K	TK 50	1	DRALORIC			L
15R 294	0001-0006-719	R-KOEHLE	39R	TK 50	1	DRALORIC			L
15R 295	0001-0006-557	R-KOEHLE	1R	TK 50	1	DRALORIC			L
15P 296	0001-0006-667	R-KOEHLE	15P	TK 50	1	DRALORIC			L
15P 297	0001-0006-557	R-KOEHLE	1R	TK 50	1	DRALORIC			L
15P 298	0001-0006-719	R-KOEHLE	39R	TK 50	1	DRALORIC			L
15R 299	0001-0006-557	R-KOEHLE	1R	TK 50	1	DRALORIC			L
15R 300	0000-7598-230	R-METALL	29K8	TK 15	1	016/04/01			L
15R 301	0000-7590-380	R-METALL	5K62	TK 15	1	018/04/01			L
15P 302	0001-0007-035	R-KOEHLE	10K	TK 50	1	DRALORIC			L
15R 304	0001-0007-158	R-KOEHLE	100K	TK 50	1	DRALORIC			L
15R 401	0001-0006-777	R-KOEHLE	82R	TK 50	1	DRALORIC			L
15R 402	0001-0001-840	R-METALL	4K99	TK 50	1	DRALORIC			L
15P 403	0001-0001-455	R-METALL	2K	TK 50	1	DRALORIC			L
15P 404	0001-0002-218	R-METALL	12K1	TK 50	1	DRALORIC			L
15R 405	0001-0001-950	R-METALL	6K49	TK 50	1	DRALORIC			L
15P 406	0001-0006-984	R-KOEHLE	3K9	TK 50	1	DRALORIC			L
15P 407	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
15P 408	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
15P 409	0001-0002-580	R-METALL	31K6	TK 50	1	DRALORIC			L
15R 412	0001-0002-580	R-METALL	31K6	TK 50	1	DRALORIC			L
15R 413	0001-0002-580	R-METALL	31K6	TK 50	1	DRALORIC			L
15R 415	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
15R 416	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
15P 417	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15P 418	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15P 420	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 421	0001-0007-035	R-KOEHLE	10K	TK 50	1	DRALORIC			L
15R 422	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 423	0001-0001-976	R-METALL	6K81	TK 50	1	DRALORIC			L
15R 424	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 425	0001-0002-179	R-METALL	11K	TK 50	1	DRALORIC			L
15R 426	0001-0001-976	R-METALL	6K81	TK 50	1	DRALORIC			L
15R 428	0001-0002-069	R-METALL	8K45	TK 50	1	DRALORIC			L
15R 430	0001-0002-137	R-METALL	39R	TK 50	1	DRALORIC			L
15P 431	0001-0065-365	R-METALL	10K	TK 50	1	DRALORIC			L
15R 432	0001-0001-031	R-METALL	53K6	TK 50	1	DRALORIC			L
15R 433	0001-0006-719	R-KOEHLE	604R	TK 50	1	DRALORIC			L
15P 434	0001-0002-807	R-METALL	39R	TK 50	1	DRALORIC			L
15P 435	0001-0002-687	R-METALL	57K6	TK 50	1	DRALORIC			L
			42K2	TK 50	1	DRALORIC			L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
15R 436	0001-0006-861	R-KOEHLE	390R	5X 0207	1	DRALORIC		L
15R 437	0001-0002-357	R-METALL	17K8	1X 0207	1	DRALORIC		L
15R 438	0001-0001-219	R-METALL	1K	1X 0207	1	DRALORIC		L
15R 439	0001-0002-991	R-METALL	100K	1X 0207	1	DRALORIC		L
15R 440	0001-0007-035	R-KOEHLE	10K	5X 0207	1	DRALORIC		L
15R 441	0001-0007-158	R-KOEHLE	100K	5X 0207	1	018/03/01		L
15R 442	0001-0007-035	R-KOEHLE	10K	5X 0207	1	DRALORIC		L
15P 443	0000-7618-961	R-MOODVL	5X 2K2	5X 0M1	1	018/06/01		L
15P 445	0001-0006-816	R-KOEHLE	150R	5X 0207	1	DRALORIC		L
15R 449	0001-0006-816	R-KOEHLE	150R	5X 0207	1	DRALORIC		L
15R 450	0001-0006-557	R-KOEHLE	1R	5X 0207	1	DRALORIC		L
15R 451	0001-0006-557	R-KOEHLE	1R	5X 0207	1	DRALORIC		L
15R 452	0001-0006-609	R-KOEHLE	4K7	5X 0207	1	DRALORIC		L
15R 453	0001-0006-719	R-KOEHLE	39R	5X 0207	1	DRALORIC		L
15R 454	0001-0006-557	R-KOEHLE	1R	5X 0207	1	DRALORIC		L
15REL101	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V	1K5 HD	1	SDS		L
15REL102	0000-7619-326	RELAIS GEPOLT BISTAB	001 AU 12V	1K5 HD	1	SDS		L
15S 401	0000-1832-015	S-DUAL-IN-LINE	1 100 SN HAKEN-		1	SIEMENS		L
15ST 102	0000-2682-002	HF-STECKER	SUBMINAX 75A 75 V A		1	119/08/03		L
15ST 103	0000-2682-002	HF-STECKER	SUBMINAX 75A 75 V A		1	119/08/03		L
15T 1	0001-0016-518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TEK		L
15T 101	0001-0016-628	TRANS SI N JFET	BF 245 A	D SOT 54	1	VALVO		L
15T 102	0001-0016-550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
15T 104	0001-0016-903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
15T 105	0001-0016-712	TRANS SI PNP	2 N 4035 (BFX48)	A TO 18	1	SGS		L
15T 107	0001-0016-518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TEK		L
15T 108	0001-0016-518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TEK		L
15T 109	0001-0016-903	TRANS SI NPN	BFY 90	A TO 72	1	SIEMENS		L
15T 111	0000-7564-219	TRANS SI N V MOS	2 N 6660	6 TO 39	1	SILICONIX		L
15T 112	0001-0016-550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
15T 201	0000-7598-971	TRANS SI P DMOS	BS 250	G TO 92	1	ITT		L
15T 202	0001-0016-550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
15T 401	0000-7619-287	TRANS SI N V MOS	ES 170	6 TO 92	1	ITT		L
15T 402	0000-7619-287	TRANS SI N V MOS	BS 170	6 TO 92	1	ITT		L
15T 403	0001-0016-770	TRANS SI NPN	2 N 2219 (BFX97)	A TO 39	1	MOTOROLA		L
15T 404	0001-0017-287	TRANS SI PNP	2 N 2905	A TO 39	1	MOTOROLA		L
19C 1	0001-0010-378	C-KF MKT	100N	20X 100V	1	MKT1822		L
19C 2	0001-0010-378	C-KF MKT	100N	20X 100V	1	MKT1822		L
19C 3	0001-0004-203	C-KERAMIK EDPT	12F	2X 63V	1	NP 0 1B		L
19C 5	0001-0004-203	C-KERAMIK EDPT	12P	2X 63V	1	NP 0 1B		L
19C 6	0001-0004-203	C-KERAMIK EDPT	12P	2X 63V	1	NP 0 1B		L
19C 7	0001-0004-821	C-KERAMIK EDPT	22N	20/80 40V	1	R10000 2		L
19C 8	0000-7566-505	C-KF MKT	10N	20X 400V	1	MKT1822		L
19C 9	0000-7566-505	C-KF MKT	10N	20X 400V	1	MKT1822		L
19C 10	0001-0040-830	ELI-O-TA SINT FEST	6UR	20X 6V3	1	ETR-1		L

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TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
19C 11	0001-0040-775	ELKO-TA SINT FEST	303	20X	16V	1	110/05/61		L
19C 12	0001-0040-775	ELKO-TA SINT FEST	303	20X	16V	1	110/05/61		L
19C 20	0001-0004-698	C-KERAMIK ELPT	1N	10X	63W	1	110/02/10		L
19C 21	0001-0004-698	C-KERAMIK EDPT	1N	10X	63W	1	110/02/10		L
19C 22	0001-0004-287	C-KERAMIK EDPT	22F	2X	63V	1	110/02/09		L
19C 23	0001-0004-287	C-KERAMIK EDPT	22F	2X	63V	1	110/02/09		L
19C 25	0001-0010-161	C-KF MKT	303	10X	100V	1	110/03/06		L
19C 26	0001-0040-995	ELKO-TA SINT FEST	33U	20X	10V	1	110/05/61		L
196L 1	0001-0018-723	DIODE SI Z-	ZPD 3		00 35	1	ITT		L
196L 2	0001-0018-723	DIODE SI Z-	ZPD 3		00 35	1	ITT		L
196L 51	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
196L 52	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
196L 53	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
196L 54	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
196L 55	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
196L 56	0001-0018-493	DIODE SI	1 N 4448		00 35	1	ITT		L
19I 1	0955-8103-007	INSTRUMENT				1		F--	L
19IC 1	0000-7519-840	IC-CMOS	40506CP		DIP 16	1	MOTOROLA		L
19IC 2	0000-7519-840	IC-CMOS	40506CP		DIP 16	1	MOTOROLA		L
19IC 3	0000-7519-840	IC-CMOS	40506CP		DIP 16	1	MOTOROLA		L
19IC 4	0001-0070-884	IC-CMOS	4081BCP		DIP 14	1	MOTOROLA		L
19IC 5	0001-0071-016	IC-CMOS	4075BCP		DIP 14	1	MOTOROLA		L
19IC 6	0001-0015-988	IC-CMOS	4011BCP		DIP 14	1	MOTOROLA		L
19IC 7	0001-0068-197	IC CMOS	4049UBCP		DIP 16	1	MOTOROLA		L
19IC 8	0001-0067-567	IC-CMOS	4028BCP		DIP 16	1	MOTOROLA		L
19IC 9	0000-7580-918	IC-LOC MOS	40373BP		DIP 20	1	VALVO		L
19IC 10	0000-7594-603	IC-A/D-WANDLER	4433P		DIP 24	1	MOTOROLA		L
19IC 11	0001-0070-884	IC-CMOS	4081BCP		DIP 14	1	MOTOROLA		L
19IC 12	0000-7580-918	IC-LOC MOS	40373BP		DIP 20	1	VALVO		L
19IC 13	0001-0061-987	IC-CMOS	4042BCP		DIP 16	1	MOTOROLA		L
19IC 15	0001-0070-839	IC-CMOS	4508BCP		DIP 24	1	MOTOROLA		L
19IC 16	0001-0016-042	IC-CMOS	4027BCP		DIP 16	1	MOTOROLA		L
19IC 17	0001-0070-897	IC-CMOS	4077BCP		DIP 14	1	MOTOROLA		L
19IC 18	0000-7529-584	IC-CMOS	ICDP1824E		DIP 18	1	RCA		L
19IC 19	0001-0070-868	IC-CMOS	4082BCP		DIP 14	1	MOTOROLA		L
19IC 20	0001-0070-884	IC-CMOS	4081BCP		DIP 14	1	MOTOROLA		L
19IC 21	0000-7548-653	IC-CMOS	4503BCP		DIP 16	1	MOTOROLA		L
19IC 25	0001-0068-540	IC-CMOS	4572UBCP		DIP 16	1	MOTOROLA		L
19IC 26	0000-7514-845	IC-CMOS	4071BCP		DIP 14	1	MOTOROLA		L
19IC 27	0001-0070-884	IC-CMOS	4081BCP		DIP 14	1	MOTOROLA		L
19IC 28	0001-0068-197	IC CMOS	4049URCP		DIP 16	1	MOTOROLA		L
19IC 30	0001-0070-839	IC-CMOS	4508BCP		DIP 24	1	MOTOROLA		L
19IC 31	0000-7550-605	IC-CMOS	4561BCP		DIP 14	1	MOTOROLA		L
19IC 32	0001-0071-595	IC-CMOS	4560BCP		DIP 16	1	MOTOROLA		L
19IC 33	0000-7548-853	IC-CMOS	4503BCP		DIP 16	1	MOTOROLA		L
19IC 35	0001-0016-042	IC-CMOS	4027BCP		DIP 16	1	MOTOROLA		L
19IC 36	0001-0068-692	IC-CMOS	4516BCP		DIP 16	1	MOTOROLA		L
19IC 37	0000-7560-721	IC-CMOS	ICN75551PA		DIP 8	1	INTERSI		L

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SERIE M 0935-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKST REF-DESIG	REMERKUNG NOTE	SERIE AF VERSION
191C 50	0001-0067-567	IC-CMOS	4028BCP	DIP 16	MOS	MOTOROLA		L
191C 51	0001-0072-390	IC-LGCMOS	40098BP	DIP 16	858521	VALVO		L
191C 52	0001-0072-390	IC-LGCMOS	40098BP	DIP 16	858521	VALVO		L
191C 53	0001-0070-839	IC-CMOS	4508BCP	DIP 24	MOS	MOTOROLA		L
191C 55	0001-0015-988	IC-CMOS	4011BCP	DIP 14	MOS	MOTOROLA		L
191C 56	0001-0015-988	IC-CMOS	4011BCP	DIP 14	MOS	MOTOROLA		L
191C 57	0001-0070-868	IC-CMOS	4082BCP	DIP 14	MOS	MOTOROLA		L
191C 60	0001-0067-431	IC-CMOS	4047BE	DIP 14	MOS	RCA		L
191C 61	0001-0061-987	IC-CMOS	4042BCP	DIP 16	MOS	MOTOROLA		L
191C 62	0001-0016-055	IC-CMOS	4029BCP	DIP 16	MOS	MOTOROLA		L
191C 63	0000-7548-853	IC-CMOS	4503BCP	DIP 16	MOS	MOTOROLA		L
191C 64	0001-0016-055	IC-CMOS	4029BCP	DIP 16	MOS	MOTOROLA		L
191C 65	0000-7548-853	IC-CMOS	4503BCP	DIP 16	MOS	MOTOROLA		L
191C 66	0001-0016-055	IC-CMOS	4029BCP	DIP 16	MOS	MOTOROLA		L
191C 67	0001-0016-055	IC-CMOS	4029BCP	DIP 16	MOS	MOTOROLA		L
191C 68	0000-7548-853	IC-CMOS	4503BCP	DIP 16	MOS	MOTOROLA		L
191C 70	0001-0070-839	IC-CMOS	4508BCP	DIP 24	MOS	MOTOROLA		L
191C 71	0001-0070-839	IC-CMOS	4508BCP	DIP 24	MOS	MOTOROLA		L
191C 75	0000-7569-450	IC-CMOS	4504BCP	DIP 16	MOS	MOTOROLA		L
191C 76	0000-7569-450	IC-CMOS	4504BCP	DIP 16	MOS	MOTOROLA		L
191C 79	0001-0015-991	IC-CMOS	4013BCP	DIP 14	MOS	MOTOROLA		L
191C 80	0001-0015-991	IC-CMOS	4013BCP	DIP 14	MOS	MOTOROLA		L
191C 80	0001-0015-988	IC-CMOS	4011BCP	DIP 14	MOS	MOTOROLA		L
191C 92	0000-7599-417	IC-DUAL OPVERST. FET	TL062ACP	DIP 8	MOS	TEXAS		L
19R 1	0000-7541-494	R-MOBU	9X100K	5% 0W1	TK250 EXB-F10E-104J	018706/01		L
19R 2	0000-7541-494	R-MOBU	9X100K	5% 0W1	TK250 EXB-F10E-104J	018706/01		L
19R 5	0001-0007-035	R-KOHL	10K	5%		DRALORIC		L
19R 6	0001-0002-920	R-METALL	80K6	1%	TK 50	DRALORIC		L
19R 7	0001-0002-687	R-METALL	42K2	1%	TK 50	DRALORIC		L
19R 10	0001-0007-116	R-KOHL	47K	5%		018703/01		L
19R 11	0001-0002-771	R-METALL	52K3	1%	TK 50	DRALORIC		L
19R 13	0001-0006-913	R-KOHL	1K	5%		DRALORIC		L
19R 14	0001-0006-913	R-KOHL	1K	5%		DRALORIC		L
19R 15	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 16	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 17	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 18	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 19	0001-0006-913	R-KOHL	1K	5%		DRALORIC		L
19R 20	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 21	0001-0002-137	R-METALL	100K	1%	TK 50	DRALORIC		L
19R 22	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 23	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 24	0001-0006-913	R-KOHL	1K	5%		DRALORIC		L
19R 25	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 26	0001-0007-158	R-KOHL	100K	5%		018703/01		L
19R 27	0001-0002-564	R-METALL	30K1	1%	TK 50	DRALORIC		L
19R 28	0001-0002-564	R-METALL	30K1	1%	TK 50	DRALORIC		L
19R 29	0001-0006-913	R-KOHL	1K	5%		DRALORIC		L
19R 30	0001-0006-670	R-KOHL	18R	5%		DRALORIC		L
19R 31	0001-0006-719	R-KOHL	39K	5%		DRALORIC		L

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SERIE M 0955-8401-000 SPY-15 955/01

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	EZEICHNUNG 1 MARKING 1	EZEICHNUNG 2 MARKING 2	MG QU	WERKFORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION
19R 32	0001-0006.719	R-KOEHLE	39R	5X 0207	56	1 DRALORIC		L
19R 49	0001-0002.991	R-METALL	100K	1X 0207	56	1 DRALORIC		L
19R 50	0000-7580.662	R-MODUL	9X 1K	5X 0W1		1 018/06/01		L
19R 51	0001-0002.496	R-METALL	25K5	1X 0207	56	1 DRALORIC		L
19R 52	0001-0006.719	R-KOEHLE	39R	5X 0207	56	1 DRALORIC		L
19R 53	0001-0002.137	R-METALL	10K	1X 0207	56	1 DRALORIC		L
19R 54	0001-0006.913	R-KOEHLE	1K	5X 0207	56	1 DRALORIC		L
19R 55	0001-0007.051	R-KOEHLE	15K	5X 0207	56	1 DRALORIC		L
19R 56	0000-7555.228	0-OHM WIDERSTAND		100-902		1 VITROHM		S
19R 57	0000-7558.377	R-METALL	27K	1X 0207	56	1 DRALORIC		L
19R 58	0001-0000.472	R-METALL	82P5	1X 0207	56	1 DRALORIC		L
19R 59	0001-0000.472	R-METALL	82P5	1X 0207	56	1 DRALORIC		L
19R 60	0000-7555.228	0-OHM WIDERSTAND		0,6		1 VITROHM		S
19R 61	0000-7558.377	R-METALL	27K	1X 0207	56	1 DRALORIC		L
19R 65	0001-0007.213	R-KOEHLE	330K	5X 0207	56	1 018/03/01		L
19R 66	0001-0007.093	R-KOEHLE	33K	5X 0207	56	1 018/03/01		L
19S 1	0000-7567.999	S-DUAL-IN-LINE	1 100 AU SCHIEBE-	09 10000 39		1 013/06/06		L
19T 1	0001-0016.550	TRANS SI PNP	BCY 78 X (D) A TO 18			1 MOT		L
20C 1	0001-0004.782	C-KERAMIK EDPT	3N9	10X 63V	56	1 110/02/10		L
20C 2	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80 40V	56	1 110/02/10		L
20C 10	0001-0041.842	ELKO-AL	220U	10/ 50 16V	56	1 110/05/40		L
20C 11	0001-0041.842	ELKO-AL	220U	10/ 50 16V	56	1 110/05/40		L
20C 12	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80 40V	56	1 110/02/10		L
20C 13	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80 40V	56	1 110/02/10		L
20C 20	0001-0004.698	C-KERAMIK EDPT	1N	10X 63V	56	1 110/02/10		L
20C 101	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	56	1 110/02/10		L
20C 102	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	56	1 110/02/10		L
20C 103	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	56	1 110/02/10		L
20GL 1	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 2	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 3	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 4	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 5	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 6	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 7	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 8	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 20	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 21	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 22	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 25	0000-7536.878	LED ROT 3MM	YLHR 4403			1 114/03/03		L
20GL 26	0000-7618.071	LED ROT	TLUR 2401 M			1 TFK		L
20GL 27	0000-7618.071	LED ROT	TLUR 2401 P			1 TFK		L
20GL 35	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 36	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 37	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L
20GL 38	0001-0018.493	DIODE SI	1 N 4448	D0 35		1 ITT		L

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SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	DEZEICHNUNG 1 MARKING 1	DEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF.DESIG	BEMERKUNG NOTE	SERIE AF VERSION
206L 39	0001-0018-493	DIODE SI	1 N 4448		1	ITT		L
206L 40	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 41	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 42	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 43	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 44	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 45	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 50	0000-7536-894	LED GELB 3MM	TLHY 4403	FRUEHER: LD 35 I	1	114/03/03		C---
206L 52	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 54	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 56	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 57	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 61	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 62	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 63	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 64	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 65	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 66	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 67	0000-7536-878	LED ROT 3MM	TLHR 4403	FRUEHER: LD 30 II	1	114/03/03		C---
206L 70	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 71	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 72	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 73	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 74	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 75	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 76	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 77	0000-7536-878	LED ROT 3MM	TLHR 4403	FRUEHER: LD 30 II	1	114/03/03		C---
206L 80	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 81	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 82	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 83	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 84	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 85	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 86	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 87	0000-7536-878	LED ROT 3MM	TLHR 4403	FRUEHER: LD 30 II	1	114/03/03		C---
206L 90	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 91	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 92	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 93	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 94	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 95	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 96	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 97	0000-7536-881	LED GRUEN 3MM	TLHG 4402	FRUEHER: LD 37 I	1	114/03/03		C---
206L 100	0000-7614-910	LED IR	LD 261 IV	FRUEHER: LD 30 II	1	SIEMENS		H---
206L 101	0000-7614-910	LED IR	LD 261 IV	FRUEHER: LD 30 II	1	SIEMENS		H---
206L 102	0000-7614-910	LED IR	LD 261 IV	FRUEHER: LD 30 II	1	SIEMENS		H---
206L 105	0001-0018-493	DIODE SI	1 N 4448		1	ITT		L
206L 106	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L
206L 107	0001-0018-493	DIODE SI	1 N 4448	DO 35	1	ITT		L

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SERIE N° 0955-2401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	DEZEICHNUNG 1 MARKING 1	DEZEICHNUNG 2 MARKING 2	MG QU	WERKFORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
201C 1	0001-0067-567	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 2	0001-0015-988	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 3	0001-0068-197	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 4	0001-0070-884	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 5	0001-0061-987	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 10	0001-0015-991	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 11	0001-0015-991	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 12	0001-0070-910	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 13	0000-7548-853	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 14	0000-7548-853	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 15	0001-0070-457	IC-CMOS		DIP 24	1	MOTOROLA			L
201C 20	0001-0015-991	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 21	0001-0016-178	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 22	0001-0068-540	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 23	0001-0065-475	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 24	0000-7580-918	IC-LCCMOS		DIP 20	1	VALVO			L
201C 25	0001-0067-431	IC-CMOS		DIP 14	1	RCA			L
201C 26	0001-0068-469	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 50	0000-7599-530	IC-DARLINGTON ARRAY	ULN-2003ANS11	DIP 16	1	TEXAS			L
201C 51	0001-0068-540	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 52	0001-0015-988	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 53	0000-7579-107	IC-QUAD OPVERST.	FET TL064CN	DIP 14	1	TEXAS			L
201C 54	0000-7579-107	IC-QUAD OPVERST.	FET TL064CN	DIP 14	1	TEXAS			L
201C 55	0000-7580-109	IC-OP-VERST.	FET TL061CP	DIP 8	1	TEXAS			L
201C 60	0001-0070-965	IC-CMOS		DIP 16	1	RCA			L
201C 61	0000-7548-853	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 62	0001-0070-884	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 63	0000-7548-853	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 64	0000-7576-935	IC-DUAL OPVERST.	FET TL062CP	DIP 8	1	TEXAS			L
201C 65	0000-7599-530	IC-DARLINGTON ARRAY	ULN-2003ANS11	DIP 16	1	TEXAS			L
201C 66	0000-7599-530	IC-DARLINGTON ARRAY	ULN-2003ANS11	DIP 16	1	TEXAS			L
201C 70	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 71	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 72	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 73	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 74	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 75	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 76	0000-7524-848	ANZEIGE 7-SEGM.	LED MAN 3640AF	DIP 14	1	114/03/01			L
201C 80	0000-7607-066	ANZEIGE 7-SEGM.	LED D 191 PK-K	9IP 10	1	TFK			L
201C 81	0000-7607-053	ANZEIGE 7-SEGM.	LED D 101 PK-K	9IP 10	1	TFK			L
201C 82	0000-7607-053	ANZEIGE 7-SEGM.	LED D 101 PK-K	9IP 10	1	TFK			L
201C 83	0000-7607-053	ANZEIGE 7-SEGM.	LED D 101 PK-K	9IP 10	1	TFK			L
201C 84	0000-7607-053	ANZEIGE 7-SEGM.	LED D 101 PK-K	9IP 10	1	TFK			L
201C 100	0001-0071-003	IC-CMOS		DIP 14	1	MOTOROLA			L
201C 101	0001-0070-813	IC-CMOS		DIP 16	1	MOTOROLA			L
201C 102	0001-0016-026	IC-CMOS		DIP 14	1	MOTOROLA			L
20L 2	0000-7619-261	L-FUNKENTSTOEK		90 OR18	1	SIEMENS			L
20FO 1	0864-7004-814	MOTOR VORM			1				A

SEPIE M 0955-8401.000 SPM-15 935/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
20R 1	0000-7541-494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	018/06/01		L
20R 2	0000-7541-494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	018/06/01		L
20R 3	0001-0007-035	R-KOEHLE	10K	5% 0207	1	DRALORIC		L
20R 4	0000-7541-436	R-MODUL	9X 10K	5% 0207	1	018/06/01		L
20R 5	0001-0006-557	R-KOEHLE	1R	5% 0W1	1	DRALORIC		L
20R 6	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
20R 9	0001-0003-217	R-METALL	221K	0207	1	DRALORIC		L
20R 10	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 11	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 12	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 13	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 15	0001-0016-783	R-METALL	5P11	TK 50	1	DRALORIC		L
20P 16	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 17	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 18	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 20	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 21	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 22	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 23	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 25	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 26	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 27	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 28	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 30	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 31	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 32	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 33	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 35	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 36	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 37	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 38	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 40	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 41	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20P 42	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 43	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 45	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 46	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 47	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 48	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 50	0001-0016-783	R-METALL	5R11	TK 50	1	DRALORIC		L
20R 51	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 52	0001-0002-755	R-METALL	49K9	TK 50	1	DRALORIC		L
20R 53	0001-0001-219	R-METALL	1K	TK 50	1	DRALORIC		L
20R 55	0001-0002-153	R-METALL	374K	TK 50	1	DRALORIC		L
20R 56	0001-0067-457	R-METALL	10K5	TK 50	1	DRALORIC		L
20R 57	0001-0002-137	R-METALL	10K	TK 50	1	DRALORIC		L
20R 58	0001-0002-111	R-METALL	9K53	TK 50	1	DRALORIC		L
20P 59	0001-0006-913	R-KOEHLE	1K	TK 50	1	DRALORIC		L
20R 65	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC		L
20R 66	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC		L
20R 67	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC		L

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SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESCRIPTION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	FIG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
ZOR 68	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 69	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 70	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 71	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 72	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 73	0001-0002-991	R-METALL	100K	TK 50	1	DRALORIC			L
ZOR 74	0001-0002-519	R-METALL	26K7	TK 50	1	DRALORIC			L
ZOR 60	0001-0007-035	R-KOEHLE	10K	TK 50	1	DRALORIC			L
ZOR 81	0001-0001-921	R-METALL	6K04	TK 50	1	DRALORIC			L
ZOR 82	0001-0002-360	R-METALL	18K2	TK 50	1	DRALORIC			L
ZOR 83	0000-7586-271	R-METALL	6R81	TK 50	1	DRALORIC			L
ZOR 90	0001-0006-641	R-KOEHLE	10R	TK 50	1	DRALORIC			L
ZOR 91	0001-0006-641	R-KOEHLE	10R	TK 50	1	DRALORIC			L
ZOR 92	0000-7541-494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	DRALORIC			L
ZOR 93	0000-7541-494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	DRALORIC			L
ZOR 95	0001-0006-557	R-KOEHLE	1R	TK 50	1	DRALORIC			L
ZOR 101	0001-0006-557	R-KOEHLE	1R	TK 50	1	DRALORIC			L
ZOR 102	0001-0007-158	R-KOEHLE	100K	TK 50	1	DRALORIC			L
ZOR 105	0001-0007-129	R-KOEHLE	56K	TK 50	1	DRALORIC			L
ZOR 106	0001-0007-158	R-KOEHLE	100K	TK 50	1	DRALORIC			L
ZOR 107	0001-0007-129	R-KOEHLE	56K	TK 50	1	DRALORIC			L
ZOR 108	0001-0007-158	R-KOEHLE	100K	TK 50	1	DRALORIC			L
ZOR 109	0001-0007-129	R-KOEHLE	56K	TK 50	1	DRALORIC			L
ZOR 110	0000-7519-484	R-METALL	332R	TK 50	1	DRALORIC			L
ZOS 1	0000-7585-133	S-SCHIEBE	2 AU 2-POL	16X 7X13	1	013/04/02			L
ZOS 2	0001-0034-147	S-SCHIEFE	2 AU 2-POL	16X 7X11	1	013/04/02			L
ZOS 10	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 11	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 12	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 13	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 20	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 21	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 22	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 23	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 30	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 31	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 32	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 40	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 41	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 42	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 43	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 50	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 51	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 52	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 53	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 60	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 61	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 62	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L
ZOS 70	0000-7564-235	S-TASTE	100 AU TAST	1547-625	1	013/06/02			L



SERIE N: 0955-8401.000 SPM-15 9.55/01 AUSF:

TEILE-NR PART NO	SACP-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKFORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
20T 1	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 2	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 3	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 4	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 5	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 6	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 7	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 8	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 9	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		L
20T 10	0000-7598.971	TRANS SI P MOS	BS 250	A TO 18	1	ITT		L
20T 11	0000-7619.287	TRANS SI N MOS	BS 170	6 TO 92	1	ITT		L
20T 12	0000-7570.669	TRANS SI NPN DARLING	BD 775	A TO 126	1	ITT		L
20T 13	0000-7614.923	TRANS SI FOTO-	BPX 81 IV		1	SIEMENS		L
20T 14	0000-7614.923	TRANS SI FOTO-	BPX 81 IV		1	SIEMENS		L
20T 15	0000-7614.923	TRANS SI FOTO-	BPX 81 IV		1	SIEMENS		L
21C 1	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 2	0001-0010.417	C-KF MKT	220N	20X	1	MKT1822		L
21C 3	0001-0010.417	C-KF MKT	220N	20X	1	MKT1822		L
21C 4	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 5	0001-0041.790	ELKO-AL	100U	10/ 50	1	R41588		L
21C 6	0001-0040.720	ELKO-TA SINT FEST	10U5	20X	1	ETR-1		L
21C 7	0001-0041.790	ELKO-AL	100U	10/ 50	1	R41588		L
21C 8	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 9	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 10	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 11	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 12	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 13	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 14	0000-7604.056	ELKO-AL	10U	20X	1	SAL-PP		L
21C 15	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 16	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 17	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 18	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 19	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 20	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 21	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 22	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 23	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 24	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 25	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 26	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 27	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 28	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 29	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 30	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 31	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 32	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 33	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 34	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	R10000 2		L
21C 35	0001-0004.795	C-KERAMIK EDPT	4N7	10X	1	R 2000 2		L
21C 36	0001-0004.177	C-KERAMIK EDPT	10P	2X	1	NP 0 1B		L

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF.:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	WERKNORM QU REF.DESIG	BEMERKUNG NOTE	SERIE AF VERSION
21C 37	0001-0004.177	C-KERAMIK EDPT	10P	2X	1	110/02/09	M-...
21C 39	0001-0041.716	ELKO-AL	22U	10/ 50	1	110/05/40	M-...
216L 1	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800		1	HPA	M-...
216L 2	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
216L 3	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
216L 4	0001-0018.480	GLEICHP SI	1 N 4007		1	ITT	M-...
216L 5	0001-0019.094	DIODE SI Z-	ZPD 10		1	ITT	M-...
216L 7	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
216L 8	0001-0018.930	DIODE SI Z-	ZPD 6,8		1	ITT	M-...
216L 9	0000-7619.355	DIODE SI Z-	ZPD 5,6		1	ITT	M-...
216L 10	0001-0018.493	DIODE SI	1 N 4448	5,6 V 2X REI 5 MA	1	ITT	M-...
216L 11	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
216L 13	0001-0019.094	DIODE SI Z-	ZPD 10		1	ITT	M-...
216L 14	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
216L 15	0001-0018.493	DIODE SI	1 N 4448		1	ITT	M-...
211C 1	0001-0070.444	IC-CMOS	45568CP	DIP 16	1	MOTOROLA	M-...
211C 2	0000-7529.584	IC-CMOS	CDP1824E	DIP 18	1	RCA	M-...
211C 3	0001-0068.197	IC CMOS	40490BCP	DIP 16	1	MOTOROLA	M-...
211C 4	0000-7569.450	IC-CMOS	4504BCP	DIP 16	1	MOTOROLA	M-...
211C 5	0000-7569.450	IC-CMOS	4504BCP	DIP 16	1	MOTOROLA	M-...
211C 9	0000-7623.192	IC-HCMOS	74HCT244N	DIP 20	1	MOTOROLA	M-...
211C 10	0000-7583.889	IC-CMOS	40116E	DIP 22	1	RCA	M-...
211C 13	0001-0071.951	IC-TTL	74LS368AN	DIP 16	1	TEXAS	M-...
211C 14	0000-7623.192	IC-HCMOS	74HCT244N	DIP 20	1	MOTOROLA	M-...
211C 15	0000-7580.992	IC-CMOS	HM6116LP-3	DIC 24	1	HITACHI	M-...
211C 16	0955-9316.026	IC-CMOS	UPD 27C256D-20	DIP 28	1	MOS	M-...
211C 17	0955-9315.027	IC-CMOS	UPD 27C256D-20	DIP 28	1	MOS	M-...
211C 18	0000-7626.458	IC-HCMOS	74HCT138N	DIP 16	1	MOTOROLA	M-...
211C 19	0000-7626.458	IC-HCMOS	74HCT138N	DIP 16	1	MOTOROLA	M-...
211C 20	0000-7623.163	IC-HCMOS	74HCT373N	DIP 20	1	MOTOROLA	M-...
211C 21	0000-7628.469	IC-CMOS	80E85A-RS	DIC 40	1	OKI	M-...
211C 23	0000-7606.342	IC-TTL	74LS393N	DIP 14	1	MOTOROLA	M-...
211C 24	0001-0067.156	IC-TTL	74LS04N	DIP 14	1	TEXAS	M-...
211C 25	0001-0066.856	IC-TTL	74LS03N	DIP 14	1	TEXAS	M-...
211C 26	0001-0056.837	IC-TTL	74LS74AN	DIP 14	1	TEXAS	M-...
211C 27	0001-0067.169	IC-TTL	74LS08N	DIP 14	1	TEXAS	M-...
211C 28	0001-0065.585	IC-TTL	74LS02N	DIP 14	1	TEXAS	M-...
211C 29	0001-0015.962	IC-CMOS	4001BCP	DIP 14	1	MOTOROLA	M-...
211C 30	0000-7547.265	IC-KOMPARATOR QUAD	LM339N	DIP 14	1	NSC	M-...
211C 32	0000-7511.521	IC-TRANS ARRAY	CA3096AE	DIP 16	1	RCA	M-...
211C 33	0000-7576.511	IC-SPGSG.-REGLER	7805CT	TO 220	1	MOTOROLA	M-...
211C 34	0000-7511.521	IC-TRANS ARRAY	CA3096AE	DIP 16	1	RCA	M-...
211C 35	0001-0065.695	IC-TTL	74LS00N	DIP 14	1	TEXAS	M-...
211C 36	0000-7604.603	IC-SPGSG.-REGLER	78L05ACP	TO 92	1	MOTOROLA	M-...
211C 38	0001-0067.567	IC-CMOS	4028BCP	DIP 16	1	MOTOROLA	M-...
211C 39	0001-0070.884	IC-CMOS	4081BCP	DIP 14	1	MOTOROLA	M-...
211C 40	0001-0068.197	IC CMOS	4049UBCP	DIP 16	1	MOTOROLA	M-...
211C 41	0001-0015.991	IC-CMOS	4013BCP	DIP 14	1	MOTOROLA	M-...
211C 43	0000-7580.918	IC-LOC MOS	40373EP	DIP 20	1	VALVO	M-...

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SERIE M 0055-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	GEZEICHNUNG 1 MARKING 1	RFZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
21C 44	0000-7580.921	IC-LOCOS	40374BP	0IP 20	1	VALVO		M-..
21C 45	0000-7580.918	IC-LOCOS	40373BP	0IP 20	1	VALVO		M-..
21C 46	0000-7580.921	IC-LOCOS	40374BP	0IP 20	1	VALVO		M-..
21C 47	0000-7580.918	IC-LOCOS	40373BP	0IP 20	1	VALVO		M-..
21C 48	0000-7580.921	IC-LOCOS	40374BP	0IP 20	1	VALVO		M-..
21C 49	0000-7580.918	IC-LOCOS	40373BP	0IP 20	1	VALVO		M-..
21C 50	0000-7580.921	IC-LOCOS	40374BP	0IP 20	1	VALVO		M-..
21L 1	0001-0042.715	L-FUNKENTSTOER	56U 20X	70 OR3	1	SIEMENS		M-..
21L 2	0001-0042.715	L-FUNKENTSTOER	56U 20X	70 OR3	1	SIEMENS		M-..
21N 1	0955-9708.003	STEUERQUARZ	4.915,200KHZ	HC18/4	1			M-..
21R 1	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 2	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 3	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 4	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 5	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 6	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 7	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 8	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 9	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 10	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 11	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 12	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 13	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 14	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 15	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 16	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 17	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 18	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 19	0001-0007.006	R-KOEHLE	5K6	5X	1	DRALORIC	56	M-..
21R 20	0001-0007.006	R-KOEHLE	5K6	5X	1	DRALORIC	56	M-..
21R 21	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 22	0001-0007.006	R-KOEHLE	5K6	5X	1	DRALORIC	56	M-..
21R 23	0001-0007.006	R-KOEHLE	5K6	5X	1	DRALORIC	56	M-..
21R 24	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 25	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 26	0000-7554.944	R-MODUL	5X 10K	TK 250 EXB-F6E-103J	1	MATSUSHITA	56	M-..
21R 30	0001-0007.006	R-KOEHLE	5K6	5X	1	DRALORIC	56	M-..
21R 31	0001-0007.051	R-KOEHLE	15K	5X	1	DRALORIC	56	M-..
21R 32	0001-0007.051	R-KOEHLE	15K	5X	1	DRALORIC	56	M-..
21R 33	0001-0006.913	R-KOEHLE	1K	5X	1	DRALORIC	56	M-..
21R 34	0001-0007.093	R-KOEHLE	33K	5X	1	DRALORIC	56	M-..
21R 35	0001-0007.093	R-KOEHLE	33K	5X	1	DRALORIC	56	M-..
21R 36	0001-0006.955	R-KOEHLE	2K2	5X	1	DRALORIC	56	M-..
21R 37	0001-0002.496	R-METALL	25K5	1X	1	DRALORIC	56	M-..
21R 38	0001-0002.496	P-METALL	25K5	1X	1	DRALORIC	56	M-..
21R 39	0001-0002.496	R-METALL	25K5	1X	1	DRALORIC	56	M-..
21R 40	0001-0002.496	R-METALL	25K5	1X	1	DRALORIC	56	M-..
21R 41	0001-0002.247	R-METALL	13K3	1X	1	DRALORIC	56	M-..

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SERIE M 0955-8401.000 SPM-15 955701 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NC	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
21R 42	0001-0002.991	R-METALL	100K	TK 50	1	DRALORIC		M	L
21R 43	0001-0006.955	R-KOEHLE	2K2	0207	1	DRALORIC		M	L
21R 44	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 45	0001-0003.343	R-METALL	475K	TK 50	1	DRALORIC		M	L
21R 46	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC		M	L
21P 47	0001-0007.132	R-KOEHLE	681	0207	1	DRALORIC		M	L
21P 48	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		M	L
21R 49	0001-0007.174	R-KOEHLE	150K	0207	1	DRALORIC		M	L
21P 50	0001-0007.093	R-KOEHLE	33K	0207	1	DRALORIC		M	L
21R 51	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		M	L
21R 52	0001-0002.014	R-METALL	7K5	TK 50	1	DRALORIC		M	L
21P 53	0001-0006.971	R-KOEHLE	3K3	0207	1	DRALORIC		M	L
21R 54	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 55	0001-0007.022	R-KOEHLE	8K2	0207	1	DRALORIC		M	L
21R 56	0001-0006.900	R-KOEHLE	820R	0207	1	DRALORIC		M	L
21P 57	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21R 58	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21R 59	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21P 60	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21R 61	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 62	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC		M	L
21R 63	0001-0007.116	R-KOEHLE	47K	0207	1	DRALORIC		M	L
21R 64	0001-0007.116	R-KOEHLE	47K	0207	1	DRALORIC		M	L
21P 66	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21R 67	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		M	L
21P 68	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21P 69	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21R 70	0001-0002.991	R-METALL	100K	TK 50	1	DRALORIC		M	L
21R 71	0001-0001.219	R-METALL	1K	TK 50	1	DRALORIC		M	L
21R 73	0001-0001.219	R-METALL	1K	TK 50	1	DRALORIC		M	L
21P 74	0001-0000.980	R-METALL	499R	TK 50	1	DRALORIC		M	L
21R 75	0001-0002.409	R-METALL	20K	TK 50	1	DRALORIC		M	L
21P 76	0001-0001.840	R-METALL	4K99	TK 50	1	DRALORIC		M	L
21P 77	0001-0006.641	R-KOEHLE	10F	0207	1	DRALORIC		M	L
21R 78	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		M	L
21R 79	0001-0001.222	R-METALL	1K07	0207	1	DRALORIC		M	L
21P 80	0001-0001.549	R-METALL	2K49	TK 50	1	DRALORIC		M	L
21R 81	0001-0001.840	R-METALL	4K99	TK 50	1	DRALORIC		M	L
21R 82	0001-0001.840	R-METALL	4K99	TK 50	1	DRALORIC		M	L
21R 83	0001-0001.222	R-METALL	1K07	TK 50	1	DRALORIC		M	L
21R 84	0001-0001.549	R-METALL	2K49	TK 50	1	DRALORIC		M	L
21P 85	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC		M	L
21R 86	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21R 87	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 88	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 89	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 90	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21P 91	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21R 92	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21R 93	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L
21R 94	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		M	L

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AUSF:

SPM-15 955/01

SERIE F 0955-8401\_000

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
21R 95	0001-0002.137	R-METALL	10K	TK 50	1	DRALORIC		M-...
21R 96	0001-0002.409	R-METALL	20K	TK 50	1	DRALORIC		M-...
21R 97	0001-0002.661	R-METALL	40K2	TK 50	1	DRALORIC		M-...
21R 98	0001-0002.920	R-METALL	80K6	TK 50	1	DRALORIC		M-...
21R 99	0001-0001.840	R-METALL	4K99	TK 50	1	DRALORIC		M-...
21R 100	0001-0002.920	R-METALL	80K6	TK 50	1	DRALORIC		M-...
21P 101	0001-0006.599	R-KOEHLE	3R3	TK 50	1	DRALORIC		M-...
21R 102	0001-0006.557	R-KOEHLE	1R	TK 50	1	DRALORIC		M-...
21R 103	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 104	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 105	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 106	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 107	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 108	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 109	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 110	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 111	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 112	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 113	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 114	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 115	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 116	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 117	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 118	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 119	0001-0001.840	R-METALL	4K99	TK 50	1	DRALORIC		M-...
21R 120	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 121	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 122	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 123	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 124	0001-0007.080	R-KOEHLE	27K	TK 50	1	DRALORIC		M-...
21R 126	0001-0006.913	R-KOEHLE	1K	TK 50	1	DRALORIC		M-...
21R 127	0000-7541.494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	DRALORIC		M-...
21R 128	0000-7592.951	R-MODUL	9X 1K	TK250 EXB-F10E-102J	1	DRALORIC		M-...
21R 129	0000-7550.650	R-MODUL	9X 15K	TK250 EXB-F10E-153J	1	DRALORIC		M-...
21R 130	0001-0007.093	R-KOEHLE	33K	TK 50	1	DRALORIC		M-...
21R 131	0001-0007.093	R-KOEHLE	33K	TK 50	1	DRALORIC		M-...
21R 132	0001-0006.955	R-KOEHLE	2K2	TK 50	1	DRALORIC		M-...
21R 133	0001-0006.955	R-KOEHLE	2K2	TK 50	1	DRALORIC		M-...
21R 134	0001-0006.955	R-KOEHLE	2K2	TK 50	1	DRALORIC		M-...
21R 135	0001-0007.093	R-KOEHLE	33K	TK 50	1	DRALORIC		M-...
21R 136	0001-0001.125	R-METALL	750R	TK 50	1	DRALORIC		M-...
21R 137	0001-0001.219	R-METALL	1K	TK 50	1	DRALORIC		M-...
21P 139	0000-7519.536	R-METALL	100K	TK 50	1	DRALORIC		M-...
21S 1	0001-0007.953	S-DUAL-IN-LINE	6 10J AU WIPP-	S76B06	1	013/06/05		M-...
21S 2	0001-0072.361	S-DUAL-IN-LINE	10 100 AU WIPP-	S76B10	1	013/06/05		M-...
21S 3	0000-7550.702	S-TASTE	100 AG TAST	MDP	1	ITT		M-...
21S 4	0000-1831.016	S-DUAL-IN-LINE	1 001 SN HAKEN-	GER.: C42315-A1347-A212	1	SIEMENS		M-...
21T 1	0000-7619.287	TRANS SI N VMOS	BS 170	MOS	1	ITT		M-...
21T 2	0000-7619.287	TRANS SI N VMOS	RS 170	MOS	1	ITT		M-...

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SERIE M 0955-8401.000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MGR QU	WERKST. REF.-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
21T	3	0000-7610.765	TRANS SI N VMOS	BUZ 10				
21T	4	0001-0016.550	TRANS SI PNP	RCY 78 X (D)	B TO 220			M---
21T	5	0001-0016.712	TRANS SI PNP	12 N 4035 (6FX48)	A TO 18			M---
21T	6	0001-0016.987	TRANS SI NPN	2 N 2369 (BSX93)	A TO 18			M---
21T	7	0000-7619.287	TRANS SI N VMOS	BS 170				M---
21T	8	0001-0016.712	TRANS SI PNP	12 N 4035 (6FX48)	A TO 18			M---
21T	9	0001-0016.987	TRANS SI NPN	12 N 2369 (BSX93)	A TO 18			M---
21T	10	0001-0016.518	TRANS SI NPN	ELCY 59 X (D)	A TO 18			M---
22C	1	0001-0010.378	C-KF MKT	100N 20%				
22C	3	0001-0041.790	ELKO-AL	100U 10/ 50		MKT1822	110/03/07	
22C	4	0001-0040.801	ELKO-TA SINT FEST	4U7 20%	100V	B41588	110/05/40	
22C	9	0001-0040.966	ELKO-TA SINT FEST	22U 20%	16V	ETR-1	110/05/61	
22C	10	0001-0010.080	C-KF MKT	1U 5%	100V	ETR-3	110/05/61	
22C	11	0000-7541.326	C-KF KS	11N3 1%	160V	MKT1813	110/03/12	
22C	12	0000-7619.258	C-GLIMMER	2N74 1%	250V	B31521	110/06/01	
22C	13	0001-0004.384	C-KERAMIK EDPT	47P 2%	63V	DF 53.20	110/02/09	
22C	14	0001-0040.704	ELKO-TA SINT FEST	1U 20%	35V	NP 0 1B	110/05/61	
22C	15	0001-0040.966	ELKO-TA SINT FEST	22U 20%	16V	ETR-1	110/05/61	
22C	16	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	40V	ETR-3	110/02/10	
22C	17	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	40V	R10000 2	110/02/10	
22C	20	0001-0040.704	ELKO-TA SINT FEST	1U 20%	35V	R10000 2	110/02/10	
22C	21	0001-0040.704	ELKO-TA SINT FEST	1U 20%	35V	ETR-1	110/05/61	
22C	22	0001-0010.417	C-KF MKT	220N 20%	100V	ETR-1	110/05/61	
22FI	1	0829-9304.001	MECH-FILTER GEPAART	(1 PAAR = 2 ST)		MKT1822	110/03/07	
22IC	1	0000-7513.257	IC-OP.-VERST.	NE5534AN	DIP 8	(EK-.BV 0829-9303.002)		
22L	1	0955-7826.000	SPULE			FRUEHER: TDA1034N		
22P	1	0001-0007.543	R-TRIM DRAHT SPINDEL	5K 10% OW7 20		MOS		
22R	1	0001-0003.181	R-METALL	200K 1%	0207	TK 100	017/04/04	
22R	2	0001-0002.687	R-METALL	42K2 1%	0207	TK 50	DRALORIC	
22R	3	0001-0002.784	R-METALL	54K9 1%	0207	TK 50	DRALORIC	
22R	4	0001-0002.645	R-METALL	38K3 1%	0207	TK 50	DRALORIC	
22R	5	0001-0002.852	R-METALL	64K9 1%	0207	TF 50	DRALORIC	
22R	6	0000-7604.195	R-METALL	30K1 1%	0204	TK 50	DRALORIC	
22R	7	0001-0006.751	R-KOEHLE	68R 5%	0207		018/04/01	
22R	8	0001-0001.219	R-METALL	1K 1%	0207	TK 50	DRALORIC	
22R	9	0001-0001.426	R-METALL	1K87 1%	0207	TK 50	DRALORIC	
22R	10	0000-7559.208	R-PTC	1K 2%	OW1	TSP 102 G	DRALORIC	
22R	11	0001-0006.793	R-KOEHLE	100R 5%	0207	TK 50	TEXAS	
22R	12	0001-0001.840	R-METALL	4K99 1%	0207	TK 50	DRALORIC	
22R	13	0001-0003.699	R-METALL	931R 1%	0207	TF 50	DRALORIC	
22R	14	0000-7559.208	R-PTC	1K 2%	OW1	TSP 102 G	DRALORIC	
22P	15	0001-0002.234	R-METALL	12K7 1%	0207	TF 50	TEXAS	
22P	16	0001-0001.251	R-METALL	1K15 1%	0207	TF 50	DRALORIC	
22R	17	0001-0001.329	R-METALL	1K3. 1%	0207	TK 50	DRALORIC	

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SERIE M 0955-8401-000 SPM-15 955/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
22R 21	0001-0002-425	R-METALL	21K	0207	1	DRALORIC		L
22R 25	0001-0002-470	R-METALL	24K3	0207	1	DRALORIC		L
22P 26	0001-0000-566	R-METALL	121R	0207	1	DRALORIC		L
22R 27	0001-0003-356	R-METALL	499K	0207	1	DRALORIC		L
22P 28	0001-0003-356	R-METALL	499K	0207	1	DRALORIC		L
22R 29	0001-0003-026	R-METALL	107K	0207	1	DRALORIC		L
22R 30	0001-0006-793	R-KOHLE	100R	0207	1	DRALORIC		L
22R 31	0001-0007-035	R-KOHLE	10K	0207	1	DRALORIC		L
22R 32	0001-0007-158	R-KOHLE	100K	0207	1	DRALORIC		L
22R 33	0001-0007-158	R-KOHLE	100K	0207	1	DRALORIC		L
22P 34	0001-0003-181	R-METALL	100K	0207	1	018/03/01		L
22R 35	0000-7555-228	0-OHM WIDERSTAND	200K	0207	1	DRALORIC		L
22R 36	0001-0007-226	R-KOHLE	0,6	0207	1	VITROHM		S
22R 37	0001-0007-158	R-KOHLE	100K	0207	1	018/03/01		L
22R 38	0001-0002-991	R-METALL	100K	0207	1	DRALORIC		L
22R 39	0001-0002-991	R-METALL	100K	0207	1	DRALORIC		L
22ST 1	0835-0009-003	STECKER	BN 855 A 4 KPL		1			B-...
22T 1	0000-7619-287	TRANS SI N VMOS	BS 170	6 TO 92	1	ITT		L
22T 2	0000-7598-971	TRANS SI P DMOS	BS 250	6 TO 92	1	ITT		L
22T 3	0001-0071-993	TRANS SI NPN	BCY 59 VIII (B)A TO 18		1	TFK		L
22T 4	0001-0071-993	TRANS SI NPN	BCY 59 VIII (B)A TO 18		1	TFK		L
22T 6	0000-7619-287	TRANS SI N VMOS	BS 170	6 TO 92	1	ITT		L
22T 7	0000-7598-971	TRANS SI P DMOS	BS 250	6 TO 92	1	ITT		L
22T 8	0001-0016-518	TRANS SI NPN	BCY 59 X (D) A TO 18		1	TFK		L
23BU 4	0000-1637-074	WINKELBU. 75 OHM KPL			1			L
23BU 5	0000-1637-074	WINKELBU. 75 OHM KPL			1			L
23C 22	0000-7591-622	C-KERAMIK EDPT	ARGLEICHWERT		1	110/02/09		M-...
25BU 1	0000-3713-006	TF-BUCHSE	2+E M EB	LT 4	1	119/01/05		L
25BU 2	0000-1680-005	HF-BUCHSE, N.ISOL.	UNI 9C	75 M A	1	119/09/04		L
51PU 2	0000-1637-074	WINKELBU. 75 OHM KPL	BNC	50 M D 5,0	1	ROSENBERG		L
51BU 3	0000-7598-696	HF-BUCHSE		CR EL 26,7 551K504-106A4	1			L
Zusätzliche Bauteile für Version 955/11								
Extra components for version 955/11								
Composants supplémentaires pour la version 955/11								
SEPIE F	0955-1100-007	UMBAUSATZ F 19" GEH.	AUSF:					BN 955/11
1PU 5	0001-0032-534	EINRAUBBUCHSE	5 A4 M EL	LT 3	1	119/07/03		L
1GL 21	0000-7659-085	GLEICHR SI SCHOTTKY-	BYV 19/45		1	VALVO		L
1GL 22	0001-0018-480	GLEICHR SI	1 N 4007	TO 220	1	ITT		L
1GL 23	0001-0018-480	GLEICHR SI	1 N 4007	P 1	1	ITT		L
11C 11	0000-7660-980	DC/DC-WANDLER	DSR 3015-7		1	MELCHER		L

**1.1 Synthesizer OD-15**  
**1.1 Synthesizer OD-15**  
**1.1 Synthétiseur OD-15**

**BN 2011/01**  
**BN 2011/01**  
**BN 2011/01**



SEPIE M 2011-8401-005 0D-15 2011/01

AUSF:

BN 2011/01

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKSTOFF REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
51C 1	0001-0041-059	ELKO-TA SINT FEST	47U 20X	ETR-3	1	110/05/61		
51C 2	0001-0040-966	ELKO-TA SINT FEST	22U 20X	ETR-3	1	110/05/61		
51C 3	0001-0004-339	C-KERAMIK EDPT	33F 2X	NP 0 1B	1	110/02/09		
51C 4	0001-0040-885	ELKO-TA SINT FEST	10U 20X	ETR-3	1	110/05/61		
51C 5	0001-0040-966	ELKO-TA SINT FEST	22U 20X	ETR-3	1	110/05/61		
51C 8	0001-0004-449	C-KERAMIK EDPT	68P 2X	INF 0 1B	1	110/05/61		
51C 20	0855-0021-007	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1	110/02/09		6---
51GL 1	0001-0019-094	DIODE SI Z-	ZPD 10		1	ITT		
51IC 1	0001-0065-695	IC-TTL	74LS00N		1	TEXAS		
51IC 2	0001-0065-682	IC-TTL	74LS90N		1	TEXAS		
51L 1	0001-0043-125	L-FEST	100N 10X	38 25 650 R08	1A2	117/01/03		
51F 1	0000-7571-736	R-TRIM CERKET SQUARE	2K 10X 0W2 20	TK 100	1	017/04/06		
51Q 1	2011-9301-007	QUARZOSZILLATOR	10.000.000KHZ		1			
51P 1	0001-0001-031	R-METALL	604R 1X	TK 50	1	DRALORIC		
51P 2	0001-0006-609	R-KOEHLE	4R7 5X		1	DRALORIC		
51P 3	0001-0000-676	R-METALL	20CR 1X	TK 50	1	DRALORIC		
51R 4	0001-0006-913	R-KOEHLE	1K 5X		1	DRALORIC		
51R 5	0001-0006-913	R-KOEHLE	1K 5X		1	DRALORIC		
51R 6	0001-0006-913	R-KOEHLE	1K 5X		1	DRALORIC		
51R 7	0001-0000-472	R-METALL	82R5 1X	TK 50	1	DRALORIC		
51R 8	0001-0001-484	R-METALL	2K15 1X	TK 50	1	DRALORIC		
51R 9	0001-0006-913	R-KOEHLE	1K 5X		1	DRALORIC		
51R 10	0001-0007-035	R-KOEHLE	10K 5X		1	DRALORIC		
51R 11	0001-0000-977	R-METALL	487R 1X	TK 50	1	DRALORIC		
51R 12	0001-0001-662	R-METALL	3K32 1X	TK 50	1	DRALORIC		
51R 13	0001-0065-200	R-METALL	27R4 1X	TK 50	1	DRALORIC		
51R 14	0001-0006-913	R-KOEHLE	1K 5X		1	DRALORIC		
51R 15	0001-0000-618	R-METALL	150R 1X	TK 50	1	DRALORIC		
51ST 1	0855-0007-005	STECKER	BN 855 A 2 KPL		1			
51ST 2	0855-0006-006	STECKER	BN 855 A 1 KPL		1			
51T 1	0001-0016-712	TRANS SI NPN	2 N 4035 (BFX48) A T0 18		1	SGS		
51T 2	0001-0016-903	TRANS SI NPN	BFY 90 A T0 72		1	SIEMENS		
51UE 1	2011-7730-007	UEERTRAGER			1			6---
52C 1	0001-0040-966	ELKO-TA SINT FEST	22U 20X	ETR-3	1	110/05/61		
52C 2	0000-7551-235	C-KERAMIK KDFU	100N 20X	X7R	1	VP32BY104MA		
52C 3	0001-0004-818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/15		
52C 4	0001-0004-698	C-KERAMIK EDPT	1N 10X	R 2000 2	1	110/02/10		
52C 5	01CC-7618-398	C-KERAMIK KDFU	1N5 5X	IC06	1	110/02/10		
52C 7	0855-0022-006	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1	110/02/15		

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SERIE W 2011-8401.005 00-15 2011/01 AUSF:

TEIL-NR PART NO	SACH-NR ITLM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
521C 1	0001-0016.178	IC-CMOS	4518BCP	DIP 16		1	MOTOROLA		L
521C 2	0000-7529.416	IC-CMOS	4175BCP	DIP 16	MOS	1	MOTOROLA		L
521C 3	0001-0015.988	IC-CMOS	4011BCP	DIP 14	MOS	1	MOTOROLA		L
521C 4	0001-0067.431	IC-CMOS	4047RE	DIP 14	MOS	1	RCA		L
52L 1	0000-7567.737	DAEMPFGUNGSPERLE	DA= 3,5 DI= 1,2	L= 3,3		1	SIEMENS		L
52L 2	2011-7826.005	SPULE		1B62110-A3011-X022		1			A
52R 1	0001-0006.696	R-KOEHLE	27R	5% 0207	56	1	DRALORIC		L
52R 2	0001-0006.683	R-KOEHLE	22R	5% 0207	56	1	DRALORIC		L
52R 3	0001-0007.064	R-KOEHLE	18K	5% 0207	56	1	DRALORIC		L
52P 4	0001-0007.064	R-KOEHLE	18K	5% 0207	56	1	DRALORIC		L
52P 5	0001-0006.751	R-KOEHLE	68R	5% 0207	56	1	DRALORIC		L
52R 6	0001-0007.077	R-KOEHLE	22K	5% 0207	56	1	DRALORIC		L
52R 9	0001-0007.077	R-KOEHLE	22K	5% 0207	56	1	DRALORIC		L
52R 10	0001-0006.968	R-KOEHLE	2K7	5% 0207	56	1	DRALORIC		L
52R 11	0001-0006.751	R-KOEHLE	68R	5% 0207	56	1	DRALORIC		L
52P 12	0001-0007.064	R-KOEHLE	18K	5% 0207	56	1	DRALORIC		L
52R 13	0001-0007.064	R-KOEHLE	18K	5% 0207	56	1	DRALORIC		L
52R 14	0001-0006.942	R-KOEHLE	1K8	5% 0207	56	1	DRALORIC		L
52R 15	0001-0007.077	R-KOEHLE	22K	5% 0207	56	1	DRALORIC		L
52R 16	0001-0006.447	R-METALL	14K3	1% 0207	56	1	DRALORIC		L
52ST 1	0855-0007.005	STECKER	BN 855	A 2 KPL	TK 50	1			L
52T 1	0001-0017.342	TRANS SI PNP	2 N 3251	A TO 18		1	MOTOROLA		L
52T 2	0001-0017.342	TRANS SI PNP	2 N 3251	A TO 18		1	MOTOROLA		L
52T 3	0001-0016.987	TRANS SI NPN	2 N 2369 (BSX93)	A TO 18		1	FSC		L
53C 1	0001-0010.323	C-KF MKT	47N	20% 250V	MKT1822	1	110/03/07	B...	L
53C 2	0001-0010.378	C-KF PKT	100N	20% 100V	MKT1822	1	110/03/07	B...	L
53C 4	0001-0010.145	C-KF MKT	2U2	10% 100V	MKT1813	1	110/03/06	B...	L
53C 5	0001-0040.885	ELKO-TA SINT FEST	10U	20% 25V	ETR-3	1	110/05/61	B...	L
53C 6	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	R10000 2	1	110/02/10	B...	L
53C 7	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	R10000 2	1	110/02/10	B...	L
53C 8	0001-0010.378	C-KF MKT	100N	20% 100V	MKT1822	1	110/03/07	B...	L
53C 9	0001-0004.818	C-KERAMIK EDPT	10N	20/100 40V	R10000 2	1	110/02/10	B...	L
53C 10	0001-0004.698	C-KERAMIK EDPT	1N	10% 63V	R 2000 2	1	110/02/10	B...	L
53C 11	0001-0040.966	ELKO-TA SINT FEST	22U	20% 16V	ETR-3	1	110/05/61	B...	L
53C 12	0001-0010.378	C-KF MKT	100N	20% 100V	MKT1822	1	110/03/07	B...	L
53C 13	0001-0041.664	ELKO-AL	10U	10/ 50	B41588	1	110/05/40	B...	L
53GL 1	0000-7629.497	DIODE SI C-GEPAART	BP 130	SOD 69		2	VALVO	B...	L
53GL 2	0000-7629.497	DIODE SI C-GEPAART	BP 130	SOD 69		2	VALVO	B...	L
53GL 3	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800	DO 35 = 1N5711		1	HPA	B...	L
53GL 4	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800	DO 35 = 1N5711		1	HPA	B...	L
53L 2	2011-7827.004	SPULE	100U	10% 1025-68	45 2,5 13 8R	1		B...	A
53L 3	2011-7827.004	SPULE				1		B...	A
53L 4	0000-7556.298	L-FEST			80MA	1	117/01/03	B...	L

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SCHALTEILLISTE / PART - LIST

SERIE M 2011-8401.005 0D-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	LEZEICHNUNG 1 MARKING 1	LEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF.-DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
53L	2011-7828.003	SPULE			1			B-..
53P	0001-0008.335	R-TRIM CERMET	47K 20X OW5	TK 100 (ALT 17/02/08)	1	017/02/15		B-..
53P	0001-0008.364	R-TRIM CERMET	1M 20X OW5	TV 100 (ALT 17/02/08)	1	017/02/15		B-..
53R	0001-0006.942	R-KOEHLE	1F8 5X 0207		1	DRALORIC		B-..
53R	0001-0007.190	R-KOEHLE	220K 5X 0207		1	018/03/01		B-..
53R	0001-0007.035	R-KOEHLE	10K 5X 0207		1	DRALORIC		B-..
53R	0001-0006.793	R-KOEHLE	100R 5X 0207		1	DRALORIC		B-..
53R	0001-0006.997	R-KOEHLE	4K7 5X 0207		1	DRALORIC		B-..
53R	0001-0006.751	R-KOEHLE	68R 5X 0207		1	DRALORIC		B-..
53P	0001-0006.793	R-KOEHLE	100R 5X 0207		1	DRALORIC		B-..
53R	0001-0007.035	R-KOEHLE	10K 5X 0207		1	DRALORIC		B-..
53R	0001-0006.793	R-KOEHLE	100R 5X 0207		1	DRALORIC		B-..
53R	0001-0007.116	R-KOEHLE	47K 5X 0207		1	018/03/01		B-..
53R	0001-0007.103	R-KOEHLE	39K 5X 0207		1	018/03/01		B-..
53R	0001-0006.913	R-KOEHLE	1K 5X 0207		1	DRALORIC		B-..
53R	0001-0007.093	R-KOEHLE	33K 5X 0207		1	018/03/01		B-..
53R	0001-0006.874	R-KOEHLE	47OR 5X 0207		1	DRALORIC		B-..
53R	0001-0006.997	R-KOEHLE	4K7 5X 0207		1	DRALORIC		B-..
53R	0001-0006.609	R-KOEHLE	4R7 5X 0207		1	DRALORIC		B-..
53R	0001-0006.926	R-KOEHLE	1K2 5X 0207		1	DRALORIC		B-..
53R	0001-0006.793	R-KOEHLE	100R 5X 0207		1	DRALORIC		B-..
53T	0001-0016.628	TRANS SI N JFET	BF 245 A D SOT 54		1	VALVO		B-..
53T	0001-0016.628	TRANS SI N JFET	BF 245 A D SOT 54		1	VALVO		B-..
53T	0001-0016.628	TRANS SI N JFET	BF 245 A D SOT 54		1	VALVO		B-..
53T	0001-0016.518	TRANS SI NPN	LCY 59 X (D) A TO 18		1	TFK		B-..
53T	0001-0016.987	TRANS SI NPN	2 N 2369 (BSX93) A TO 18		1	FSC		B-..
53T	0001-0016.518	TRANS SI NPN	LCY 59 X (D) A TO 18		1	TFK		B-..
53UE	2011-7727.007	UEBERTRAGER			1			B-..
54C	0001-0004.698	C-KERAMIK EDFT	1N 10X 63V	R 2000 2	1	110/02/10		A
54C	0001-0040.775	ELKO-TA SINT FEST	3U3 20X 16V	ETR-1	1	110/05/61		L
54C	0001-0004.821	C-KERAMIK EDFT	22N 20/ 80 40V	R10000 2	1	110/02/10		L
54C	0001-0004.698	C-KERAMIK EDPT	1N 10X 63V	R 2000 2	1	110/02/10		L
54C	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		L
54C	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		L
54C	0001-0040.966	ELKO-TA SINT FEST	22U 20X 16V	ETR-3	1	110/02/10		L
54C	0855-0022.006	C-KERAMIK DURZ	4N7 20/ 80 63V	D 6000 2	1	110/05/61		L
54R	0001-0007.064	R-KOEHLE	18K 5X 0207		1	DRALORIC		L
54R	0001-0007.064	R-KOEHLE	18K 5X 0207		1	DRALORIC		L
54R	0001-0006.751	R-KOEHLE	68R 5X 0207		1	DRALORIC		L
54R	0001-0007.077	R-KOEHLE	22K 5X 0207		1	DRALORIC		L
54R	0001-0006.751	R-KOEHLE	68R 5X 0207		1	DRALORIC		L
54R	0001-0007.090	R-KOEHLE	27K 5X 0207		1	DRALORIC		L
54R	0001-0006.751	R-KOEHLE	68R 5X 0207		1	DRALORIC		L
54R	0001-0007.006	R-KOEHLE	5K6 5X 0207		1	018/03/01		L
54R	0001-0007.006	R-KOEHLE	5K6 5X 0207		1	DRALORIC		L

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SERIE N 2011-E401-005 00-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
54R 10	0001-0007.006	R-KOEHLE	5K6	0207	1	DRALORIC			L
54R 11	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC			L
54R 12	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC			L
54R 13	0001-0006.942	R-KOEHLE	1K8	0207	1	DRALORIC			L
54R 14	0001-0007.064	R-KOEHLE	18K	0207	1	DRALORIC			L
54R 15	0001-0007.064	R-KOEHLE	18K	0207	1	DRALORIC			L
54R 16	0001-0001.730	R-METALL	3F92	0207	1	DRALORIC			L
54R 17	0001-0001.497	R-METALL	2L21	0207	1	DRALORIC			L
54R 18	0001-0006.719	R-KOEHLE	39R	0207	1	DRALORIC			L
54R 19	0001-0006.793	R-KOEHLE	100R	0207	1	DRALORIC			L
54R 20	0001-0006.997	R-KOEHLE	4K7	0207	1	DRALORIC			L
54R 21	0001-0007.158	R-KOEHLE	100K	0207	1	DRALORIC			L
54T 1	0001-0016.987	TRANS SI NPN	2 N 2369 (BSX93)	A T0 18	1	FSC			L
54T 2	0001-0016.929	TRANS SI PNP	2 N 2894 (BSX29)	A T0 18	1	FSC			L
54T 3	0001-0016.929	TRANS SI PNP	2 N 2894 (BSX29)	A T0 18	1	FSC			L
54T 4	0001-0016.929	TRANS SI PNP	2 N 2894 (BSX29)	A T0 18	1	FSC			L
54T 5	0001-0016.987	TRANS SI NPN	2 N 2369 (BSX93)	A T0 18	1	FSC			L
54T 6	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A T0 18	1	TFK			L
55C 1	0001-0040.885	ELKO-TA SINT FEST	100	25V	1	110/05/61		F-...	L
55C 2	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 3	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 4	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 5	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 6	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 7	0001-0004.559	C-KERAMIK EDPT	120P	2X	1	110/02/09		F-...	L
55C 11	0001-0004.575	C-KERAMIK EDPT	150P	2X	1	110/02/09		F-...	L
55C 12	0001-0004.821	C-KERAMIK EDPT	22N	20/ 80	1	110/02/10		F-...	L
55C 13	0001-0004.601	C-KERAMIK EDPT	220P	2X	1	110/02/10		F-...	L
55C 15	0855-0022.006	C-KERAMIK DDMZ	4N7	20/ 80	1	110/02/09		F-...	L
55GL 1	0001-0018.493	DIODE SI	1 N 4448	00 35	1	ITT		F-...	L
55IC 1	0001-0071.427	IC-TTL	74LS112AN	DIP 16	1	TEXAS		F-...	L
55IC 2	0001-0071.427	IC-TTL	74LS112AN	DIP 16	1	TEXAS		F-...	L
55IC 3	0001-0071.427	IC-TTL	74LS112AN	DIP 16	1	TEXAS		F-...	L
55IC 4	0001-0071.427	IC-TTL	74LS112AN	DIP 16	1	TEXAS		F-...	L
55IC 5	0001-0067.169	IC-TTL	74LS08N	DIP 14	1	TEXAS		F-...	L
55IC 6	0001-0016.026	IC-CMOS	40174BP	DIP 16	1	VALVO	858521	F-...	L
55IC 7	0001-0016.026	IC-CMOS	4023BCP	DIP 14	1	MOTOROLA	MOS	F-...	L
55IC 8	0001-0015.988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA	MOS	F-...	L
55IC 9	0001-0015.111	IC-CMOS	4088BP	DIP 14	1	MOTOROLA	MOS	F-...	L
55IC 10	0001-0016.042	IC-CMOS	4027ECP	DIP 16	1	MOTOROLA	MOS	F-...	L
55IC 11	0001-0016.328	IC-CMOS	4027ECP	DIP 16	1	MOTOROLA	MOS	F-...	L
55IC 12	0001-0068.197	IC CMOS	4049URCP	DIP 16	1	MOTOROLA	MOS	F-...	L
55IC 14	0001-0065.695	IC-TTL	74LS00N	DIP 14	1	TEXAS	858521	F-...	L
55IC 15	0001-0065.085	IC-CMOS	4025FP	DIP 14	1	VALVO	858521	F-...	L
55L 1	0000-7567.737	DAEMFUNGSFLE	DA= 3,5 DI= 1,2 L= 3,3	E62110-A3011-X022	1	SIMENS		F-...	L

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SEPIE M 2011-8401-005 0d-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	DEZEICHNUNG 1 MARKING 1	DEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF C VERSION
561C 5	0001-0070-868	IC-CMOS	14028BCP	DIP 14	1	MOTOROLA		L
561C 6	0001-0016-026	IC-CMOS	4023BCP	DIP 16	1	MOTOROLA		L
561C 7	0001-0016-042	IC-CMOS	4027BCP	DIP 16	1	MOTOROLA		L
561C 8	0000-7529-351	IC-CMOS	4160BCP	DIP 16	1	MOTOROLA		L
561C 9	0001-0015-988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		L
561C 10	0001-0016-026	IC-CMOS	4023BCP	DIP 14	1	MOTOROLA		L
561C 12	0000-7529-351	IC-CMOS	4160BCP	DIP 16	1	MOTOROLA		L
561C 13	0001-0068-197	IC CMOS	4049BCP	DIP 16	1	MOTOROLA		L
561C 14	0000-7529-351	IC-CMOS	4160BCP	DIP 16	1	MOTOROLA		L
561C 15	0000-7565-328	IC-LOC MOS	4027EP	DIP 16	1	VALVO		L
561C 16	0001-0015-988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		L
561C 17	0001-0016-042	IC-CMOS	4027BCP	DIP 16	1	MOTOROLA		L
561C 18	0000-7529-351	IC-CMOS	4160BCP	DIP 16	1	MOTOROLA		L
561C 19	0001-0015-988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		L
561C 20	0001-0070-868	IC-CMOS	4082BCP	DIP 14	1	MOTOROLA		L
561C 21	0001-0016-026	IC-CMOS	4023BCP	DIP 14	1	MOTOROLA		L
561C 22	0000-7529-351	IC-CMOS	4160BCP	DIP 16	1	MOTOROLA		L
561C 23	0001-0065-475	IC-CMOS	4012BCP	DIP 14	1	MOTOROLA		L
56R 1	0001-0006-625	R-KOEHLE	5R6	0207	1	DRALORIC		L
56R 2	0000-7614-127	R-METALL	336K	0207 TK 50	1	DRALOPIC		L
56P 3	0000-7614-143	R-METALL	167K	0207 TK 50	1	DRALORIC		L
56R 4	0000-7614-208	R-METALL	83K5	0207 TK 50	1	DRALORIC		L
56R 5	0000-7547-401	R-METALL	41K7	0207 TK 50	1	DRALORIC		L
56P 6	0000-7610-817	R-METALL	3M32	0207 TK100	1	RESISTA		L
56P 7	0000-7614-321	R-METALL	1M69	0207 TK 50	1	DRALORIC		L
56R 8	0000-7614-211	R-METALL	845K	0207 TK 50	1	DRALORIC		L
56R 9	0000-7614-282	R-METALL	422K	0207 TK 50	1	DRALORIC		L
56R 10	0001-0002-137	R-METALL	10K	0207 TK 50	1	DRALORIC		L
56R 11	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
56R 12	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
56R 13	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
56R 14	0001-0006-913	R-KOEHLE	1K	0207	1	DRALORIC		L
57C 1	0001-0004-290	C-KERAMIK	22F	63V	1	110/02/09		B---
57C 2	0001-0004-821	C-KERAMIK	22N	40V	1	110/02/10		B---
57C 3	0000-7566-505	C-KF MKT	10N	400V	1	110/03/07		B---
57C 4	0001-0004-180	C-KERAMIK	10F	63V	1	110/02/09		B---
57C 5	0001-0004-821	C-KERAMIK	22N	20/ 80	1	110/02/10		B---
57C 6	0001-0004-821	C-KERAMIK	22N	20/ 80	1	110/02/10		B---
57C 7	0001-0004-177	C-KERAMIK	10P	40V	1	110/02/10		B---
57C 8	0001-0040-885	ELKO-TA SINT FEST	10U	25V	1	110/02/09		B---
57C 9	0000-7598-573	C-KF KP	4N22	25V	1	110/05/61		B---
57C 10	0001-0010-323	C-KF MKT	47N	250V	1	110/03/13		B---
57C 11	0001-0004-821	C-KERAMIK	22N	20/ 80	1	110/03/07		B---
57C 12	0001-0040-775	ELKO-TA SINT FEST	3U3	40V	1	110/02/10		B---
57C 13	0001-0004-711	C-KERAMIK	1N5	16V	1	110/05/61		B---
57C 14	0001-0004-630	C-KERAMIK	330P	63V	1	110/02/10		B---
57C 15	0001-0010-268	C-KF MKT	22N	400V	1	110/02/09		B---
57C 16	0001-0010-459	C-KF P/KT	470N	100V	1	110/03/07		B---

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SERIE II 2011-2401-005 0D-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	LEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
57C 18	0001-0010.378	C-KF MKT	160N	100V	1	110/03/07		B-...
57C 19	0001-0010.323	C-KF MKT	47N	250V	1	110/03/07		B-...
57C 20	0001-0040.966	ELKO-TA SINT FEST	22U	16V	1	110/05/61		B-...
57C 21	0001-0040.966	ELKO-TA SINT FEST	22U	16V	1	110/05/61		B-...
57C 22	0001-0004.737	C-KERAMIK EDPT	2N2	63V	1	110/02/10		B-...
57C 23	0001-0010.093	C-KF MKT	1U	100V	1	110/03/06		B-...
57C 24	0001-0010.394	C-KF MKT	150N	100V	1	110/03/07		B-...
57C 25	0001-0041.745	ELKO-AL	47U	10/ 50	1	110/03/40		B-...
57C 26	0001-0010.394	C-KF MKT	150N	100V	1	110/03/07		B-...
57C 27	0001-0041.745	ELKO-AL	47U	10/ 50	1	110/03/40		B-...
57C 28	0001-0004.737	C-KERAMIK EDPT	2N2	63V	1	110/05/40		B-...
57C 30	0855-0025.003	C-KERAMIK DDMZ	4N7	20/ 80	1	110/02/10		B-...
57C 31	0855-0025.003	C-KERAMIK DDMZ	4N7	20/ 80	1			B-...
57C 32	0855-0025.003	C-KERAMIK DDMZ	4N7	20/ 80	1			B-...
57G 1	0001-0018.998	DIODE SI Z-	ZPD 7,5	00	1	ITT		B-...
57G 2	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 3	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 4	0000-7600.429	IC-DIODEN-ARRAY	ID101	T0 71	1	INTERSIL		B-...
57G 6	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 7	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 8	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 9	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 10	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 11	0001-0018.493	DIODE SI	1 N 4448	00	1	ITT		B-...
57G 12	0001-0018.833	DIODE SI Z-	ZPD 5,1	00	1	ITT		B-...
57G 13	0001-0018.833	DIODE SI Z-	ZPD 5,1	00	1	ITT		B-...
57IC 1	0001-0015.988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		B-...
57IC 2	0001-0015.988	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		B-...
57IC 3	0001-0045.475	IC-CMOS	4012BCP	DIP 14	1	MOTOROLA		B-...
57IC 4	0000-7578.085	IC-QUAD CP.-VERST.	UA324PC	DIP 14	1	FSC		B-...
57IC 5	0000-7581.140	IC-DUAL OP.-VERST.	LM358N	DIP 8	1	MOTOROLA		B-...
57IC 6	0000-7567.054	IC-OP.-VERST. FET	TL081ACP	DIP 8	1	MOTOROLA		B-...
57IC 7	0000-7556.777	IC-OP.-VERST.	UA714HC	T0 99	1	FSC		B-...
57IC 8	0000-7556.777	IC-OP.-VERST.	UA714HC	T0 99	1	FSC		B-...
57L 1	2011-7830.004	SPULE			1			A
57L 2	0001-0043.109	L-FEST	220U 5X	1537-92	1	117/01/02		B-...
57L 3	0001-0043.109	L-FEST	220U 5X	1537-92	1	117/01/02		B-...
57L 4	0000-7567.737	DAEMPFUNGSPERLE	DA= 3,5 DI= 1,2 L= 3,3	R62110-A3011-X022	1	SIEMENS		B-...
57P 1	0000-7537.929	R-TRIM CERMET SQUARE	10K	0W2	1	017/04/06		B-...
57P 2	0001-0008.348	R-TRIM CERMET LIEG	100K	0W5	1	017/02/15		B-...
57P 3	0000-7571.723	R-TRIP CERMET SQUARE	1k	0W2	1	017/04/06		B-...
57P 4	0000-7571.707	R-TRIM CERMET SQUARE	100P	0W2	1	017/04/06		B-...
57P 5	0001-0008.351	R-TRIP CERMET LIEG	470K	0W5	1	017/02/15		B-...
57R 1	0001-0002.221	P-METALL	12K4	1X	1	DRALORIC		B-...
57R 2	0001-0001.895	R-METALL	5K62	1X	1	DRALORIC		B-...
57R 3	0001-0002.098	R-METALL	9K09	1X	1	DRALORIC		B-...

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SERIE F 2011-8401.005 OD-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
57R 4	0001-0001.183	R-METALL	909R	TK 50	1	DRALORIC		B...	L
57R 5	0001-0006.751	R-KOEHLE	68R	0207	56	DRALORIC		R...	L
57R 6	0001-0007.103	R-KOEHLE	39K	0207	56	018/03/01		B...	L
57R 7	0001-0007.103	R-KOEHLE	39K	0207	56	018/03/01		B...	L
57R 8	0001-0002.467	R-METALL	23K7	TK 50	1	DRALORIC		B...	L
57R 9	0001-0065.365	R-METALL	53K6	TK 50	1	DRALORIC		B...	L
57R 10	0001-0007.174	R-KOEHLE	150K	0207	56	018/03/01		B...	L
57R 11	0001-0002.904	R-METALL	75K	TK 50	1	DRALORIC		P...	L
57R 12	0001-0006.719	R-KOEHLE	39R	0207	56	DRALORIC		B...	L
57R 13	0001-0002.328	R-METALL	16K5	TK 50	1	DRALORIC		B...	L
57R 14	0001-0001.992	R-METALL	7K15	TK 50	1	DRALORIC		B...	L
57R 15	0001-0001.183	R-METALL	909R	TK 50	1	DRALORIC		B...	L
57R 16	0001-0006.751	R-KOEHLE	68R	0207	56	DRALORIC		B...	L
57R 17	0001-0007.048	R-KOEHLE	12K	0207	56	DRALORIC		B...	L
57R 18	0001-0007.048	R-KOEHLE	12K	0207	56	DRALORIC		B...	L
57R 19	0001-0002.467	R-METALL	23K7	TK 50	1	DRALORIC		B...	L
57R 20	0001-0002.865	R-METALL	66K5	TK 50	1	DRALORIC		B...	L
57R 21	0001-0002.946	R-METALL	84K5	TK 50	1	DRALORIC		B...	L
57R 22	0001-0063.121	R-METALL	402K	TK 50	1	DRALORIC		B...	L
57R 23	0001-0002.959	R-METALL	86K6	TK 50	1	DRALORIC		B...	L
57R 24	0001-0006.939	R-KOEHLE	1K5	0207	56	DRALORIC		B...	L
57R 25	0001-0006.751	R-KOEHLE	68R	0207	56	DRALORIC		B...	L
57R 26	0001-0002.603	R-METALL	33K2	TK 50	1	DRALORIC		B...	L
57R 27	0001-0001.992	R-METALL	7K15	TK 50	1	DRALORIC		B...	L
57R 28	0001-0002.328	R-METALL	16K5	TK 50	1	DRALORIC		B...	L
57R 29	0001-0001.316	R-METALL	1K33	TK 50	1	DRALORIC		B...	L
57R 30	0001-0001.251	R-METALL	1K15	TK 50	1	DRALORIC		B...	L
57R 31	0001-0006.751	R-KOEHLE	68R	0207	56	DRALORIC		B...	L
57R 32	0001-0007.200	R-KOEHLE	270K	0207	56	018/03/01		B...	L
57R 33	0001-0003.725	R-METALL	357K	TK 50	1	DRALORIC		B...	L
57R 34	0001-0003.408	R-METALL	562K	TK 50	1	DRALORIC		B...	L
57R 35	0001-0001.756	R-METALL	4K12	TK 50	1	DRALORIC		B...	L
57R 36	0001-0006.997	R-KOEHLE	4K7	TK 50	1	DRALORIC		B...	L
57R 37	0001-0001.808	R-METALL	4K64	TK 50	1	DRALORIC		B...	L
57R 38	0001-0001.808	R-METALL	4K64	TK 50	1	DRALORIC		B...	L
57R 39	0001-0006.939	R-KOEHLE	1K5	TK 50	1	DRALORIC		B...	L
57R 40	0001-0000.993	R-METALL	523R	TK 50	1	DRALORIC		B...	L
57R 41	0001-0000.993	R-METALL	523R	TK 50	1	DRALORIC		B...	L
57R 42	0001-0007.022	R-KOEHLE	8K2	TK 50	1	DRALORIC		B...	L
57R 43	0001-0007.145	R-KOEHLE	82K	TK 50	1	DRALORIC		B...	L
57R 44	0001-0007.103	R-KOEHLE	39K	TK 50	1	018/03/01		B...	L
57R 45	0001-0003.181	R-METALL	200K	TK 50	1	DRALORIC		B...	L
57R 46	0001-0003.181	R-METALL	200K	TK 50	1	DRALORIC		B...	L
57R 47	0001-0062.025	R-METALL	301K	TK 50	1	DRALORIC		B...	L
57R 48	0001-0062.025	R-METALL	301K	TK 50	1	DRALORIC		B...	L
57R 49	0001-0062.025	R-METALL	301K	TK 50	1	DRALORIC		B...	L
57R 50	0001-0062.025	R-METALL	301K	TK 50	1	DRALORIC		B...	L
57R 51	0001-0007.323	R-KOEHLE	301K	TK 50	1	DRALORIC		B...	L
57R 52	0001-0006.858	R-KOEHLE	301K	TK 50	1	DRALORIC		B...	L
57R 53	0001-0007.158	R-KOEHLE	330R	TK 50	1	DRALORIC		B...	L
57R 54	0001-0003.233	R-METALL	100K	TK 50	1	018/03/01		B...	L
57P 54	0001-0003.233	R-METALL	243K	TK 50	1	DRALORIC		B...	L

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SERIE M 2011-8401.005 OD-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	BEREMKUNG NOTE	SERIE AF VERSION
57P 55	0001-0002.593	R-METALL	3214	TK 50	1	DRALORIC		B...
57R 56	0001-0007.284	R-KOEHLE	1M	0207	1	DRALORIC		B...
57R 57	0001-0007.156	R-KOEHLE	100K	0207	1	018/03/01		B...
57R 58	0001-0006.955	R-KOHLF	2K2	0207	1	DRALORIC		B...
57P 59	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		B...
57P 60	0001-0007.035	R-KOEHLE	10K	0207	1	DRALORIC		B...
57R 61	0001-0006.890	R-KOEHLE	680R	0207	1	DRALORIC		B...
57R 62	0001-0003.822	R-METALL	110K	0207	1	DRALORIC		B...
57P 63	0001-0001.413	R-METALL	1K82	TK 50	1	DRALORIC		B...
57P 64	0001-0000.715	R-METALL	221R	TK 50	1	DRALORIC		B...
57R 65	0001-0000.980	R-METALL	499R	TK 50	1	DRALORIC		B...
57R 66	0001-0007.019	R-KOEHLE	6K8	0207	1	DRALORIC		B...
57R 67	0001-0007.019	R-KOEHLE	6K8	0207	1	DRALORIC		B...
57R 68	0001-0007.080	R-KOEHLE	27K	0207	1	DRALORIC		B...
57R 69	0001-0007.161	R-KOEHLE	120K	0207	1	018/03/01		B...
57R 70	0001-0007.158	R-KOEHLE	100K	0207	1	018/03/01		B...
57P 71	0001-0006.900	R-KOEHLE	820R	0207	1	DRALORIC		B...
57R 72	0001-0006.751	R-KOEHLE	6ER	0207	1	DRALORIC		B...
57P 73	0001-0006.751	R-KOEHLE	68R	0207	1	DRALORIC		B...
57P 74	0001-0003.796	R-METALL	1K78	TK 50	1	DRALORIC		B...
57R 75	0001-0006.913	R-KOEHLE	1K	0207	1	DRALORIC		B...
57S 1	0000-1832.015	S-DUAL-IN-LINE	1 100 SN HAKEN-	GEK.: C42315-A1347-A124	1	SIEMENS		B...
57S 2	0000-1832.015	S-DUAL-IN-LINE	1 100 SN HAKEN-	GEK.: C42315-A1347-A124	1	SIEMENS		B...
57T 1	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 2	0001-0016.712	TRANS SI PNP	2 N 4035(BFX46)	A TO 18	1	SGS		B...
57T 3	0001-0016.712	TRANS SI PNP	2 N 4035(BFX48)	A TO 18	1	SGS		B...
57T 4	0001-0016.987	TRANS SI NPN	2 N 2369(BSX93)	A TO 18	1	FSC		B...
57T 5	0001-0016.903	TRANS SI NPN	8FY 90	A TO 72	1	SIEMENS		B...
57T 6	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 7	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 8	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 9	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 10	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 11	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 12	0001-0016.987	TRANS SI NPN	2 N 2369(BSX93)	A TO 18	1	FSC		B...
57T 13	0001-0016.903	TRANS SI NPN	8FY 90	A TO 72	1	SIEMENS		B...
57T 14	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 15	0000-7567.850	TRANS SI NPN JFET	BCY 59 X (D)	A TO 18	1	SILICOMIX		B...
57T 16	0001-0016.518	TRANS SI NPN	IU 402	H TO 71	1	TFK		B...
57T 17	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 18	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 19	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 20	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 21	0001-0016.550	TRANS SI PNP	BCY 78 X (D)	A TO 18	1	MOT		B...
57T 22	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 23	0001-0016.628	TRANS SI NPN JFET	LF 245 A	D SOT 54	1	VALVO		B...
57T 24	0001-0016.518	TRANS SI NPN	BCY 59 X (D)	A TO 18	1	TFK		B...
57T 25	0000-7513.231	TRANS SI NPN DARLING	MPS-A 13	E TO 92	1	MOTOROLA		B...
57T 26	0000-7531.491	TRANS SI NPN DARLING	MPS-A 63	B TO 92	1	MOTOROLA		B...

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SERIE M 2011-8401-005 OD-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	ZEICHNUNG 1 MARKING 1	ZEICHNUNG 2 MARKING 2	MG QUANT	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION
58C 1	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		L
58C 2	0001-0004.504	C-KERAMIK EDPT	160P	NP 0	56	110/02/09		L
58C 3	0001-0004.821	C-KERAMIK EDPT	22N	2Z	56	110/02/10		L
58C 4	0001-0004.818	C-KERAMIK EDPT	10N	20/80	56	110/02/10		L
58C 5	0001-0004.818	C-KERAMIK EDPT	10N	20/100	56	110/02/10		L
58C 6	0001-0004.818	C-KERAMIK EDPT	10N	20/100	56	110/02/10		L
58C 7	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 8	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 9	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 10	0001-0004.009	C-KERAMIK EDPT	2P2	OP25	56	110/02/10		L
58C 11	0001-0004.821	C-KERAMIK EDPT	22N	20/80	56	110/02/10		L
58C 12	0001-0040.966	ELKO-TA SINT FEST	22U	20Z	56	110/02/10		L
58C 13	0001-0004.821	C-KERAMIK EDPT	22N	20/80	56	110/02/10		L
58C 14	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 15	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 16	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 17	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 18	0001-0004.698	C-KERAMIK EDPT	1N	10Z	56	110/02/10		L
58C 19	0001-0040.775	ELKO-TA SINT FEST	303	20Z	56	110/02/10		L
58C 20	0001-0004.818	C-KERAMIK EDPT	10N	20/100	56	110/05/61		L
58C 22	0855-0025.003	C-KERAMIK DDMZ	4N7	20/80	04	110/02/10		L
58C 23	0855-0025.003	C-KERAMIK DDMZ	4N7	20/80	04	110/02/10		L
58C 24	0855-0025.003	C-KERAMIK DDMZ	4N7	20/80	04	110/02/10		L
58GL 1	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	HP 5082-2811	1	HPA		L
58GL 2	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	HP 5082-2811	1	HPA		L
58GL 3	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	HP 5082-2811	1	HPA		L
58GL 4	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	HP 5082-2811	1	HPA		L
58GL 5	0001-0018.231	DIODE SI SCHOTTKY-	HP 5082-2811	HP 5082-2811	1	HPA		L
58GL 6	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 7	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 8	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 9	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 10	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 11	0000-7574.982	DIODE SI C-	BP 329	BP 329	1	ITT		L
58GL 12	0000-7574.982	DIODE SI C-	BP 329	BP 329	1	ITT		L
58GL 13	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 14	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58GL 15	0001-0018.493	DIODE SI	1 N 4448	1 N 4448	1	ITT		L
58IC 1	0001-0068.197	IC CMOS	4049UECF	DIP 16	1	MOTOROLA		L
58IC 2	0001-0067.567	IC-CMOS	4028BCP	DIP 16	1	MOTOROLA		L
58L 1	0000-7556.311	L-FEST	150U	10Z	30	0,8	11 15R	L
58L 2	0000-7556.065	L-FEST	1U2	10Z	25	7,9	150 0R18	L
58L 3	0000-7556.175	L-FEST	10U	10Z	55	7,9	50 3R4	L
58L 4	0000-7556.175	L-FEST	10U	10Z	55	7,9	50 3R4	L
58L 5	0000-7556.175	L-FEST	10U	10Z	55	7,9	50 3R4	L
58L 6	0000-7556.175	L-FEST	10U	10Z	55	7,9	50 3R4	L
58L 7	0000-7556.175	L-FEST	10U	10Z	55	7,9	50 3R4	L

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SERIE M 2011-8401-005 0D-15 2011/01 AUSF:

TEIL C-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	VERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
58P 1	0001-0008.490	R-TRIM CERMET	47K 20% UWS 1	TK 100	1	017/02/15		L
58P 2	0001-0008.487	R-TRIM CERMET	22K 20% OWS 1	TK 100	1	017/02/15		L
58P 3	0001-0008.487	R-TRIM CERMET	22K 20% OWS 1	TK 100	1	017/02/15		L
58P 4	0001-0008.474	R-TRIM CERMET	10K 20% OWS 1	TK 100	1	017/02/15		L
58P 5	0001-0008.474	R-TRIM CERMET	10K 20% OWS 1	TK 100	1	017/02/15		L
58Q 1	2011-9701.005	STEUERQUARZ	36.000,000KHZ	HC/450	1			L
58Q 2	2011-9702.004	STEUERQUARZ	38.000,000KHZ	HC/450	1			L
58Q 3	2011-9703.003	STEUERQUARZ	40.000,000KHZ	HC/450	1			L
58Q 4	2011-9704.002	STEUERQUARZ	42.000,000KHZ	HC/450	1			L
58Q 5	2011-9705.001	STEUERQUARZ	44.000,000KHZ	HC/450	1			L
58R 1	0001-0000.472	R-METALL	82R5 1X	TK 50	1	DRALORIC		L
58R 2	0001-0000.715	R-METALL	22TR 1X	TK 50	1	DRALORIC		L
58R 3	0001-0001.219	P-METALL	1K 1X	TK 50	1	DRALORIC		L
58R 4	0001-0002.878	R-METALL	68K1 1X	TK 50	1	DRALORIC		L
58R 5	0001-0000.566	R-METALL	12TR 1X	TK 50	1	DRALORIC		L
58R 6	0001-0000.184	R-METALL	22R1 1X	TK 50	1	DRALORIC		L
58R 7	0001-0001.963	R-METALL	61G5 1X	TK 50	1	DRALORIC		L
58R 8	0001-0001.879	R-METALL	5K36 1X	TK 50	1	DRALORIC		L
58R 9	0001-0000.566	R-METALL	12TR 1X	TK 50	1	DRALORIC		L
58R 10	0001-0002.328	R-METALL	16K5 1X	TK 50	1	DRALORIC		L
58R 11	0001-0000.566	R-METALL	12TR 1X	TK 50	1	DRALORIC		L
58R 12	0001-0002.137	R-METALL	10K 1X	TK 50	1	DRALORIC		L
58R 13	0001-0002.137	R-METALL	10K 1X	TK 50	1	DRALORIC		L
58R 14	0001-0002.991	R-METALL	100K 1X	TK 50	1	DRALORIC		L
58R 15	0001-0002.519	R-METALL	26K7 1X	TK 50	1	DRALORIC		L
58R 16	0001-0000.472	R-METALL	82R5 1X	TK 50	1	DRALORIC		L
58R 17	0001-0002.137	R-METALL	10K 1X	TK 50	1	DRALORIC		L
58R 18	0001-0001.824	R-METALL	4K75 1X	TK 50	1	DRALORIC		L
58R 19	0001-0002.056	R-METALL	8F25 1X	TK 50	1	DRALORIC		L
58R 20	0001-0002.878	R-METALL	68K1 1X	TK 50	1	DRALORIC		L
58R 21	0001-0002.739	R-METALL	47F5 1X	TK 50	1	DRALORIC		L
58R 22	0001-0002.360	R-METALL	18F2 1X	TK 50	1	DRALORIC		L
58R 23	0001-0002.137	R-METALL	10K 1X	TK 50	1	DRALORIC		L
58P 24	0001-0001.662	R-METALL	3K32 1X	TK 50	1	DRALORIC		L
58R 25	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC		L
58R 26	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC		L
58P 27	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC		L
58P 28	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC		L
58P 29	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC		L
58R 30	0001-0000.472	R-METALL	82R5 1X	TK 50	1	DRALORIC		L
58R 31	0001-0000.472	R-METALL	82R5 1X	TK 50	1	DRALORIC		L
58R 32	0001-0000.537	R-METALL	100R 1X	TK 50	1	DRALORIC		L
58R 33	0001-0000.744	R-METALL	249P 1X	TK 50	1	DRALORIC		L
58R 34	0001-0000.074	R-METALL	10R 1X	TK 50	1	DRALORIC		L
58R 35	0001-0002.098	R-METALL	9K09 1X	TK 50	1	DRALORIC		L
58P 36	0001-0002.386	R-METALL	19K1 1X	TK 50	1	DRALORIC		L
58P 37	0001-0002.658	R-METALL	39K2 1X	TK 50	1	DRALORIC		L
58R 38	0001-0001.992	R-METALL	7K15 1X	TK 50	1	DRALORIC		L
58P 39	0001-0002.593	R-METALL	22K4 1X	TK 50	1	DRALORIC		L

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SERIE M 2C11-8401.005 00-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BEZEICHNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	REMERKUNG NOTE	SERIE AF VERSION
58P 40	0001-0006.793	R-KOEHLE	100R 5X 0207		1	DRALORIC		L
58T 1	0001-0016.550	TRANS SI PNP	BCY 78 X (D) A TO 18		1	MOT		L
58T 2	0001-0016.903	TRANS SI MPH	EFY 90 A TO 72		1	SIEMENS		L
58T 3	0001-0016.903	TRANS SI MPH	EFY 90 A TO 72		1	SIEMENS		L
58T 4	0001-0016.903	TRANS SI MPN	EFY 90 A TO 72		1	SIEMENS		L
58T 5	0001-0016.929	TRANS SI PNP	2 N 2894(BSX29) A TO 18		1	FSC		L
58UE 1	2011-7728.006	UEBERTRAGER			1			A
59C 1	0001-0040.966	ELKO-TA SINT FEST	22U 20X 20/ 80 16V	ETR-3	1	110/05/61		L
59C 2	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80 40V	R10000 2	1	110/02/10		L
59C 3	0000-7500.901	C-KERAMIK EDPT	ARGLEICHWERT		1	110/02/09		L
59C 4	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80 40V	R10000 2	1	110/02/09		L
59C 5	0001-0004.821	C-KERAMIK EDPT	470P 10X 63V	R 2000 2	1	110/02/10		L
59C 6	0001-0004.669	C-KERAMIK EDPT	22N 20/ 80 40V	R 10000 2	1	110/02/10		L
59C 7	0001-0004.821	C-KERAMIK EDPT	303 20X 16V	ETR-1	1	110/05/61		L
59C 9	0001-0040.775	ELKO-TA SINT FEST	18P 2X 63V	MP 0 1P	1	110/02/09		L
59C 10	0001-0004.258	C-KERAMIK EDPT	10P 2X 63V	MP 0 1B	1	110/02/09		L
59C 11	0001-0004.177	C-KERAMIK EDPT	11N 10X 63V	R 2000 2	1	110/02/10		L
59C 12	0001-0004.698	C-KERAMIK EDPT	22P 2X 63V	MP 0 1B	1	110/02/09		L
59C 13	0001-0004.287	C-KERAMIK EDPT	18P 2X 63V	MP 0 1P	1	110/02/09		L
59C 14	0001-0004.258	C-KERAMIK EDPT	22U 20X 16V	ETR-3	1	110/05/61		L
59C 15	0001-0040.966	ELKO-TA SINT FEST	22U 20X 16V	ETR-3	1	110/05/61		L
59C 16	0001-0040.966	ELKO-TA SINT FEST	22U 20X 16V	ETR-3	1	110/05/61		L
59C 17	0001-0004.384	C-KERAMIK EDPT	47P 2X 63V	MP 0 1B	1	110/02/09		L
59C 18	0855-0022.006	C-KERAMIK DDMZ	4N7 20/ 80 63V	D 6000 2	1			L
59C 19	0855-0022.006	C-KERAMIK DDFZ	4N7 20/ 80 63V	D 6000 2	1			L
59GL 1	0001-0018.244	DIODE SI SCHOTTKY-	HP 5082-2815 DO 35	LOSES QUARTETT AUS HPS08	1	HPA		L
59GL 5	0001-0018.859	DIODE SI Z-	ZPD 5,6 P0 35		1	ITT		L
59GL 6	0001-0018.493	DIODE SI	1 N 4448 DO 35		1	ITT		L
59IC 1	0000-7520.109	IC-OP.-VERST. FET	TL061CP DIP 8		1	TEXAS		L
59L 1	0000-7556.065	L-FEST	102 10X 1025-22	25 7,9 150 0R18 565MA	1	117/01/03		L
59P 1	0001-0008.364	R-TRIM CERMET LIEG	1M 20X 0W5 1	TY 100 (CALT 17/02/08)	1	017/02/15		L
59R 1	0001-0006.777	R-KOHL	82R 5X 0207		1	DRALORIC		L
59R 2	0001-0006.793	R-KOHL	100P 5X 0207		1	DRALORIC		L
59R 3	0001-0006.858	R-KOHL	330R 5X 0207		1	DRALORIC		L
59R 4	0001-0006.777	R-KOHL	82R 5X 0207		1	DRALORIC		L
59R 5	0001-0007.051	R-KOHL	15R 5X 0207		1	DRALORIC		L
59R 6	0001-0007.022	R-KOHL	8K2 5X 0207		1	DRALORIC		L
59R 7	0001-0006.832	R-KOHL	220R 5X 0207		1	DRALORIC		L
59R 9	0001-0007.116	R-KOHL	47K 5X 0207		1	DRALORIC		L
59R 10	0001-0006.793	R-KOHL	100R 5X 0207		1	DRALORIC		L
59R 11	0001-0006.858	R-KOHL	330R 5X 0207		1	DRALORIC		L
59R 12	0001-0006.971	R-KOHL	3K3 5X 0207		1	DRALORIC		L

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SERIAL M 2011-8401-005 0D-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
59P 13	0001-0007-145	R-KOEHLE	82K 5X	0207	1	018/03/01		L
59P 14	0001-0007-336	R-KOEHLE	3M3 5X	0207	1	DRALORIC		L
59P 15	0001-0006-926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		L
59P 16	0001-0007-048	R-KOEHLE	12K 5X	0207	1	DRALORIC		L
59P 17	0001-0006-997	R-KOEHLE	4K7 5X	0207	1	DRALORIC		L
59P 18	0001-0006-955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		L
59P 19	0001-0006-641	R-KOEHLE	10R 5X	0207	1	DRALORIC		L
59P 20	0001-0006-641	R-KOEHLE	10R 5X	0207	1	DRALORIC		L
59P 21	0001-0007-190	R-KOEHLE	220K 5X	0207	1	018/03/01		L
59P 22	0001-0007-022	R-KOEHLE	8K2 5X	0207	1	DRALORIC		L
59P 23	0001-0006-955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		L
59P 24	0001-0006-900	R-KOEHLE	820R 5X	0207	1	DRALORIC		L
59P 25	0001-0006-900	R-KOEHLE	820R 5X	0207	1	DRALORIC		L
59P 26	0001-0006-793	R-KOEHLE	100R 5X	0207	1	DRALORIC		L
59P 27	0001-0006-793	R-KOEHLE	100R 5X	0207	1	DRALORIC		L
59S 1	0000-1832-015	S-DUAL-IN-LINE	1 100 SN HAKEN-	6EK.: C42315-A1347-A124	1	SIEMENS		L
59T 1	0001-0016-929	TRANS SI PNP	2 N 2894 (BSX29) A TO 18		1	FSC		L
59T 2	0001-0016-903	TRANS SI PNP	BFY 90 A TO 72		1	SIEMENS		L
59T 3	0001-0016-903	TRANS SI NPN	BFY 90 A TO 72		1	SIEMENS		L
59T 4	0001-0016-929	TRANS SI PNP	2 N 2894 (BSX29) A TO 18		1	FSC		L
59T 5	0001-0016-903	TRANS SI NPN	BFY 90 A TO 72		1	SIEMENS		L
59UE 1	2011-7729-005	UEBERTRAGER			1			A
60C 1	0001-0040-720	ELKO-TA SINT FEST	1U5 20X	25V	1	110/05/61		L
60C 2	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		L
60C 3	0001-0004-504	C-KERAMIK EDPT	100P 2X	63V	1	110/02/09		L
60C 4	0001-0004-203	C-KERAMIK EDPT	12P 2X	63V	1	110/02/09		L
60C 5	0001-0040-966	ELKO-TA SINT FEST	22U 20X	16V	1	110/05/61	ARGLEICHWERT	L
60C 6	0001-0010-093	C-KF MKT	1U 10X	100V	1	110/03/06		L
60C 7	0001-0040-966	ELKO-TA SINT FEST	22U 20X	16V	1	110/05/61		L
60C 8	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 9	0001-0004-504	C-KERAMIK EDPT	100P 2X	63V	1	110/02/09		L
60C 10	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 13	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/05/61		L
60C 14	0001-0040-966	ELFO-TA SINT FEST	22U 20X	16V	1	110/02/10		L
60C 15	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 16	0001-0040-966	ELKO-TA SINT FEST	22U 20X	16V	1	110/05/61		L
60C 17	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 18	0001-0004-795	C-KERAMIK EDPT	4N7 10X	63V	1	110/02/10		L
60C 19	0001-0040-704	ELKO-TA SINT FEST	1U 20X	35V	1	110/05/61		L
60C 20	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 21	0001-0004-821	C-KERAMIK EDPT	22N 20/ 80	40V	1	110/02/10		L
60C 22	0001-0040-966	ELKO-TA SINT FEST	22U 20X	16V	1	110/02/10		L
60C 23	0001-0004-203	C-KERAMIK EDPT	12P 2X	63V	1	110/05/61		L
60C 24	0855-0022-006	C-KERAMIK DMZ	4N7 20/ 30	63V	1	110/02/10		L
60C 25	0855-0025-003	C-KERAMIK DMZ	4N7 20/ 80	63V	1	110/05/61		L
60C 26	0855-0022-006	C-KERAMIK DMZ	4N7 20/ 80	63V	1	110/02/09		L

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SERIE N: 2011-8401.005 0D-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	FEMERKUNG NOTE	SERIE AF VERSION	C
60GL 1	0000-7599.860	DIODE SI C-	U 409	00 35	1	SIEMENS			L
60GL 2	0000-7599.860	DIODE SI C-	UB 409	00 35	1	SIEMENS			L
60GL 3	0000-7599.860	DIODE SI C-	BB 409	00 35	1	SIEMENS			L
60GL 4	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800	00 35 = 1N5711	1	HPA			L
60GL 5	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800	00 35 = 1N5711	1	HPA			L
60L 1	0000-7556.133	L-FEST	407 10X	1025-36	1	117/01/03			L
60L 2	2011-7881.008	SPULE	303 10X	1025-32	1	117/01/03			L
60L 3	0000-7556.117	L-FEST			1				A
60P 1	0000-7554.096	R-TRIM CERMET	LIEG1220K	20Z 0W5	1	017/02/15			L
60R 1	0001-0002.250	R-METALL	13K7	1X 0207	1	DRALORIC	ARGLICHWERT		L
60R 2	0001-0002.564	R-METALL	30K1	1X 0207	1	DRALORIC			L
60R 3	0001-0002.755	R-METALL	49K9	1X 0207	1	DRALORIC			L
60R 4	0001-0002.823	R-METALL	60K4	1X 0207	1	DRALORIC			L
60R 5	0000-7601.363	R-METALL	270K	1X 0207	1	DRALORIC			L
60R 6	0001-0006.777	R-KOEHLE	82R	5X 0207	1	DRALORIC			L
60R 7	0001-0002.218	R-METALL	12K1	1X 0207	1	DRALORIC			L
60R 8	0001-0007.145	R-KOEHLE	82K	5X 0207	1	018/03/01			L
60R 9	0001-0006.913	R-KOEHLE	1K	5X 0207	1	DRALORIC			L
60R 10	0001-0002.263	R-METALL	14K	1X 0207	1	DRALORIC			L
60R 11	0001-0002.645	R-METALL	38K3	1X 0207	1	DRALORIC			L
60R 12	0001-0006.816	R-KOEHLE	150R	5X 0207	1	DRALORIC			L
60R 13	0001-0006.816	R-KOEHLE	150R	5X 0207	1	DRALORIC			L
60R 14	0001-0006.793	R-KOEHLE	100R	5X 0207	1	DRALORIC			L
60R 15	0001-0006.793	R-KOEHLE	100R	5X 0207	1	DRALORIC			L
60R 16	0001-0006.793	R-KOEHLE	100R	5X 0207	1	DRALORIC			L
60R 17	0001-0000.906	R-METALL	402P	1X 0207	1	DRALORIC			L
60R 18	0001-0000.935	R-METALL	432K	1X 0207	1	DRALORIC			L
60R 19	0001-0001.374	R-METALL	1K58	1X 0207	1	DRALORIC			L
60R 20	0001-0007.077	R-KOEHLE	22K	5X 0207	1	DRALORIC			L
60R 21	0001-0000.469	R-METALL	80K6	1X 0207	1	DRALORIC			L
60R 22	0001-0002.056	R-METALL	8K25	1X 0207	1	DRALORIC			L
60R 23	0001-0002.467	R-METALL	23K7	1X 0207	1	DRALORIC			L
60R 24	0001-0006.816	R-KOEHLE	150K	5X 0207	1	DRALORIC			L
60R 25	0001-0006.722	R-KOEHLE	47R	5X 0207	1	DRALORIC			L
60R 28	0001-0000.935	R-METALL	432P	1X 0207	1	DRALORIC			L
60R 29	0001-0001.167	R-METALL	866R	1X 0207	1	DRALORIC			L
60P 30	0001-0006.793	R-KOEHLE	100R	5X 0207	1	DRALORIC			L
60R 31	0001-0006.913	R-KOEHLE	1K	5X 0207	1	DRALORIC			L
60R 32	0001-0006.641	R-KOEHLE	10K	5X 0207	1	DRALORIC			L
60R 33	0001-0006.793	R-KOEHLE	100K	5X 0207	1	DRALORIC			L
60R 34	0001-0000.537	R-METALL	100R	1X 0207	1	DRALORIC			L
60S 1	0000-7631.016	S-DUAL-IN-LINE	T 001 SN HALEN-	IGFK.: 642315-A1347-A212	1	SIEMENS			L
60T 1	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
60T 2	0001-0016.518	TRANS SI NPN	LCY 59 X (D)	A TO 18	1	TFK			L
60T 3	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
60T 4	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L
60T 5	0001-0016.903	TRANS SI NPN	DFY 90	A TO 72	1	SIEMENS			L

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SERIE P 2011-8401.005 Cd-15 2011/01

AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	PEMERKUNG NOTE	SERIE AF VERSION
60T	0001-0016.518	TRANS SI NPH	BCY 59 X (D) A TO 18		1	TFK		
61C	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0004.656	C-FERAMIK EDPT	390P	R 2000 2	1	110/02/10		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0040.775	ELKO-TA SINT FEST	3U3	ETR-1	1	110/05/61		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0004.656	C-KERAMIK EDPT	390P	R 2000 2	1	110/02/10		
61C	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
61C	0001-0040.775	ELKO-TA SINT FEST	3U3	ETR-1	1	110/05/61		
61C	0001-0004.559	C-KERAMIK EDPT	120P	NP 0 1B	1	110/02/09		
61C	0001-0004.627	C-KERAMIK EDPT	270P	N 750 1B	1	110/02/09		
61C	0001-0004.559	C-KERAMIK EDPT	120P	NP 0 1B	1	110/02/09		
61C	0001-0004.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		
61C	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	1	110/02/10		
61C	0855-0022.006	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1			
61C	0855-0025.003	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1			
61C	0855-0022.006	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1			
61C	0855-0025.003	C-KERAMIK DDMZ	4N7 20/ 80	D 6000 2	1			
61C	0001-0004.067	C-KERAMIK EDPT	3F9	NP 0 1B	1	110/02/09		
61C	0001-0004.656	C-KERAMIK EDPT	390P	R 2000 2	1	110/02/10		
61C	0001-0004.203	C-KERAMIK EDPT	12P	NP 0 1B	1	110/02/09		
611C	0600-7555.215	RINGMISCHER	1E-500		1	MINICIRC.		
61L	0000-7556.104	L-FEST	207 10X	35 7,9 100	1	117/01/03		
61L	0000-7556.104	L-FEST	207 10X	35 7,9 100	1	117/01/03		
61R	0001-0002.072	R-METALL	8K66	TK 50	1	DRALORIC		
61R	0001-0002.331	R-METALL	16F9	TK 50	1	DRALORIC		
61R	0001-0006.793	R-KOHLE	100R		1	DRALORIC		
61R	0001-0006.719	R-KOHLE	39F		1	DRALORIC		
61R	0001-0006.683	R-KOHLE	22R		1	DRALORIC		
61R	0001-0001.316	R-METALL	1K33	TK 50	1	DRALORIC		
61R	0001-0000.605	R-METALL	143R	TK 50	1	DRALORIC		
61R	0001-0001.361	R-METALL	1H54	TK 50	1	DRALORIC		
61R	0001-0006.793	R-KOHLE	100R		1	DRALORIC		
61R	0001-0000.618	R-METALL	150R		1	DRALORIC		
61R	0001-0001.617	R-METALL	2K94	TK 50	1	DRALORIC		
61R	0001-0001.617	R-METALL	2K94	TK 50	1	DRALORIC		
61R	0001-0001.073	R-METALL	665R	TK 50	1	DRALORIC		
61R	0001-0006.793	R-KOHLE	100R		1	DRALORIC		
61R	0001-0001.167	R-METALL	846R	TK 50	1	DRALORIC		
61R	0001-0007.035	R-METALL	10F		1	DRALORIC		
61R	0001-0006.793	R-KOHLE	100R		1	DRALORIC		
61R	0001-0000.618	R-METALL	150F	TK 50	1	DRALORIC		

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SERIE N: 2011-8401-005 00-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NP ITEM NO	BENENNUNG DESIGNATION	LEZFEICHNUNG 1 MARKING 1	LEZFEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION
61P 20	0001-0002.632	R-METALL	37K4	TK 50	1	DRALORIC		
61P 21	0001-0002.438	R-METALL	21K5	TK 50	1	DRALORIC		
61P 22	0001-0006.793	R-KOEHLE	100R		1	DRALORIC		
61R 23	0001-0006.816	R-KOEHLE	150K		1	DRALORIC		
61R 24	0001-0001.921	R-METALL	6K04	TK 50	1	DRALORIC		
61P 25	0001-0001.086	R-METALL	681R	TK 50	1	DRALORIC		
61R 26	0001-0000.634	R-METALL	169R	TK 50	1	DRALORIC		
61P 27	0001-0006.641	R-KOEHLE	10R		1	DRALORIC		
61P 28	0001-0006.641	R-KOEHLE	10R		1	DRALORIC		
61R 29	0001-0006.641	R-KOEHLE	10R		1	DRALORIC		
61R 30	0001-0006.641	R-KOEHLE	10R		1	DRALORIC		
61R 31	0001-0003.518	R-METALL	47R5	TK 50	1	DRALORIC		
61P 32	0001-0006.751	R-KOEHLE	68R		1	DRALORIC		
61T 1	0001-0016.903	TRANS SI NPN	DFY 90		1	SIEMENS		
61T 2	0001-0016.903	TRANS SI NPN	BFY 90		1	SIEMENS		
61T 3	0000-7536.153	TRANS SI PNP	2 N 4209		1	FSC		
61T 4	0001-0016.518	TRANS SI NPN	BCY 59 X (D)		1	TFK		
61T 5	0001-0016.903	TRANS SI NPN	DFY 90		1	SIEMENS		
62C 1	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
62C 2	0001-0004.368	C-KERAMIK EDPT	39P	NP 0	1	110/02/09		
62C 3	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
62C 4	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		
62C 5	0001-0004.504	C-KERAMIK EDPT	100P	NP 0	1	110/02/09		
62C 6	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
62C 7	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		
62C 8	0001-0004.339	C-KERAMIK EDPT	33P	NP 0	1	110/02/09		
62C 9	0001-0004.177	C-KERAMIK EDPT	10P	NP 0	1	110/02/09		
62C 10	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		
62C 11	0001-0004.339	C-KERAMIK EDPT	33P	NP 0	1	110/05/61		
62C 13	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
62C 14	0001-0040.704	ELKO-TA SINT FEST	1U	ETR-1	1	110/05/61		
62C 15	0001-0004.821	C-KERAMIK EDPT	22P	R10000 2	1	110/02/10		
62C 16	0001-0004.601	C-KERAMIK EDPT	22U	N 75C 18	1	110/02/09		
62C 17	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		
62C 18	0001-0004.821	C-KERAMIK EDPT	22U	ETR-3	1	110/05/61		
62C 19	0001-0004.779	C-KERAMIK EDPT	3N3	R 2000 2	1	110/02/10		
62C 20	0001-0004.504	C-KERAMIK EDPT	100P	NP 0	1	110/02/09		
62C 21	0001-0040.966	ELKO-TA SINT FEST	22U	ETR-3	1	110/05/61		
62C 22	0001-0010.323	C-KF MKT	47N	IMKT1822	1	110/05/61		
62C 24	0655-0025.003	C-KERAMIK DDMZ	4N7	D 6000 2	1	110/03/07		
62GL 1	0001-0018.228	DIODE SI SCHOTTKY-	HP 5082-2800	D 0 35 = 1N5711	1	HPA		
62GL 2	0001-0064.104	DIODE SI STABI-	ZTE 2	D 0 35	1	ITT		
62IC 1	0000-7576.935	IC-DUAL OPVERST. FET	TL062CP	DIP 8	1	TEXAS		
62IC 2	0001-0065.695	IC-TTL	74LS00N	DIP 14	1	TEXAS		
62IC 3	0001-0065.695	IC-TTL	74LS00N	DIP 14	1	TEXAS		
62IC 4	0001-0066.238	IC-TTL	74LS20N	DIP 14	1	TEXAS		

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SERIE M 2011-8401.005 00-15 2011/01 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	LEZEICHNUNG 1 MARKING 1	LEZEICHNUNG 2 MARKING 2	M6 QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
621C	5	IC-TTL	7ALS10N	DIP 14	1	TEXAS		L
621C	6	IC-KOMPARATOR DUAL	LM393N	DIP 8	1	NSC		L
621C	7	IC-OP.-VERST. FET	TL071CP	DIP 8	1	TEXAS		L
62L	1	L-FEST	1100U 10X	1025-68	1	117/01/93		L
62L	2	L-FEST	1100U 10X	1025-68	1	117/01/03		L
62P	1	R-METALL	549R	0207	1	DRALORIC		L
62P	2	R-METALL	34K8	0207	1	DRALORIC		L
62P	3	R-METALL	20K	0207	1	DRALORIC		L
62P	4	R-KOHLE	100R	0207	1	DRALORIC		L
62P	5	R-METALL	3K32	0207	1	DRALORIC		L
62P	6	R-METALL	3K48	0207	1	DRALORIC		L
62P	7	R-METALL	2K	0207	1	DRALORIC		L
62P	8	R-KOHLE	100R	0207	1	DRALORIC		L
62P	9	R-KOHLE	100R	0207	1	DRALORIC		L
62P	10	R-METALL	3K32	0207	1	DRALORIC		L
62P	11	R-KOHLE	68R	0207	1	DRALORIC		L
62P	12	R-METALL	2K32	0207	1	DRALORIC		L
62P	13	R-METALL	499R	0207	1	DRALORIC		L
62P	14	R-KOHLE	330R	0207	1	DRALORIC		L
62P	16	R-KOHLE	470R	0207	1	DRALORIC		L
62P	17	R-KOHLE	10K	0207	1	DRALORIC		L
62P	18	R-KOHLE	68R	0207	1	DRALORIC		L
62P	19	R-METALL	2K32	0207	1	DRALORIC		L
62P	20	R-METALL	499R	0207	1	DRALORIC		L
62P	21	R-METALL	3K01	0207	1	DRALORIC		L
62P	22	R-METALL	16K9	0207	1	DRALORIC		L
62P	23	R-METALL	20K	0207	1	DRALORIC		L
62P	24	R-METALL	30K1	0207	1	DRALORIC		L
62P	25	R-METALL	10K	0207	1	DRALORIC		L
62P	26	R-KOHLE	10K	0207	1	DRALORIC		L
62P	29	R-KOHLE	10K	0207	1	DRALORIC		L
62P	30	R-KOHLE	10K	0207	1	DRALORIC		L
62P	31	R-METALL	5K36	0207	1	DRALORIC		L
62P	32	R-METALL	2K	0207	1	DRALORIC		L
62P	33	R-METALL	13K3	0207	1	DRALORIC		L
62P	34	R-METALL	4K64	0207	1	DRALORIC		L
62P	35	R-METALL	16K9	0207	1	DRALORIC		L
62P	36	R-KOHLE	100R	0207	1	DRALORIC		L
62P	37	R-KOHLE	100R	0207	1	DRALORIC		L
62P	38	R-KOHLE	10R	0207	1	DRALORIC		L
62P	39	R-METALL	6K81	0207	1	DRALORIC		L
62P	40	R-METALL	6K81	0207	1	DRALORIC		L
62P	41	R-KOHLE	100R	0207	1	DRALORIC		L
62P	42	R-KOHLE	100R	0207	1	DRALORIC		L
62P	43	R-METALL	31K6	0207	1	DRALORIC		L
62P	44	R-METALL	281	0207	1	DRALORIC		L
62P	45	R-METALL	31K6	0207	1	DRALORIC		L
62P	46	R-METALL	60K9	0207	1	DRALORIC		L
62P	47	R-METALL	110K	0207	1	DRALORIC		L

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SERIE M 2011-8401-005 CD-15 2011/01 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	VERKNORM REF-DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
62P 48	0001-0006.793	R-KOEHLE	100R 5X	TK 50	1	DRALORIC			L
62R 49	0001-0001.455	R-METALL	2K 1X	TK 50	1	DRALORIC			L
62R 50	0001-0001.426	R-METALL	1K87 1X	TK 50	1	DRALORIC			L
62R 51	0001-0006.913	R-KOEHLE	1K 5X	TK 50	1	DRALORIC			L
62R 52	0001-0001.743	R-METALL	4K02 1X	TK 50	1	DRALORIC			L
62R 53	0001-0006.793	R-KOEHLE	100R 5X	TK 50	1	DRALORIC			L
62R 54	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC			L
62P 55	0001-0006.913	R-KOEHLE	1K 5X	TK 50	1	DRALORIC			L
62R 57	0001-0000.537	R-METALL	100R 1X	TK 50	1	DRALORIC			L
62P 58	0001-0007.158	R-KOEHLE	100K 5X	TK 50	1	DRALORIC			L
62R 59	0001-0007.093	R-KOEHLE	33K 5X	TK 50	1	018/03/01			L
62T 1	0001-0016.518	TRANS SI NPN	BCY 59 X (D) A TO 18		1	TFK			L
62T 2	0001-0016.518	TRANS SI NPN	BCY 59 X (D) A TO 18		1	TFK			L
62T 3	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48) A TO 18		1	SGS			L
62T 4	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48) A TO 18		1	SGS			L
62T 5	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48) A TO 18		1	SGS			L
62T 6	0001-0016.987	TRANS SI NPN	2 N 2369 (RSX93) A TO 18		1	FSC			L
62T 7	0001-0016.712	TRANS SI PNP	2 N 4035 (BFX48) A TO 18		1	SGS			L
62T 8	0001-0016.987	TRANS SI NPN	2 N 2369 (RSX93) A TO 18		1	FSC			L
62T 9	0001-0016.518	TRANS SI NPN	BCY 59 X (D) A TO 18		1	TFK			L
62T 10	0001-0016.631	TRANS SI N JFET	EF 245 C D SOT 54		1	VALVO			L
62T 11	0001-0016.550	TRANS SI PNP	BCY 78 X (D) A TO 18		1	MOT			L
62T 12	0001-0016.550	TRANS SI PNP	BCY 78 X (D) A TO 18		1	MOT			L
63C 1	0001-0004.821	C-KERAMIK EDPT	22N 20/80 40V	R10000 2	1	110/02/10			L
63C 2	0001-0004.795	C-KERAMIK EDPT	4N7 10X 63V	R 2000 2	1	110/02/10			L
63C 3	0001-0040.966	ELKO-TA SINT FEST	22U 20X 16V	ETR-3	1	110/05/61			L
63C 4	0001-0004.067	C-KERAMIK EDPT	3F9 0p25 63V	NP 0 1B	1	110/02/09		C--	L
63P 1	0001-0006.816	R-KOEHLE	150R 5X	TK 50	1	DRALORIC			L
63R 2	0001-0006.793	R-KOEHLE	100F 5X	TK 50	1	DRALORIC			L
63R 3	0001-0001.219	R-METALL	1K 1X	TK 50	1	DRALORIC			L
63R 4	0001-0000.375	R-METALL	60R4 1X	TK 50	1	DRALORIC			L
63R 5	0001-0006.793	R-KOEHLE	100R 5X	TK 50	1	DRALORIC			L
63P 6	0001-0006.913	R-KOEHLE	1K 5X	TK 50	1	DRALORIC			L
63ST 1	0855-0006.006	STECKER	EN 855 A 1 KPL		1				L
63T 1	0001-0016.903	TRANS SI NPN	EFY 90 A TO 72		1	SIEMENS			L
63T 2	0001-0016.518	TRANS SI NPN	BCY 59 X (D) A TO 18		1	TFK			L

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2.1 Batteriezusatz BAZ-15  
2.1 Battery Pack BAZ-15  
2.1 Auxiliaire batterie BAZ-15

BN 955/00.01  
BN 955/00.01  
BN 955/00.01

BN 955/00.01

AUSF:

SERIE H 0955-8400.014 OPTION 955/00/01

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
1ST 2	0000-7614.965	EINBAUSTECKER	3 AT V EB LT 4	MASEI 3	1	HIRSCHMAN			L

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**2.2 Mitläufer PSE-15**  
**2.2 Tracking Generator PSE-15**  
**2.2 Générateur suiveur PSE-15**

**BN 955/00.02**  
**BN 955/00.02**  
**BN 955/00.02**

SERIE N 0955-8400-027 OPTION 955/00.02 AUSF:

BN 955/00.02

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MATERIAL REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION
23C 1	0001-0004.384	C-KERAMIK EDPT	47P 2x	NP 0 1B	110/02/09		E...
23C 3	0001-0004.148	C-KERAMIK EDPT	8P2 0P25	NP 0 1B	110/02/09		E...
23C 4	0001-0004.478	C-KERAMIK EDPT	82P 2x	NP 0 1B	110/02/09		E...
23C 5	0001-0004.678	C-KERAMIK EDPT	82P 2x	NP 0 1B	110/02/09		E...
23C 8	0001-0004.009	C-KERAMIK EDPT	2P2 0P25	NP 0 1B	110/02/09		E...
23C 9	0001-0004.504	C-KERAMIK EDPT	100P 2x	NP 0 1B	110/02/09		E...
23C 11	0001-0040.995	ELKO-TA SINT FEST	33U 20x	ETR-3	110/05/61		E...
23C 12	0001-0040.995	ELKO-TA SINT FEST	33U 20x	ETR-3	110/05/61		E...
23C 13	0000-7588.143	C-KERAMIK KDRU	1U 20x	Z5U	110/05/61		E...
23C 14	0001-0040.801	ELKO-TA SINT FEST	4U7 20x	ETR-1	110/05/61		E...
23C 15	0000-7588.143	C-KERAMIK KDRU	1U 20x	Z5U	110/05/61		E...
23C 16	0001-0041.208	ELKO-TA SINT FEST	220U 20x	ETR-5	110/05/61		E...
23C 18	0001-0068.401	C-TRIM KER SCHEIBE	4F5-20P N 750 0,5	VI 301427502 21	111/01/06		E...
23C 19	0001-0041.114	ELKO-TA SINT FEST	68U 20x	ETR-4	110/05/61		E...
23C 20	0001-0041.198	ELKO-TA SINT FEST	150U 20x	ETR-5	110/05/61		E...
23C 21	0000-7547.223	C-TRIM KER SCHEIBE	2P5-5P NP 0	PPT RR 301504111 21	111/01/05		E...
23C 26	0001-0040.966	ELKO-TA SINT FEST	22U 20x	ETR-3	110/05/61		E...
23C 27	0001-0040.966	ELKO-TA SINT FEST	22U 20x	ETR-3	110/05/61		E...
23C 28	0000-7646.302	ELKO-AL	2200U 20x	222202115222	110/05/61		E...
23C 29	0001-0041.185	ELKO-TA SINT FEST	150U 20x	ETR-4	110/05/61		E...
23C 31	0001-0040.830	ELKO-TA SINT FEST	6U8 20x	ETR-1	110/05/61		E...
23C 32	0001-0040.704	ELKO-TA SINT FEST	1U 20x	ETR-1	110/05/61		E...
23C 33	0001-0041.208	ELKO-TA SINT FEST	220U 20x	ETR-5	110/05/61		E...
23C 39	0001-0041.790	ELKO-AL	100U 10/50	B41588	110/05/61		E...
23C 40	0001-0004.821	C-KERAMIK EDPT	22N 20/80	R10000 2	110/02/10		E...
23C 41	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 42	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 43	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 44	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 45	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 46	0001-0004.821	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 47	0001-0004.821	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 48	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 49	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 50	0001-0004.821	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 51	0000-7600.995	C-KERAMIK EDPT	22N 20/80	R10000 2	CORNING		E...
23C 52	0001-0040.995	ELKO-TA SINT FEST	33U 20x	ETR-3	110/02/10		E...
23C 53	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/05/61		E...
23C 54	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 55	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 56	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 57	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 58	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 59	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 60	0001-0004.818	C-KERAMIK EDPT	10N 20/100	R10000 2	110/02/10		E...
23C 61	0001-0040.720	ELKO-TA SINT FEST	10H 20/100	R10000 2	110/02/10		E...
23C 401	0000-7513.189	C-KF HKU	1U5 20x	ETR-1	110/05/61		E...
23C 402	0855-0021.007	C-KERAMIK EDPT	4U7 10x	B32110	110/05/61		E...
23C 403	0855-0021.007	C-KERAMIK EDPT	4N7 20/80	D 6000 2	110/05/61		E...
23C 501	0000-7519.277	ELKO-AL	4N7 20/80	D 6000 2	110/05/61		E...
23C 502	0001-0041.732	ELKO-AL	47U 10/50	B41588	110/05/61		E...
23C 503	0001-0041.732	ELKO-AL	47U 10/50	B41588	110/05/61		E...

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When ordering, quote item No.

SERIE N 0955-6400-027 OPTION 955/00.02 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
23C 503	0855-0022.006	C-KERAMIK	4N7 20/ 80	D 6000 2	1		L
23C 504	0855-0022.006	C-KERAMIK	4N7 20/ 80	D 6000 2	1		L
236L 1	0001-0018.493	DIODE SI	1 N 4448	00 35	1		E...
236L 2	0000-7531.860	DIODE SI REFERENZ	1 N 4572 A	00 7	1		E...
236L 3	0001-0018.493	DIODE SI	1 N 4448	00 35	1		E...
231C 1	0000-7579.149	IC-OP.-VERST.	NE5539N	DIP 14	1		E...
231C 2	0000-7567.025	IC-OP.-VERST. FET	TL081CP	DIP 8	1		E...
231C 11	0001-0015.988	IC-CMOS	4011BCP	DIP 14	1		E...
231C 12	0001-0067.567	IC-CMOS	4028BCP	DIP 16	1	MOS	E...
231C 13	0001-0070.884	IC-CMOS	4081BCP	DIP 14	1	MOS	E...
231C 14	0000-7609.585	IC-D/A-WANDLER	AD7545KM	DIP 20	1	MOS	E...
231C 15	0000-7576.650	IC-OP.-VERST.	OP20HP	DIP 8	1		E...
231C 16	0000-7576.650	IC-OP.-VERST.	OP20HP	DIP 8	1		E...
231C 17	0000-7580.921	IC-LOC MOS	40374BP	DIP 20	1	858521	E...
231C 18	0001-0072.390	IC-LOC MOS	40098BP	DIP 16	1	858521	E...
231C 19	0000-7580.921	IC-LOC MOS	40374BP	DIP 20	1	858521	E...
231C 20	0001-0072.390	IC-LOC MOS	40098BP	DIP 16	1	858521	E...
231C 21	0001-0072.390	IC-LOC MOS	40098BP	DIP 16	1	858521	E...
231C 501	0000-7618.602	IC-DC/DC-WANDLER	V5R15	DIP 24	1	RELIABILITY	E...
23L 1	0955-7887.007	SPULE	10U 10X	1537-36	1		E...
23L 2	0955-7888.006	SPULE	1U 10X	1025-20	1	55 7,9 45 0R9 290MA	E...
23L 3	0001-0042.964	L-FEST	5U6 10X	1025-38	1	25 25 230 1R1 385MA	E...
23L 4	0000-7556.052	L-FEST	100N 10X	1025-94	1	45 7,9 65 1R8 190MA	E...
23L 5	0000-7556.146	L-FEST	100N 10X	1025-94	1	38 25 650 R08 1A2	E...
23L 6	0001-0043.125	L-FEST	10U 10X	1537-36	1	55 7,9 45 0R9 290MA	E...
23L 7	0001-0042.964	L-FEST	6U 20X	882111-A-C4	1	55 7,9 45 0R9 290MA	E...
23L 401	0001-0042.430	L-FUNKENTSTOER	6U 20X	882111-A-C4	1	TA5	E...
23L 402	0001-0042.430	L-FUNKENTSTOER	6U 20X	882111-A-C4	1	TA5	E...
23P 2	0000-7571.710	R-TRIM CERMET SQUARE	200R 10X	0W2 20	1	TK 100	E...
23P 3	0000-7571.736	R-TRIM CERMET SQUARE	2K 10X	0W2 20	1	TK 100	E...
23R 1	0001-0003.819	R-METALL	226R 1X	0207	1	TK 50	E...
23R 2	0001-0001.400	R-METALL	1K74 1X	0207	1	TK 50	E...
23R 3	0001-0006.641	R-KOEHLE	10R 5X	0207	1	56	E...
23R 4	0001-0006.641	R-KOEHLE	10R 5X	0207	1	56	E...
23R 5	0001-0065.268	R-METALL	45R3 1X	0207	1	TK 50	E...
23R 6	0001-0002.409	R-METALL	20K 1X	0207	1	TK 50	E...
23R 7	0001-0002.409	R-METALL	20K 1X	0207	1	TK 50	E...
23R 8	0001-0006.751	R-KOEHLE	68R 5X	0207	1	56	E...
23R 9	0001-0062.326	R-METALL	34K8 1X	0207	1	TK 50	E...
23R 10	0001-0002.438	R-METALL	21A5 1X	0207	1	TK 50	E...
23R 11	0001-0006.683	R-KOEHLE	22R 5X	0207	1	56	E...
23R 13	0001-0000.676	R-METALL	200R 1X	0207	1	TK 50	E...
23R 14	0001-0000.537	R-METALL	100R 1X	0207	1	TK 50	E...
23R 15	0001-0001.581	R-METALL	2K74 1X	0207	1	TK 50	E...
23R 16	0001-0001.099	R-METALL	698P 1X	0207	1	TK 50	E...
23R 17	0001-0001.235	R-METALL	1A1 1X	0207	1	TK 50	E...

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SEPIE N 0955-8400-027 OPTION 955700.02 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG GU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
23R 18	0000-7511-660	R-METALL	681K	0207	TK 15	1 018/04/01		E...	L
23P 20	0000-7608-683	R-METALL	215R	0207	TK 15	1 018/04/01		E...	L
23P 21	0001-0003-071	R-METALL	133K	0207	TK 50	1 DRALORIC		E...	L
23R 22	0000-7511-136	R-METALL	100P	0207	TK 15	1 018/04/01		E...	L
23R 23	0001-0002-483	R-METALL	24K9	0207	TK 50	1 DRALORIC		E...	L
23R 24	0001-0000-702	R-METALL	215K	0207	TK 50	1 DRALORIC		E...	L
23P 25	0000-7644-003	R-METALL	127R	0204	TK 50	1 018/04/01		E...	L
23P 26	0001-0007-035	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L
23P 31	0001-0001-824	R-METALL	4K75	0207	TK 50	1 DRALORIC		E...	L
23R 32	0001-0001-769	R-METALL	4K22	0207	TK 50	1 DRALORIC		E...	L
23P 33	0001-0002-399	R-METALL	19K6	0207	TK 50	1 DRALORIC		E...	L
23P 34	0001-0006-751	R-KOEHLE	68R	0207	TK 50	1 DRALORIC		E...	L
23P 35	0001-0001-345	R-METALL	1K47	0207	TK 50	1 DRALORIC		E...	L
23P 36	0001-0006-751	R-KOEHLE	68R	0207	TK 50	1 DRALORIC		E...	L
23P 37	0001-0003-592	R-METALL	365R	0207	TK 50	1 DRALORIC		E...	L
23R 38	0001-0018-587	R-METALL	845R	0207	TK 50	1 DRALORIC		E...	L
23P 39	0001-0003-589	R-METALL	294R	0207	TK 50	1 DRALORIC		E...	L
23R 40	0001-0001-099	R-METALL	698R	0207	TK 50	1 DRALORIC		E...	L
23R 42	0001-0006-751	R-KOEHLE	68R	0207	TK 50	1 DRALORIC		E...	L
23R 43	0001-0001-455	R-METALL	2K	0207	TK 50	1 DRALORIC		E...	L
23R 44	0001-0001-798	R-METALL	4K53	0207	TK 50	1 DRALORIC		E...	L
23R 45	0001-0001-125	R-METALL	750R	0207	TK 50	1 DRALORIC		E...	L
23R 46	0001-0006-793	R-KOEHLE	100R	0207	TK 50	1 DRALORIC		E...	L
23P 47	0001-0006-751	R-KOEHLE	68R	0207	TK 50	1 DRALORIC		E...	L
23P 48	0001-0000-375	R-METALL	60R4	0207	TK 50	1 DRALORIC		E...	L
23P 49	0001-0065-255	R-METALL	44P2	0207	TK 50	1 DRALORIC		E...	L
23R 50	0000-7512-478	R-METALL	113K	0207	TK 15	1 018/04/01		E...	L
23R 51	0001-0002-137	R-METALL	10K	0207	TK 50	1 DRALORIC		E...	L
23R 52	0001-0000-058	R-METALL	8K06	0207	TK 50	1 DRALORIC		E...	L
23R 53	0001-0003-550	R-METALL	42K2	0207	TK 50	1 DRALORIC		E...	L
23R 54	0001-0001-549	R-METALL	2K49	0207	TK 50	1 DRALORIC		E...	L
23R 55	0000-7569-696	R-METALL	147R	0207	TK 15	1 018/04/01		E...	L
23P 56	0000-7500-930	R-METALL	ABGLEICHWEIT	0207	TK 50	1 DRALORIC	ABGLEICHWEIT	E...	L
23P 57	0001-0016-783	R-METALL	5R11	0207	TK 50	1 DRALORIC		E...	L
23P 58	0001-0060-674	R-METALL	5R23	0207	TK 50	1 DRALORIC		E...	L
23R 59	0001-0063-820	R-METALL	7R15	0207	TK 50	1 DRALORIC		E...	L
23P 60	0001-0063-820	R-METALL	7R15	0207	TK 50	1 DRALORIC		E...	L
23P 61	0000-7647-495	R-METALL	4R87	0204	TK 50	1 018/04/01		E...	L
23R 62	0000-7647-495	R-METALL	4R87	0204	TK 50	1 018/04/01		E...	L
23P 70	0001-0006-641	R-KOEHLE	10R	0207	TK 50	1 DRALORIC		E...	L
23P 71	0001-0006-641	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L
23P 72	0001-0006-641	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L
23P 73	0001-0006-641	R-KOEHLE	10R	0207	TK 50	1 DRALORIC		E...	L
23P 74	0001-0006-641	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L
23P 75	0001-0006-641	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L
23P 76	0001-0006-641	R-KOEHLE	10R	0207	TK 50	1 DRALORIC		E...	L
23P 77	0001-0006-641	R-KOEHLE	10R	0207	TK 50	1 DRALORIC		E...	L
23P 78	0001-0006-719	R-KOEHLE	39P	0207	TK 50	1 DRALORIC		E...	L
23P 79	0001-0006-719	R-KOEHLE	39R	0207	TK 50	1 DRALORIC		E...	L
23P 80	0001-0006-719	R-KOEHLE	39P	0207	TK 50	1 DRALORIC		E...	L
23P 81	0001-0006-641	R-KOEHLE	10P	0207	TK 50	1 DRALORIC		E...	L

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When ordering, quote item No.

SERIE N 0955-£40C\_027 OPTION 955/00\_02 AUSF:

TEIL-NR PART NO	SACH-NP ITEM NO	ELENERUNG DESIGNATION	FELZEICHNUNG 1 MARKING 1	UEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF.DESIG	BEMERKUNG NOTE	SERIE AF VERSION
23R 82	0000-7541.494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	018/06/01		E-...
23R 83	0000-7541.494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	018/06/01		E-...
23R 84	0001-0001.727	R-METALL	3K83	TK 50	1	DRALORIC		E-...
23R 85	0001-0001.879	R-METALL	5K36	TK 50	1	DRALORIC		E-...
23R 86	0001-0001.950	R-METALL	6K49	TK 50	1	DRALORIC		E-...
23R 88	0001-0000.537	R-METALL	10GP	TK 50	1	DRALORIC		E-...
23R 90	0000-7541.494	R-MODUL	9X100K	TK250 EXB-F10E-104J	1	018/06/01		E-...
23R 90	0001-0002.137	R-METALL	10K	TK 50	1	DRALORIC		E-...
23R 91	0001-0002.991	R-METALL	100K	TK 50	1	DRALORIC		E-...
23R 92	0001-0002.991	R-METALL	100K	TK 50	1	DRALORIC		E-...
23REL 1	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU 12V	RS12V	1	SDS		E-...
23REL 2	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU 12V	RS12V	1	SDS		E-...
23REL 3	0000-7610.707	RELAIS GEPOLT BISTAB	002 AU 12V	DSZE-L-12V	1	SDS		E-...
23REL 4	0000-7610.707	RELAIS GEPOLT BISTAB	002 AU 12V	DSZE-L-12V	1	SDS		E-...
23T 1	0000-7536.153	TRANS SI FNF	2 N 4209		1	FSC		E-...
23T 2	0001-0014.903	TRANS SI FNF	FFY 9C	A TO 52	1	SIEMENS		E-...
23T 3	0001-0016.903	TRANS SI FNF	BFY 90	A TO 72	1	SIEMENS		E-...
23T 4	0001-0017.601	TRANS SI NPL	2 N 5109	A TO 39	1	MOTOROLA		E-...
23T 5	0001-0017.601	TRANS SI NPN	2 N 5109	A TO 39	1	MOTOROLA		E-...
23T 6	0000-7610.765	TRANS SI N VMO5	BUZ 10	B TO 220	1	VAL 0983		E-...
23UE 2	0955-7702.001	UEI ERTRAGER			1			A
25C 1	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P N1500	OR 301427603	1	111/01/06		E-...
25C 4	0001-0004.122	C-KERAMIK EDPT	6PE OP25 63V	NP 0 1B	1	111/02/09		E-...
25C 5	0001-0014.086	C-TRIM KER SCHEIBE	3P5- 13P N 470	BL 301427411	1	111/01/06		E-...
25C 6	0000-7500.901	C-KERAMIK EDPT	ARGLEICHWERT		1	110/02/09	ABGLEICHWERT	E-...
25C 7	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 8	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 9	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 10	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 11	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 12	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 13	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 14	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 15	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25C 16	0001-0004.818	C-KERAMIK EDPT	10N 20/100 40V	R10000 2	1	110/02/10		E-...
25P 1	0000-7571.736	R-TRIM CERMET SQUARE	2K 10% 0K2	ITK 100	1	017/04/06		E-...
25P 3	0000-7571.736	R-TRIM CERMET SQUARE	2K 10% 0K2	ITK 100	1	017/04/06		E-...
25R 1	0000-7579.165	R-METALL	137R 0X1	TK 15	1	018/04/01		E-...
25P 2	0000-7579.165	R-METALL	137R 0X1	TK 15	1	018/04/01		E-...
25R 3	0000-7630.787	R-METALL	71K5 0X1	TK 15	1	018/04/01		E-...
25P 5	0000-7630.787	R-METALL	71K5 0X1	TK 15	1	018/04/01		E-...
25P 7	0000-7648.397	R-METALL	324K 0X1	TK 15	1	018/04/01		E-...
25P 8	0000-7648.397	R-METALL	324K 0X1	TK 15	1	018/04/01		E-...
25P 9	0000-7619.436	R-METALL	750R 1%	TK 50	1	018/04/01		E-...

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SERIE N 0955-8400.027 OPTION 955/00.02 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
25R 10	0000-7619-436	P-METALL	730R 1% 0204	TK 50 56	1	018/04/01		E-..	L
25R 11	0000-7608-612	R-METALL	294R 0%1 0207	TK 15 56	1	018/04/01		E-..	L
25R 12	0001-0002-580	P-METALL	31K6 1% 0207	TK 50 56	1	DRALORIC		E-..	L
25R 13	0001-0002-580	P-METALL	31K6 1% 0207	TK 50 56	1	DRALORIC		E-..	L
25R 14	0000-7608-612	P-METALL	294R 0%1 0207	TK 15 56	1	018/04/01		E-..	L
25REL 1	0000-7619-326	RELAIS GEPOLT	001 AU 12V 1K5 HD	RSL12V	1	SDS		F-..	L
25REL 2	0000-7619-326	RELAIS GEPOLT	001 AU 12V 1K5 HD	RSL12V	1	SDS		F-..	L
25REL 3	0000-7610-707	RELAIS GEPOLT	002 AU 12V 1K4 SD	DS2E-L-12V	1	SDS		E-..	L
25REL 4	0000-7610-707	RELAIS GEPOLT	002 AU 12V 1K4 SD	DS2E-L-12V	1	SDS		E-..	L
25REL 5	0000-7588-800	RELAIS GEPOLT	040 AU 12V 1K5 HD	S4-L-12V	1	SDS		E-..	L
25UE 1	0954-7726-000	UEBERTRAGER			1			E-..	A

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- 2.3 Interface <IEC 625>-Karte
- 2.3 Interface <IEC 625> Card
- 2.3 Carte Interface <IEC 625>

- BN 955/00.03
- BN 955/00.03
- BN 955/00.03

BN 955/00.03

AUSF:

SERIE G 0955-8400.030 OPTION 955/00.03

TEIL-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNOM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION
24C 1	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		L
24C 2	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		L
24C 3	0001-0004.821	C-KERAMIK EDPT	22N 20/ 80	R10000 2	1	110/02/10		L
24C 4	0001-0004.795	C-KERAMIK EDPT	4N7 10%	R 2000 2	1	110/02/10		L
24IC 1	0001-0015.986	IC-CMOS	4011BCP	DIP 14	1	MOTOROLA		L
24IC 2	0001-0070.871	IC-CMOS	4073BCP	DIP 14	1	MOTOROLA		L
24IC 3	0000-7519.840	IC-CMOS	4050BCP	DIP 16	1	MOTOROLA		L
24IC 4	0000-7519.840	IC-CMOS	4050BCP	DIP 16	1	MOTOROLA		L
24IC 5	0000-7583.889	IC-CMOS	40116E	DIP 22	1	RCA		L
24IC 6	0000-7569.450	IC-CMOS	4504BCP	DIP 16	1	MOTOROLA		L
24L 1	0001-0042.430	L-FUNKLEISTOER	6U 20%	75 DR19	1	SIEMENS		L
24R 1	0000-7541.494	R-MODUL	9X100K	TK250 EXP-F10E-104J	1	018/06/01		L
24R 2	0000-7541.494	R-MODUL	9X100K	TK250 EXP-F10E-104J	1	018/06/01		L
24R 3	0001-0007.035	R-KOEHLE	10P	5%	1	DRALORIC		L
24R 4	0000-7541.436	R-MODUL	9X 10K	5%	1	018/06/01		L
24R 5	0001-0007.158	R-KOEHLE	100K	5%	1	018/03/01		L
24R 6	0001-0007.158	R-KOEHLE	100K	5%	1	018/03/01		L
24R 7	0001-0006.735	R-KOEHLE	56R	5%	1	DRALORIC		L
24ST 1	0000-7634.916	MESSERLEISTE C/2	32	2 2,54x5,08 S3 AU	1	SIEMENS		L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

SEITE 0A53-8450.001 IEC-625-BUS 853/50 AUSF:

TEILE-NR PART NO	SACH-NP ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKFORM REF.-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
90S	1	0000-7541.504	S-DUAL-IN-LINE		1	013706/05		..-G
90S	2	0000-7541.504	S-DUAL-IN-LINE	8 100 AU WIPP- 8 100 AU WIPP-	1	013706/05		..-G
91C	1	0001-0010.093	C-KF MKT	1U				..-G
91C	1	0001-0010.093	C-KF MKT	1U				..-G
91C	2	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	MKT1813		..-G
91C	2	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	MKT1813		H...-G
91C	3	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	3	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	4	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	4	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	5	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	5	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	6	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	6	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	7	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	7	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	8	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	8	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	9	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	9	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	10	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	10	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	11	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	11	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	12	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	12	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	13	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	13	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	14	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	14	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	15	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	15	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	16	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	16	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	17	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	17	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	18	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	18	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	19	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	19	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	20	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	20	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	21	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	21	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	22	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	22	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	23	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	23	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	24	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		..-G
91C	24	0001-0004.821	C-KEPAMIK EDPT	22N 20/ 80	56	R10000 2		H...-G
91C	25	0001-0004.779	C-KEPAMIK EDPT	3N3 10X R 2000 2	56	R 2000 2		..-G

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

SERIE 0853-8450-001 IEC-625-BUS 253/50 AUSF:

TEIL-NR PART NO	SACH-NR ITEM NO	BEZEICHNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QUANTITÄT	WERTUNG NOTE	SERIE AF VERSION
91C 25	0001-0004.779	C-KERAMIK	3M3	P 2000 2	1		H---
91C 26	0001-0004.779	C-KERAMIK	3M3	P 2000 2	1		---
91C 26	0001-0004.779	C-KERAMIK	3M3	P 2000 2	1		H---
91C 27	0001-0004.821	C-KERAMIK	22N	P10000 2	1		U---
91C 1	0001-0067.156	IC-TTL	SN74LS C4N		1		---
91C 1	0001-0067.156	IC-TTL	SN74LS 04M		1		H---
91C 2	0001-0067.169	IC-TTL	SN74LS 08N		1		---
91C 2	0001-0067.169	IC-TTL	SN74LS 08N		1		---
91C 3	0001-0070.512	IC-TTL	SN74LS138N		1		H---
91C 3	0001-0070.512	IC-TTL	SN74LS138N		1		---
91C 4	0001-0071.281	IC-TTL	SN74LS 32N		1		H---
91C 4	0001-0071.281	IC-TTL	SN74LS 32N		1		---
91C 5	0001-0070.512	IC-TTL	SN74LS138N		1		H---
91C 5	0001-0070.512	IC-TTL	SN74LS138N		1		---
91C 6	0001-0072.170	IC-TTL	SN74LS243N		1		H---
91C 6	0001-0072.170	IC-TTL	SN74LS243N		1		---
91C 7	0001-0072.170	IC-TTL	SN74LS243N		1		H---
91C 7	0001-0072.170	IC-TTL	SN74LS243N		1		---
91C 8	0001-0065.695	IC-TTL	SN74LS 00H		1		H---
91C 8	0001-0065.695	IC-TTL	SN74LS 00H		1		---
91C 9	0000-7541.494	R-MODUL	9X100K	5% 0W1	1		H---
91C 9	0000-7541.494	R-MODUL	9X100K	5% 0W1	1		---
91C 10	0000-7541.494	R-MODUL	9X100K	5% 0W1	1		H---
91C 10	0000-7541.494	R-MODUL	9X100K	5% 0W1	1		---
91C 11	0001-0070.541	IC-TTL	SN74LS258AN		1		H---
91C 11	0001-0070.541	IC-TTL	SN74LS258AN		1		---
91C 12	0001-0070.541	IC-TTL	SN74LS258AN		1		H---
91C 12	0001-0070.541	IC-TTL	SN74LS258AN		1		---
91C 13	0001-0067.169	IC-TTL	SN74LS 08N		1		H---
91C 13	0001-0067.169	IC-TTL	SN74LS 08N		1		---
91C 14	0001-0066.254	IC-TTL	SN74LS 93N		1		H---
91C 14	0001-0066.254	IC-TTL	SN74LS 93N		1		---
91C 15	0001-0066.856	IC-TTL	SN74LS 03N		1		H---
91C 15	0001-0066.856	IC-TTL	SN74LS 03N		1		---
91C 16	0001-0065.585	IC-TTL	SN74LS 02N		1		H---
91C 16	0001-0065.585	IC-TTL	SN74LS 02N		1		---
91C 17	0001-0066.241	IC-TTL	SN74LS 76AN		1		H---
91C 17	0001-0066.241	IC-TTL	SN74LS 76AN		1		---
91C 18	0001-0067.198	IC-TTL	SN74LS123N		1		H---
91C 18	0001-0067.198	IC-TTL	SN74LS123N		1		---
91C 19	0001-0056.837	IC-TTL	SN74LS 74AN		1		H---
91C 19	0001-0056.837	IC-TTL	SN74LS 74AN		1		---
91C 20	0001-0071.281	IC-TTL	SN74LS 32N		1		H---
91C 20	0001-0071.281	IC-TTL	SN74LS 32N		1		---
91C 21	0000-7541.436	R-MODUL	9X 10K	5% 0W1	1		H---
91C 21	0000-7541.436	R-MODUL	9X 10K	5% 0W1	1		---
91C 22	0000-7547.825	IC-MOS	MC 68488 F	DIP 40	1		H---
91C 22	0000-7547.825	IC-MOS	MC 68488 F	DIP 40	1		---
91C 23	0000-7547.838	IC-TTL	MC 3448 AP	DIP 16	1		H---
91C 23	0000-7547.838	IC-TTL	MC 3447 P	DIP 24	1		---
91C 24	0000-7585.305	IC-TTL			1		H---
91C 24	0000-7585.305	IC-TTL			1		---

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

SERIE 0853-8450-001 IEC-625-BUS 853/50 AUSF:

TEILE-NR PART NO	SACH-NP ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEWEPKUNG NOTE	SERIE AF VERSION	C
911C 24	0000-7547.838	IC-TTL	MC 3448 AP	DIP 16	1	MOTOROLA		...	L
911C 24	0000-7585.905	IC-TTL	MC 3447 P	DIC 24	1	MOTOROLA		H...	L
911C 25	0000-7547.838	IC-TTL	MC 3448 AP	DIP 16	1	MOTOROLA		...	L
911C 26	0000-7547.838	IC-TTL	MC 3448 AP	DIP 16	1	MOTOROLA		...	L
91P 1	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		...	L
91P 1	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		H...	L
91P 2	0001-0007.145	R-KOEHLE	82K 5X	0207	1	018/03/01		...	L
91P 2	0001-0007.145	R-KOEHLE	82K 5X	0207	1	018/03/01		H...	L
91P 3	0001-0007.116	R-KOEHLE	47K 5X	0207	1	018/03/01		...	L
91P 3	0001-0007.116	R-KOEHLE	47K 5X	0207	1	018/03/01		H...	L
91P 4	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		...	L
91P 4	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		H...	L
91P 5	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		...	L
91P 5	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		H...	L
91P 6	0001-0006.955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		...	L
91P 6	0001-0006.955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		H...	L
91P 7	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		...	L
91P 7	0001-0006.926	R-KOEHLE	1K2 5X	0207	1	DRALORIC		H...	L
91P 8	0001-0006.971	R-KOEHLE	3K3 5X	0207	1	DRALORIC		H...	L
91P 9	0001-0006.955	R-KOEHLE	2K2 5X	0207	1	DRALORIC		U...	L
91S 1	0000-7541.504	S-DUAL-IN-LINE	8 100 AU WIPP-	S76B08	1	013/06/05		H...	L
91S 2	0000-7541.504	S-DUAL-IN-LINE	8 100 AU WIPP-	S76B08	1	013/06/05		H...	L
91ST 1	0000-7547.867	D-STECKVERB.(V)	25 2 2,77X2,84 S1 AU	DB25P-0L1	1	CANNON		...	L
91ST 1	0000-7547.867	D-STECKVERB.(V)	25 2 2,77X2,84 S1 AU	DB25P-0L1	1	CANNON		H...	L

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When ordering, quote item No.

BN 955/00.06  
BN 955/00.06  
BN 955/00.06

2.4 Zusatzfilter 100 Hz  
2.4 100 Hz auxiliary filter  
2.4 Filtre auxiliaire 100 Hz

**BN 955/00.06**

SEPIC U 0055-6400-060 ZUSATZFILTER 100KHZ AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BEZEICHNUNG DESIGNATION	REZEICHNUNG 1 MARKING 1	REZEICHNUNG 2 MARKING 2	PG QU	WERTNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
17C 1	0000-7552-784	C-KF KS	5N11	631521	1	110/03/12		L
17C 2	0000-7552-292	C-KF KS	562P	631521	1	110/03/12		L
17C 3	0000-7552-263	C-KF KS	499P	631521	1	110/03/12		L
17C 4	0000-7552-234	C-KF KS	453P	631521	1	110/03/12		L
17C 5	0001-0004-821	C-KERAMIK EDPT	22N 20/80	R10000 2	1	110/02/10		L
17C 12	0001-0040-966	ELFO-TA SINT FEST	22U 20%	10 1326 25008 000	1	110/05/61		L
17C 15	0001-0014-374	C-TRIM LUFT GIFF	1P8- 8P8 50PPI	10 1326 25008 000	1	111/02/02		L
17C 16	0001-0004-559	C-KERAMIK EDPT	120P	18	1	110/02/09		L
17C 17	0001-0004-397	C-KERAMIK EDPT	47F	N 150 16	1	110/02/09		L
17C 21	0000-7588-143	C-KERAMIK KDFU	1U 20%	VP44HY105MA	1	VITRAMON		L
17C 22	0000-7551-235	C-KERAMIK KDFU	100N 20%	VP32BY104MA	1	VITRAMON		L
17C 23	0000-7588-143	C-KERAMIK KDFU	1U 20%	VP44HY105MA	1	VITRAMON		L
17C 24	0000-7551-235	C-KERAMIK KDFU	100N 20%	VP32BY104MA	1	VITRAMON		L
17C 25	0000-7588-143	C-KERAMIK KDFU	1U 20%	VP44HY105MA	1	VITRAMON		L
17C 26	0000-7588-143	C-KERAMIK KDFU	1U 20%	VP44HY105MA	1	VITRAMON		L
17C 27	0001-0004-821	C-KERAMIK EDPT	22N 20/80	VP44HY105MA	1	VITRAMON		L
17L 1	0974-7827-001	SPULE			1			L
17L 2	0829-7761-002	SPULE			1			A
17P 1	0001-0008-306	R-TRIM CERMET LIEG	4K7 20% 0N5 1	TKF 100 (ALT 17/02/08)	1	017/02/15		L
17Q 1	0874-9711-005	FILTERQUARZ	10,032KHZ		1			L
17Q 2	0874-9710-006	FILTERQUARZ	9,967KHZ		1			L
17R 2	0000-7644-812	R-METALL	12K4	TK 50	1	018/04/01		L
17R 3	0000-7533-745	R-METALL	3K65	TK 50	1	018/04/01		L
17P 4	0000-7645-882	R-METALL	1K	TK 50	1	018/04/01		L
17P 5	0000-7519-471	R-METALL	100R	TK 50	1	018/04/01		L
17R 6	0000-7645-882	R-METALL	1M	TK 50	1	018/04/01		L
17P 7	0000-7585-560	R-METALL	10K	TK 50	1	018/04/01		L
17P 8	0000-7585-560	R-METALL	56R2	TK 50	1	018/04/01		L
17R 9	0000-7608-845	R-METALL	22R1	TK 50	1	018/04/01		L
17R 21	0000-7608-845	R-METALL	100K	TK 50	1	018/04/01		L
17P 22	0000-7519-536	R-METALL	1K	TK 50	1	018/04/01		L
17P 23	0000-7519-536	R-METALL	100K	TK 50	1	018/04/01		L
17R 24	0000-7585-544	R-METALL	1K	TK 50	1	018/04/01		L
17P 25	0000-7519-536	R-METALL	100K	TK 50	1	018/04/01		L
17P 26	0000-7519-536	R-METALL	100K	TK 50	1	018/04/01		L
17R 27	0000-7633-991	R-METALL	200K	TK 50	1	018/04/01		L
17P 28	0000-7519-536	R-METALL	100K	TK 50	1	018/04/01		L
17R 29	0000-7519-471	R-METALL	100P	TK 50	1	018/04/01		L
17S 1	0000-7598-104	S-SCHILBE	3 AU 2-POL	ETSF 2-3 AU KNOPF GFAU	1	NSF/EHF		L
17S 2	0000-1P32-015	S-DUAL-IM-LINE	1 100 SN HAKEN-	GEK.: C42315-A1347-A124	1	SIEMENS		L
17ST 1	0000-7610-574	MESSERLEISTE C/2	48	C133-714A-GRP(30)	1	AMPHENOL		L
17ST 2	0000-2717-003	HF-KABELWINKLSTECKER	75 V D	LT KA	1			L
17ST 3	0000-2717-003	HF-KABELWINKLSTECKER	75 V D	LT KA	1			L
17T 1	0000-7656-376	TRANS SI MPN	HC 549 C	A TC 92	1	VALVO		L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.



SERIE R 0255-8400.069 ZUSATZFILTER 100HZ AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
17T 21	0000-7619.287	TRANS SI N VMOS	16S 170	6 T0 92	1	ITT			L
17T 22	0000-7598.971	TRANS SI P DMOS	16S 250	6 T0 92	1	ITT			L
17T 23	0000-7598.971	TRANS SI P DMOS	16S 250	6 T0 92	1	ITT			L
17T 24	0000-7619.287	TRANS SI N VMOS	16S 170	6 T0 92	1	ITT			L
17T 25	0000-7619.287	TRANS SI N VMOS	16S 170	6 T0 92	1	ITT			L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote Item No.

**2.5**

**2.6**

<b>2.5</b>	<b>Ausgangsfeld zum PSE-15 für Grundgerät BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.5</b>	<b>Output section for PSE-15 main frame BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.5</b>	<b>Section sortie pour PSE-15 pour appareil de base BN 955/01</b>	<b>BN 955/00.21</b>
<b>2.6</b>	<b>Ausgangsfeld zum PSE-15 für Grundgerät BN 955/02</b>	<b>BN 955/00.22</b>
<b>2.6</b>	<b>Output section for PSE-15 main frame BN 955/02</b>	<b>BN 955/00.22</b>
<b>2.6</b>	<b>Section sortie pour PSE-15 pour appareil de base BN 955/02</b>	<b>BN 955/00.22</b>

BN 955/00.21

SERIE B 0955-8400.21R OPTION 0955/00.21 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF. DESIG	REMERKUNG NOTE	SERIE AF VERSION	C
2P 3	0000-7580.510	R-METALL	137R 0X1	TK 15	1	018/04/01			L
2R 4	0001-0002.247	R-METALL	13K3 1X	TK 50	1	0207			L
3R 63	0001-0000.100	R-METALL	15R4 1X	TK 50	1	0207			L
25P 3	0000-7648.533	R-METALL	64R2 0X1	TK 15	1	018/04/01			L
25R 5	0000-7648.533	R-METALL	64R2 0X1	TK 15	1	018/04/01			L
25P 7	0000-7511.660	R-METALL	681R 0X1	TK 15	1	018/04/01			L
25R 8	0000-7511.660	R-METALL	681R 0X1	TK 15	1	018/04/01			L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

**BN 955/00.22**

SEPIE C 0955-8400.221 OPTION 955/00.22 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MIG QU	WERKNORM REF. DESIG	BEMERKUNG NOTE	SERIE AF VERSION
2FU 1	0001-0032.990	RF-BUCHSE	WECO 470C	LT FL 57,0	1			L
2FU 2	0001-0032.990	RF-BUCHSE	WECO 470C	LT FL 57,0	1			L
2PU 3	0000-7555.189	KLINKENBUCHSE+FEDERS	M EL	M-112A (HI-D JAX)	1	SWITCHCRAF		L
2RU 4	0000-7555.192	KLINKENBUCHSE+FEDERS	M EL	M-112B (HI-D JAX)	1	SWITCHCRAF		L
2C 1	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P	OR 301427603	1	111/01/06		L
2C 3	0001-0014.086	C-TRIM KER SCHEIBE	3PS - 13P	BL 301427411	1	111/01/06		L
2C 9	0000-7519.866	C-KF MKT	1U	MKT1822 NUR ERO	1	ROEDERST.	C---	L
2C 10	0000-7520.460	ELKO-AL UNGEPOLT	47U 10/ 50	E-U	1	ROEDERST.	C---	L
2C 11	0001-0004.669	C-KERAMIK EDPT	470P	R 2000 2	1	110/02/10		L
2C 12	0000-7535.303	C-TRIM KER SCHEIBE	3PS - 20P	20 PF 301504114	1	111/01/05		L
2C 13	0001-0004.339	C-KERAMIK EDPT	33P	NP 0	1	110/02/09		L
2C 14	0001-0069.468	C-TRIM KER SCHEIBE	7P - 35P	NP 0	1	111/01/06		L
2C 15	0001-0004.148	C-KERAMIK EDPT	8P2	OR 301427603	1	111/01/06		L
2L 1	0000-7556.337	L-FEST	1220U 10X	30 0,8 9 21R 50MA	1	117/01/03		L
2L 2	0000-7555.985	L-FEST	1270N 10X	35 25 430 OR16 960MA	1	117/01/03		L
2L 3	0000-7555.998	L-FEST	1330N 10X	30 25 410 OR22 815MA	1	117/01/03		L
2P 1	0000-7577.963	R-METALL	612R	TK 15	1	DRALORIC		L
2P 2	0001-0002.713	R-METALL	45K3	TK 50	1	DRALORIC		L
2P 3	0000-7580.510	R-METALL	137R	TK 15	1	018/04/01		L
2P 4	0001-0002.140	R-METALL	10K2	TK 50	1	DRALORIC		L
2P 5	0000-7563.854	R-METALL	126R	TK 15	1	DRALORIC		L
2P 6	0001-0002.179	R-METALL	11K	TK 50	1	DRALORIC		L
2P 7	0000-7608.528	R-METALL	523R	TK 15	1	DRALORIC		L
2P 8	0001-0000.935	R-METALL	432R	TK 50	1	DRALORIC		L
2P 9	0001-0000.579	R-METALL	127P	TK 50	1	DRALORIC		L
2P 10	0002.195	R-METALL	11K5	TK 50	1	DRALORIC		L
2P 11	0000-7617.360	R-METALL	150K	TK 15	1	DRALORIC		L
2P 12	0000-7563.841	P-METALL	152R	TK 15	1	018/04/01		L
2REL 1	0000-7619.326	RELAIS GEPOLT BISTAB	001 AU 12V	RSL12V	1	SDS		L
2REL 2	0000-7610.707	RELAIS GEPOLT BISTAB	002 AU 12V	DSZE-L-12V	1	SDS		L
2REL 5	0000-7610.707	RELAIS GEPOLT BISTAB	002 AU 12V	DSZE-L-12V	1	SDS		L
2REL 6	0000-7610.707	RELAIS GEPOLT BISTAB	002 AU 12V	DSZE-L-12V	1	SDS		L
2UE 1	0820-7727.004	UEBERTRAGER	15R4	TK 50	1	DRALORIC		L
2UE 2	0829-7731.003	UEBERTRAGER			1			A
3P 63	0001-0000.100	P-METALL	15R4	TK 50	1	DRALORIC		L
9P 7	0001-0001.329	P-METALL	1K37	TK 50	1	DRALORIC		L
9R 8	0001-0001.950	P-METALL	6K49	TK 50	1	DRALORIC		L
15RU 401	0000-7555.192	KLINKENBUCHSE+FEDERS	F EL	M-112B (HI-D JAX)	1	SWITCHCRAF		L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

SERIE C 0955-8400-221 OPTION 955/00.22 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION
25FU 1	0001-0032.990	HF-BUCHSE	WECO 470C	LT FL 57,0	1			
25BU 2	0001-0032.990	HF-BUCHSE	WECO 470C	LT FL 57,0	1			
25BU 3	0000-7555.189	KLINKENBUCHSE+FEDERS	M EL	IM-112A (HI-D JAX)	1	SWITCHCRAF		
25BU 4	0000-7555.192	KLINKENBUCHSE+FEDERS	M EL	IM-112P (HI-D JAX)	1	SWITCHCRAF		
25C 1	0001-0069.468	C-TRIM KLR SCHEIBE	7P - 35P N1500	OR 301427603	1	111/01/06		
25C 3	0001-0069.400	C-TRIM KER SCHEIBE	2P5 - 7P5 NP 0	BR 301427125	1	111/01/06		
25C 5	0001-0014.086	C-TRIM KER SCHEIBE	3P5 - 13P N 470	RL 301427411	1	111/01/06		
25C 6	0000-7500.901	C-KEFAMIK EDPT	ARGLEICHWERT		1	110/02/09	ARGLEICHWERT	
25C 6	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 9	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 9	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 10	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 11	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 12	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 13	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 14	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 15	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 16	0001-0004.818	C-KEFAMIK EDPT	10N 20/100 40V	IR10000 2	1	110/02/10		
25C 17	0001-0004.753	C-KEFAMIK EDPT	2N7 10X 63V	IR 2000 2	1	110/02/10		
25C 18	0001-0004.737	C-KEFAMIK EDPT	2N2 10X 63V	IR 2000 2	1	110/02/10		
25C 19	0001-0004.122	C-KEFAMIK EDPT	6P8 OP25	IMP 0 1B	1	110/02/09		
25C 20	0000-7500.901	C-KEFAMIK EDPT	ARGLEICHWERT		1	110/02/09	ARGLEICHWERT	
25P 1	0000-7571.736	R-TRIM CERMET SQUARE	2K 10X 0W2 20	TK 100	1	1 017/04/06		
25P 3	0000-7571.736	R-TRIP CERMET SQUARE	2K 10X 0W2 20	TK 100	1	1 017/04/06		
25R 1	0000-7579.165	R-METALL	137R 0X1 0207	TK 15	1	1 018/04/01		
25R 2	0000-7579.165	R-METALL	137P 0X1 0207	TK 15	1	1 018/04/01		
25P 3	0000-7640.858	R-METALL	59P 0X1 0207	TK 15	1	1 018/04/01		
25P 4	0001-0002.137	R-METALL	10K 1X 0207	TK 50	1	DRALORIC		
25P 5	0000-7640.858	R-METALL	59R 0X1 0207	TK 15	1	1 018/04/01		
25P 6	0001-0002.137	R-METALL	10K 1X 0207	TK 50	1	DRALORIC		
25P 7	0000-7619.436	R-METALL	750R 1X 0204	TK 50	1	1 018/04/01		
25P 8	0000-7608.612	R-METALL	294R 0X1 0207	TK 15	1	1 018/04/01		
25P 9	0001-0002.580	R-METALL	31X6 1X 0207	TK 50	1	DRALORIC		
25P 10	0001-0002.580	R-METALL	31X6 1X 0207	TK 50	1	DRALORIC		
25P 11	0000-7608.612	R-METALL	294R 0X1 0207	TK 15	1	1 018/04/01		
25R 13	0000-7640.845	R-METALL	74R1 0X1 0207	TK 15	1	1 018/04/01		
25R 15	0000-7640.845	R-METALL	74R1 0X1 0207	TK 15	1	1 018/04/01		
25P 17	0000-7608.942	R-METALL	825R 1X 0204	TK 50	1	1 018/04/01		
25REL 1	0000-7619.326	RELAIS GEPOLT BISTAB	1001 AU 12V	PSL12V	1	1 SDS		
25REL 2	0000-7619.326	RELAIS GEPOLT BISTAB	1001 AU 12V	PSL12V	1	1 SDS		
25REL 3	0000-7610.707	RELAIS GEPOLT BISTAB	1002 AU 12V	DS2L-L-12V	1	1 SDS		
25REL 4	0000-7610.707	RELAIS GEPOLT BISTAB	1002 AU 12V	DS2E-L-12V	1	1 SDS		
25REL 5	0000-7588.800	RELAIS GEPOLT BISTAB	1040 AU 12V	IS4-L-12V	1	1 SDS		
25UE 1	0954-7726.000	UEFERTIGER			1			A

Bei Bestellung Sech-Nr. angeben!  
When ordering, quote item No.

<b>2.7</b>	<b>Geräuschberechnung in dBrnC</b>	<b>BN 955/00.23</b>
<b>2.7</b>	<b>Noise measurements in dBrnC</b>	<b>BN 955/00.23</b>
<b>2.7</b>	<b>Mesure de bruit en dBrnC</b>	<b>BN 955/00.23</b>

BN 955/00.23

AUSF:

OPTION 0955/00.23

SEFIL

C 955-8400-234

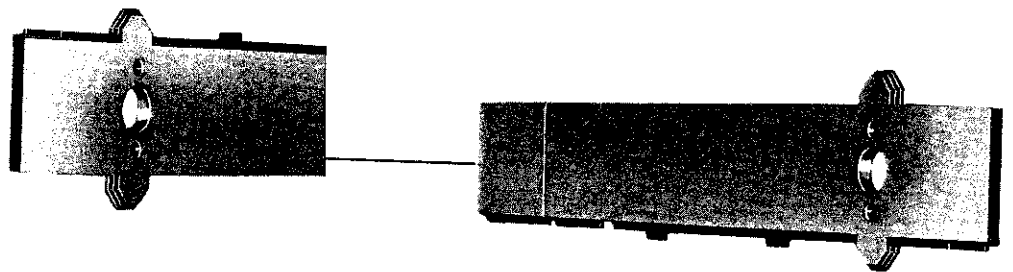
TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF-DESIG	BEMERKUNG NOTE	SERIE AF VERSION	C
7	0001-0001.329	R-METALL	1K37 1%	TK 50	1	DRALORIC			L
9R	0001-0001.950	R-METALL	6K49 1%	TK 50	1	DRALORIC			L

Bei Bestellung Sach-Nr. angeben!  
When ordering, quote item No.

<b>3/4 19'' Halbschalengehäuse</b>	<b>BN 960</b>
<b>3/4 19'' Half-shell type case</b>	<b>BN 960</b>
<b>Coffret cadre 3/4 19''</b>	<b>BN 960</b>

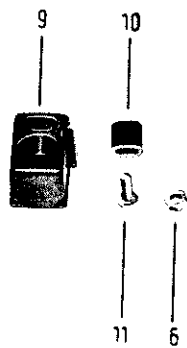


Pos.	Bezeichnung	Description	Désignation	Bestell-Nummer Order Number N° de commande
1	Schale oben	Upper shell	Coquille supérieure	0960-0120.019
2	Zylinderschraube M4×50 DIN 912	Cylinder head machine screw, 4×50 mm, DIN 912	Vis cylindrique M4×50 DIN 912	0000-7578.069
3	Gehäusefuß	Foot for case	Pied de coffret	0960-0000.074
4	Führung	Guide	Téton	0700-0100.013
5	Zylinderschraube M4×8 DIN 7984	Cylinder head machine screw, 4×8 mm, DIN 7984	Vis cylindrique M4×8 DIN 7984	0000-7583.931
6	Sechskantmutter M4 DIN 439	Hexagonal nut, 4 mm, DIN 439	Ecrou à 6 pans M4 DIN 439	0001-0024.021
7	Schale unten	Lower shell	Coquille inférieure	0960-0110.016
8	Rastfuß I	Indented foot I	Pied verrouillage I	0700-0000.029
9	Rastfuß II	Indented foot II	Pied verrouillage II	0700-0000.032
10	Fuß	Foot	Pied	0000-0421.075
11	Zylinderschraube M4×12 DIN 84	Cylinder head machine screw, 4×12 mm, DIN 84	Vis cylindrique M4×12 DIN 84	0001-0022.036
12	Seitenteil links und rechts	Side section, left and right	Parois latérales droite et gauche	0960-0000.139
13	Traggriff komplett	Carrier handle, complete	Poignée de transport complète	0960-0002.001
14	Druckknopf	Push button	Bouton poussoir	0960-0002.069
15	Feder	Spring	Ressort	0960-0002.072
16	Wellscheibe	Spring friction washer	Rondelle élastique	0960-0002.098
17	Sicherungsscheibe 10.0×20; 4×1.2 DIN 6799	Circlip, 10.0×20; 4×1.2 DIN 6799	Circlip 10.0×20; 4×1.2 DIN 6799	0000-7588.855
5/1067 18	Druckplatte	Pressure plate	Plaque d'appui	0960-0002.043

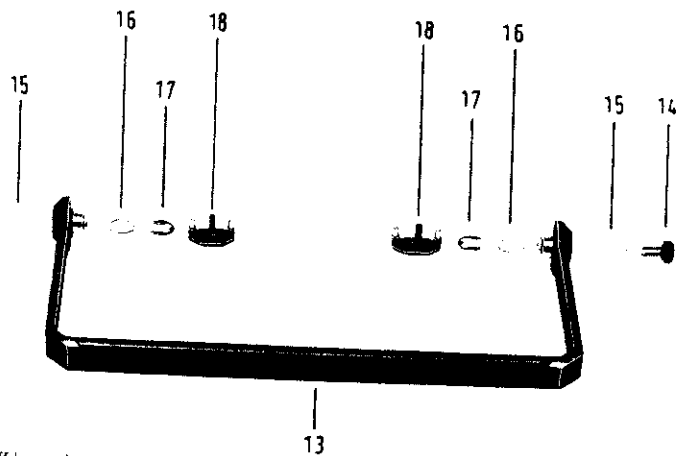


Seitenteil links  
Side section, left  
Parois latérales droite

Seitenteil rechts  
Side section, right  
Parois latérales gauche



Rastfuß I und II  
Lock-foot I and II  
Pied verrouillage I et II



Griff komplett  
Carrier handle, complete  
Poignée de transport complète

**Mechanische Teile für Frontplatte**  
**Mechanical parts for front panel**  
**Composants mécaniques pour la face avant**

Bitte bei Bestellung immer die Gerätenummer und Serie  
 Please state instrument number and series when ordering  
 Lors de commandes donner toujours le numéro de l'appareil

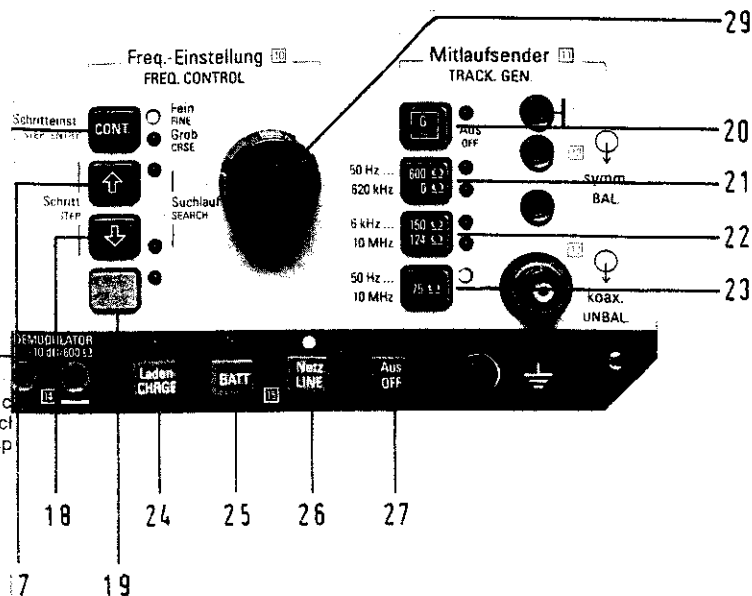
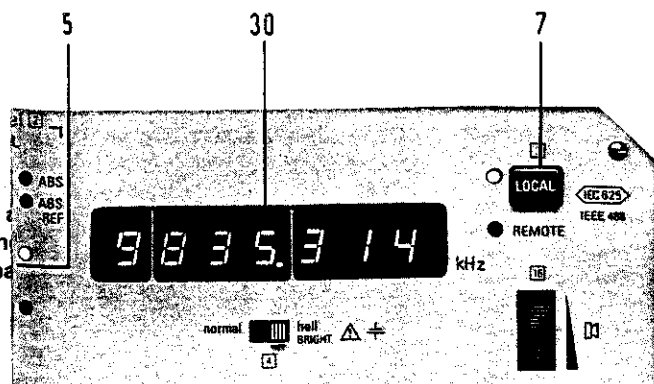
Pos. Benennung  
 Pos. Designation  
 Pos. Désignation

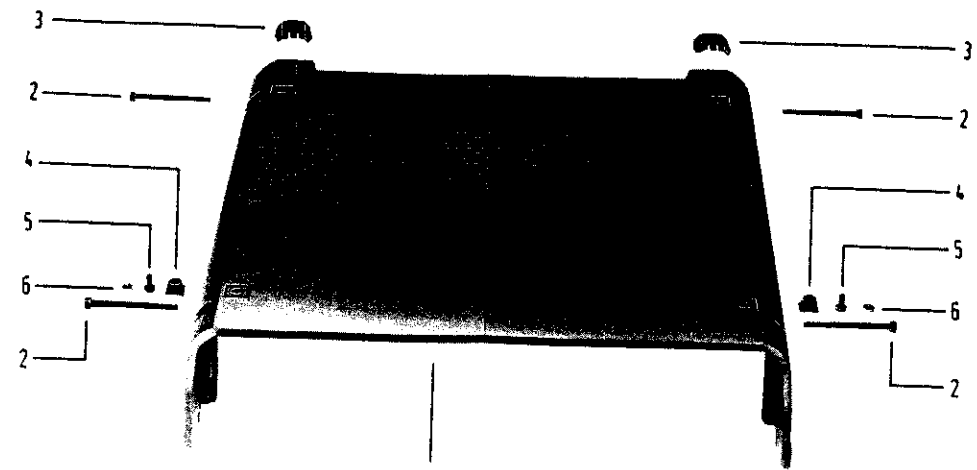
Bestellangaben  
 Order Number  
 Numéros de commande

1	Kappe, cap, capuchon	0000-2001.308
2	Kappe, cap, capuchon	0000-2000.503
3	Kappe, cap, capuchon	0000-2000.529
4	Kappe, cap, capuchon	0000-2007.483
5	Kappe, cap, capuchon	0000-2000.765
6	Kappe, cap, capuchon	0000-2007.441
7	Kappe, cap, capuchon	0000-2001.269
8	Kappe, cap, capuchon	0000-2007.344
9	Kappe, cap, capuchon	0000-2007.360
10	Kappe, cap, capuchon	0000-2007.386
11	Kappe, cap, capuchon	0000-2007.409
12	Kappe, cap, capuchon	0000-2007.506
13	Kappe, cap, capuchon	0000-2007.425
14	Kappe, cap, capuchon	0000-2007.467
15	Kappe, cap, capuchon	0000-2021.540
16	Kappe, cap, capuchon	0000-2003.021

Int. Vermerk:  
 Pos. 1-23 in Liste Eingabeschaltung  
 Pos. 24-27 in Liste S-Verdrahtung  
 Pos. 28-30 in Liste Gerät komplett

Int. Note:  
 Pos. 1-22 in list entry C  
 Pos. 24-27 in list switch  
 Pos. 28-30 in list comp



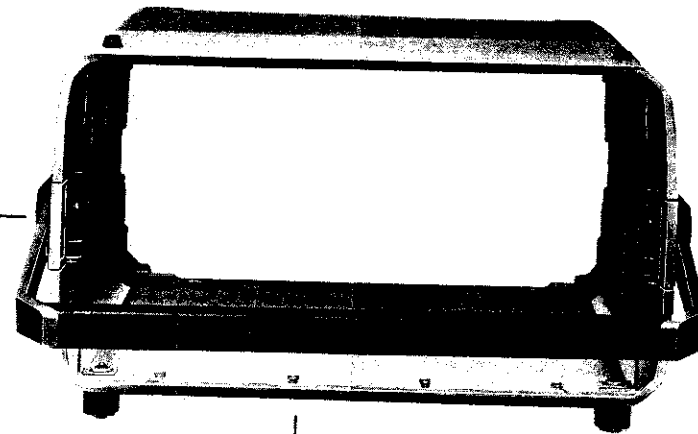


Schale oben  
Upper shell  
Coquille supérieure

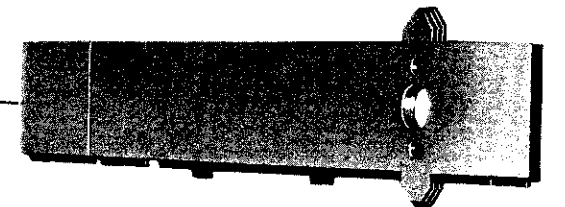


Seitenteil links  
Side section, left  
Parois latérales droite

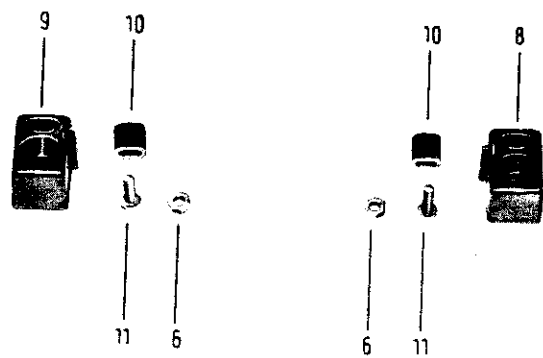
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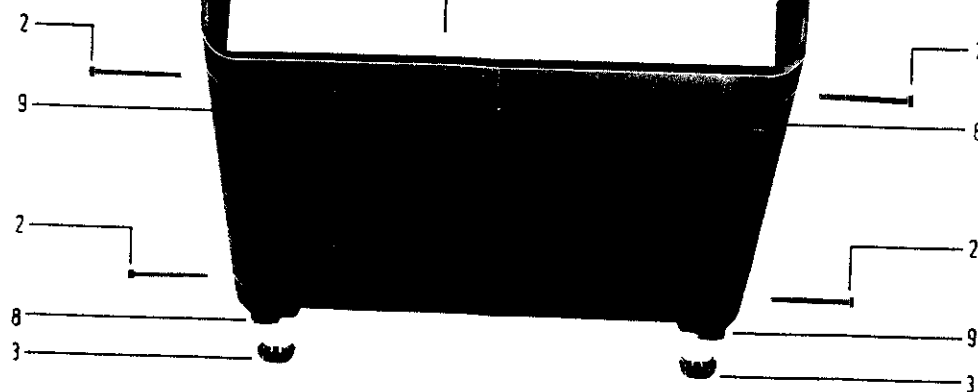
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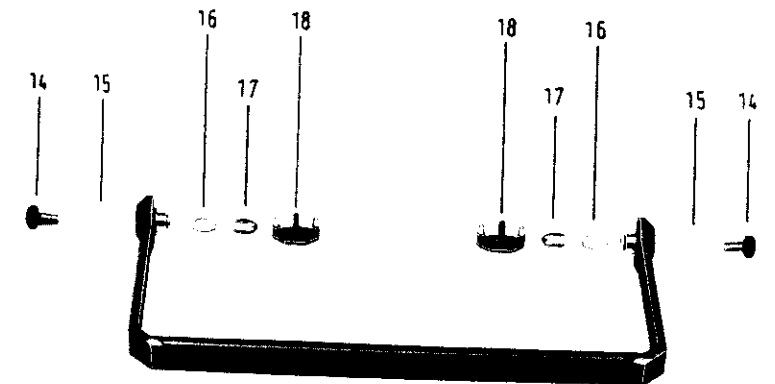
Seitenteil rechts  
Side section, right  
Parois latérales gauche



Rastfuß I und II  
Lock-foot I and II  
Pied verrouillage I et II



Schale unten  
Lower shell  
Coquille inférieure



Traggriff komplett  
Carrier handle, complete  
Poignée de transport complète

13

**Mechanische Teile für Frontplatte**  
**Mechanical parts for front panel**  
**Composants mécaniques pour la face avant**

SPM-15

Bitte bei Bestellung immer die Gerätenummer und Serie angeben  
 Please state instrument number and series when ordering parts  
 Lors de commandes donner toujours le numéro de l'appareil et la série

Pos.	Benennung	Bestellangaben	Pos.	Benennung	Bestellangaben
Pos.	Designation	Order Number	Pos.	Designation	Order Numbers
Pos.	Désignation	Numéros de commande	Pos.	Désignation	Numéros de commande
1	Kappe, cap, capuchon	0000-2001.308	17	Kappe, cap, capuchon	0000-2000.286
2	Kappe, cap, capuchon	0000-2000.503	18	Kappe, cap, capuchon	0000-2000.286
3	Kappe, cap, capuchon	0000-2000.529	19	Kappe, cap, capuchon	0000-3732.061
4	Kappe, cap, capuchon	0000-2007.483	20	Kappe, cap, capuchon	0000-2022.361
5	Kappe, cap, capuchon	0000-2000.765	21	Kappe, cap, capuchon	0000-2021.566
6	Kappe, cap, capuchon	0000-2007.441	22	Kappe, cap, capuchon	0000-2021.582
7	Kappe, cap, capuchon	0000-2001.269	23	Kappe, cap, capuchon	0000-2021.605
8	Kappe, cap, capuchon	0000-2007.344	24	Kappe, cap, capuchon	0000-2050.223
9	Kappe, cap, capuchon	0000-2007.360	25	Kappe, cap, capuchon	0000-2050.249
10	Kappe, cap, capuchon	0000-2007.386	26	Kappe, cap, capuchon	0000-2050.265
11	Kappe, cap, capuchon	0000-2007.409	27	Kappe, cap, capuchon	0000-2055.044
12	Kappe, cap, capuchon	0000-2007.506	28	Drehknopf, Knob, Bouton	0001-0063.435
13	Kappe, cap, capuchon	0000-2007.425	29	Deckel, Cover, Couvercle	0001-0063.710
14	Kappe, cap, capuchon	0000-2007.467	29	Drehknopf, Knob, Bouton	0001-0063.422
15	Kappe, cap, capuchon	0000-2021.540	30	Deckel, Cover, Couvercle	0001-0063.710
16	Kappe, cap, capuchon	0000-2003.021		Scheibe, Window plate, Vitre	0955-0000.043

Int. Vermerk:  
 Pos. 1-23 in Liste Eingabeschaltung  
 Pos. 24-27 in Liste S-Verdrahtung  
 Pos. 28-30 in Liste Gerät komplett

Int. Note:  
 Pos. 1-22 in list entry circuit  
 Pos. 24-27 in list switch wiring  
 Pos. 28-30 in list complete instrument

Note interne:  
 Pos. 1-23 dans liste circuit d'entrée  
 Pos. 24-27 dans liste câblage commutateur  
 Pos. 28-30 dans liste appareil complet

