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MINIPORT RECEIVER
EB 100

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Fig. 11-4 Removal of assemblies (without control unit)
Fig. 11-5 Removal of control unit

Service documentation

5. Maintenance

5.1 Electrical Maintenance

The overall design concept of the unit is such that it requires only a minimum of electrical maintenance.
The periodic maintenance of switching contacts is superfluous due to the use of highly selected and tested switches and pushbuttons.

5.2 Mechanical Maintenance

Mechanical maintenance is limited to a minimum owing to the almost complete absence of moving parts.
The front panel of the unit is to be cleaned occasionally (depending on the degree of contamination by means of a soft cloth soaked in soap water. It must be remembered to clean the front panel only with a moist cloth (not wet!)) to prevent soap suds from penetrating the unit.

5.3 Storage

The unit may be stored in a temperature range of -40 to +85°C.
The built-in battery must be removed in compliance with section 2.6 of the operating manual if the unit should be stored longer than 1 month. In order to minimize damage to the receiver, it must be wrapped in plastic sheet or wax paper.
The unit must be dried out for several hours at an ambient temperature ranging from +50 to +70°C prior to switch-on should it have become moist despite having been wrapped thoroughly.

6. Performance Test

6.1 Preliminary Remarks

The test set-up according to Fig. 11-1 is used for most of the performance tests (unless stated otherwise), the unit settings being as follows:

Signal generator

AM modulated (m = 0.5) or FM modulated (f = 150 MHz), modulated with a deviation of 6 kHz, f_{mod} = 1 kHz.

Receiver EB 100

f = 150 MHz, IF bandwidth 15 kHz, AF MOD, attenuator = 0 dB, threshold = -10 dBµV, AFC off.

6.2 Required Measuring Equipment and Accessories

Item	+ Type of unit, required specifications * Recommended R&S unit	Type	Order No.	Application
1	+ RF signal generator 20 to 1760 MHz AM/FM can be modulated 0 to 80 dBµV (-107 to -27 dBm) * Signal Generator	SMG	801.0001.52	6.8 6.9 6.11 .... 6.14 6.16 .... 6.18
2	+ AF voltmeter with CCITT weighting filter 10 Hz to 100 kHz * Modulation Analyzer	UPA	372.0010.02	6.12 6.17 6.18
3	+ Digital voltmeter 0 to 30 V DC * Digital Multimeter	UDL 33	388.8011.02	6.8 6.9 6.11 6.12 6.17
4	+ Oscilloscope DC to 30 MHz sensitivity 1 mV * Oszilloscope	BOP	374.0020.02	6.12
5	+ Selective voltmeter 600 to 1130 MHz -10 to +40 dBµV * Test Receiver	ESV	342.4020.53	6.15
6	+ Resistor 4 ... 4.7 Ω 0.5 W			6.17
7	+ Squarewave/puls generator * Function generator	AFG	377.2100.02	6.20

Item	+ Type of unit, required specifications * Recommended R&S unit	Type	Order No.	Appli-cation
8	+ Test mixer	e.g. MD 108		6.20
9	+ SWR Bridge * SWR Bridge	 ZRB 2	 373.9017.53	 6.9

6.3 Checking the Fuses F1 and F2

The receiver EB 100 is protected against overcurrent by two fuses (black plastic housing).
Fuse F1 (1 A semi time-lag type) protects the internal receiver circuit.
Fuse F2 (2.5 A time-lag type) protects the charging current circuit of the built-in battery.

6.3.1 Changing the Fuses F1 and F2

The two fuses are located to left and right of the on/off-switch S1 on the tuning unit. The top and bottom cover must be removed (as described in section 8, preliminaries) to permit changing of the fuses. The faulty fuse can be removed from its holder and be replaced using the fuse tongs (691.0362) contained in the service box.

6.4 Battery Check

Switch on receiver and press pushbutton TEST. The pointer of the level meter should be within the green range.

6.5 Illumination

Switch on receiver and press pushbutton ☼ . The level meter and the LCD display are illuminated.

6.6 Checking Operation by means of the Keypad

(See operating manual, section 2)

6.7 Tuning Knob

Perform several frequency settings using the tuning knob located on the side of the receiver. The step size Δf depends on the IF bandwidth B set on the receiver.

a) Δf = 1 kHz at B = 7.5 and 15 kHz

b) Δf = 10 kHz at B = 150 kHz

c) Δf = 10 kHz at B = 150 kHz (Pulse)

Check function of locking switch:

⊥⊥ corresponds to locked state, i.e. actuation of the tuning knob has no bearing on the frequency setting of the receiver.

6.8 Function of Carrier Squelch

(For test set-up, see Fig. 11-1)

- Set the level threshold of receiver to 20 dBµV.
- Apply modulated RF signal at 150 MHz.
- The squelch switching point should be audible when changing the level threshold at a generator level of 20 dBµV (-87 dBm) ±5 dB.
- Check also the squelch switching point at the male connector X4.5 as TTL level change.

6.9 Checking the IF Filter

(For test set-up, see Fig. 11-1)

a) 3-dB bandwidth of the filter 7.5 kHz and 15 kHz

- Apply unmodulated RF signal at 150 MHz and 40 dBµV (-67 dBm).
- Measure and note DC voltage at male connector X4.3.
- Increase RF level of signal generator by 3 dB and detune the signal generator frequency to both sides until noted DC voltage is obtained again.
- The minimum and maximum frequencies set on the signal generator correspond to the 3-dB bandwidth.

b) 3-dB bandwidth 150 kHz

(For test set-up, see Fig. 11-2)

- Set signal generator (a) to: f = 150 kHz, level 60 dBµV $m = 0.5$, f_{mod} = 1 kHz.
- Set signal generator (b) to: f = 149.8 MHz, level 60 dBµV, without modulation.
- Set EB 100 to: f_{in} = 150 MHz, AM, bandwidth 150 kHz.
- Measure AF level and normalize to 0 dB.
- Detune signal generator (b) towards to 150 kHz until the AF level reaches the value of -3 dB and note frequency (lower band limit (B_L)).
- Set signal generator (b) to 150.2 MHz; measure AF level and normalize to 0 dB.
- Detune signal generator backwards to 150 MHz until the AF level reaches the value of -3 dB and note frequency (upper band limit (Bu)).
- $B_{3\ dB} = B_u - B_L$.

c) Selection, 50-dB bandwidth

- Apply unmodulated AF signal at 150 MHz and 60 dBµV (-47 dBm).
- Detune signal generator by ±Δf until level meter on receiver indicates 10 dBµV (check accuracy of level meter reading using the signal generator, if necessary).

d) Nominal values

IF bandwidth	7.5 kHz	15 kHz	150 kHz
B_{3dB} (kHz)	6.5 to 10	13 to 20	110 to 200
B_{50dB} (kHz)	≤ 33	≤ 66	≤ 750

6.10 Frequency Accuracy

The tolerance of the temperature-stabilized crystal oscillator cannot be measured when the receiver is closed. See section 10.3.2.2 in this service manual for checking the frequency accuracy of the receiver.

6.11 Checking the Signal Level Display and the Level Tone

(For test set-up, see Fig. 11-1)

- Apply unmodulated AF signal at 150 MHz and 40 dBµV (-67 dBm).
- Level meter should indicate 40 dBµV ±5 dB.
- DC voltage at the male connector X4.3 is 2.35 ±0.3 V.
- Increase signal generator level by 40 dB and switch on attenuator -40 dB on the receiver. The level meter should indicate 40 dBµV ±5 dB.
- Switch on level tone on receiver and turn threshold knob. The pitch must vary noticeably within a ±15 dB change (lower scale of level meter).

6.12 Sensitivity

(For test set-up, see Fig. 11-1)

- The (S+N)/N measurements are carried out with CCITT filter on the male connector X5 or X4.7, the RF input signal being 0 dBµV (-107 dBm) and the frequencies to be set on the signal generator and receiver are as follows:

  20 MHz, 100 MHz, 200 MHz, 300 MHz etc. ... 999.999 MHz

- Nominal values: for AM (S+N)/N $\geq$ 10 dB, for FM (S+N)/N $\geq$ 18 dB } B = 15 kHz
- The AF output at FM should be monitored on an oscilloscope starting at 500 MHz so as to make it easier to obtain the IF centre by slightly detuning the generator frequency, if necessary. The IF centre is indicated by an optimum sinewave displayed on the oscilloscope.

6.13 Measuring the Image Frequency Rejection

(For test set-up, see Fig. 11-1)

Be $f_i = f_s + 2 \times f_{IF}$ where

f_i = image frequency = frequency of the signal generator

f_s = frequency to be set on the receiver

f_{IF} = 629.3 MHz for $f_s < 500$ MHz or
117.3 MHz for $f_s \geq 500$ MHz

Three measured values are determined per sub-range, the criterion being compliance of both signal levels at the male connector X4.3 referred to the applied signal f_1 of f_s at an RF input level of approx. 0 dBµV (-107 dBm).

Nominal values: f_s < 500 MHz ... > 80 dB
$f_s \geq$ 500 MHz ... > 55 dB

6.14 IF Rejection

(For test set-up, see Fig. 11-1)

- Apply intermediate frequency f_{IF} at a level of 0 dBµV (-107 dBm) using an RF signal generator.

  f_{IF} = 629.3 MHz for f_s < 500 MHz
  f_{IF} = 117.3 MHz for $f_s \geq$ 500 MHz

- Tune receiver to f_{IF}. The indication of 0 dBµV on the receiver is the reference value for the following measurements.
- Tune receiver to a centre frequency of a sub-range.
- Increase level of signal generator until the level meter of the receiver indicates the value 0 dBµV.
- The level difference on the RF signal generator is the IF rejection.

Nominal value per sub-range:

20 to 107.999 MHz	> 90 dB
108 to 219.999 MHz	> 80 dB
220 to 499.999 MHz	> 68 dB
500 to 999.999 MHz	> 100 dB

6.15 Oscillator Re-radiation at the Antenna

Voltage measurement at the antenna connection X1 of the receiver using the selective voltmeter or analyzer.

- Tune selective voltmeter to oscillator frequency f_o of receiver.

  f_o = 649.3 to 1129.299 MHz for f_s = 20 to 499.999 MHz
  f_o = 617.3 to 1117.299 MHz for f_s = 500 to 999.999 MHz

- Random check of three frequencies each below and above 500 MHz.
- Nominal value: V $\leq$ 5 µV into 50 Ω

6.16 Checking the AF Function

(For test set-up, see Fig. 11-1)

- Apply RF signal at a level of 40 dBµV (-67 dBm).
- Switch on AFC on receiver.
- When the signal generator is detuned (detune frequency $\leq$ bandwidth/2), the indicated frequency of the receiver is to follow the frequency of the signal generator in steps of 1 kHz independent of the set bandwidth.
- The frequency indications of both units must conform within <.±3 kHz.

6.17 AF Output

(For test set-up, see Fig. 11-1)

- Connect dummy load of 4 to 4.7 Ω to the headphone connector X5.
- Apply RF signal at 150 MHz at a level of 60 dBµV (-47 dBm), AM m = 0.8.

a) Measure frequency output, referred to 1 kHz:
   At 0.3 or 3,3 kHz .... 6 ±3 dB

b) Output voltage at 1 kHz and with the volume control on the receiver turned to maximum:
   $V_{max.} \geq 0.7$ V

6.18 AF S/N Ratio at V_{in} = 1 mV

(For test set-up, see Fig. 11-1)

- Apply RF signal at a level of 1 mV (-47 dBm).
- Measure AF S/N ratio using AF voltmeter with CCITT weighting at the male connector X5 or X4.7 (BW = 150 kHz).

Nominal values: for AM (m = 0.8) .... > 40 dB
for FM (dev. = 22 kHz) .... > 40 dB

6.19 Checking the Power-Down Logic for the CPU D301

The display must be cleared when the unit is being switched off. Furthermore, the pointer of the level meter must at the same time deflect to the left-hand end of the scale.

6.20 Checking the Peak Rectifier

(For test set-up, see Fig. 11-3)

- Set function generator to 50 µs pulse width and a repetition time of 1 ms.
- Set signal generator to f = 150 MHz, level 50 dBµV.
- Measure the smallest pulse width causes an error in indication of -6 dB.
- Nominal value: pulse width ≤ 70 µs.

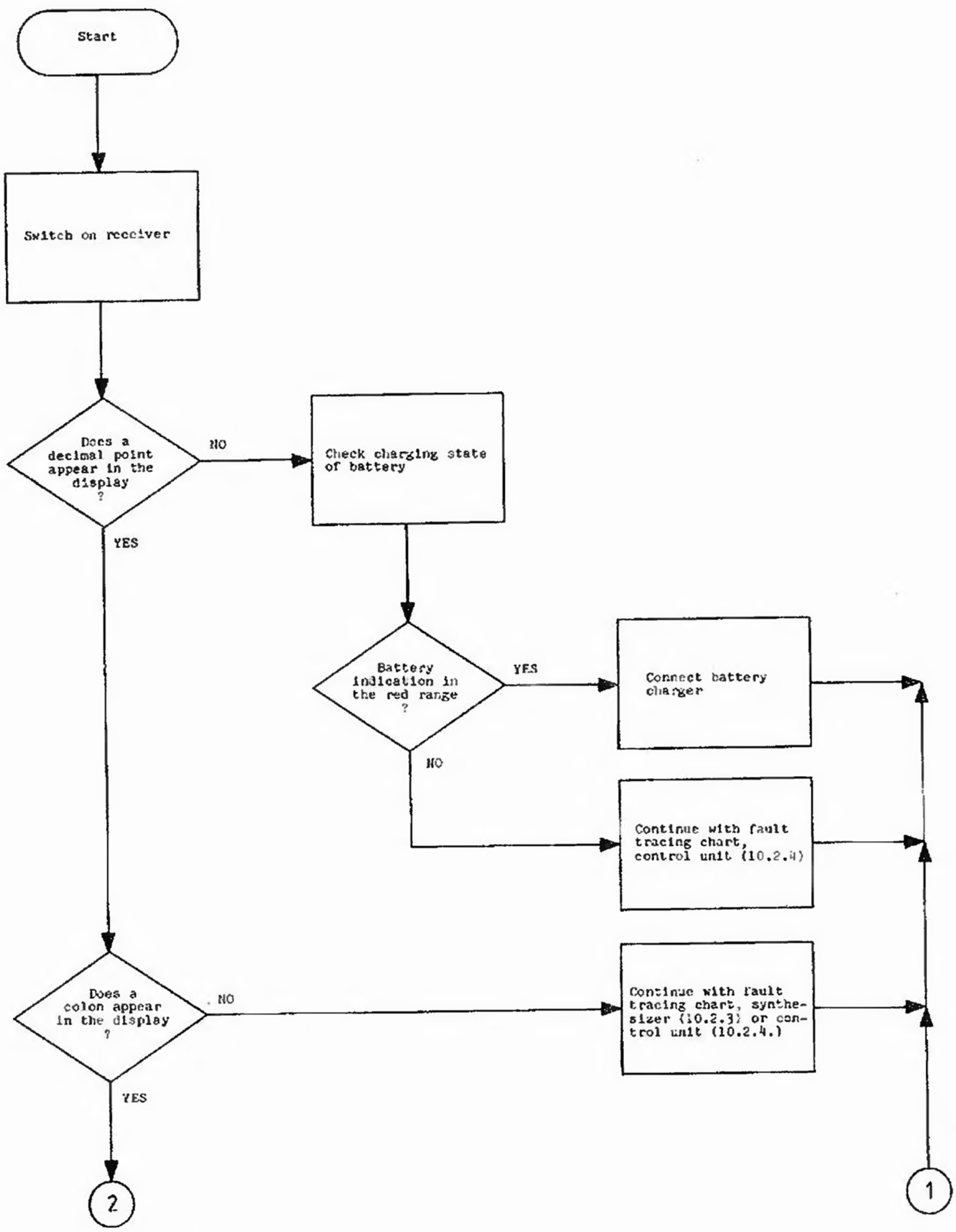
6.21 IF Output 10.7 MHz

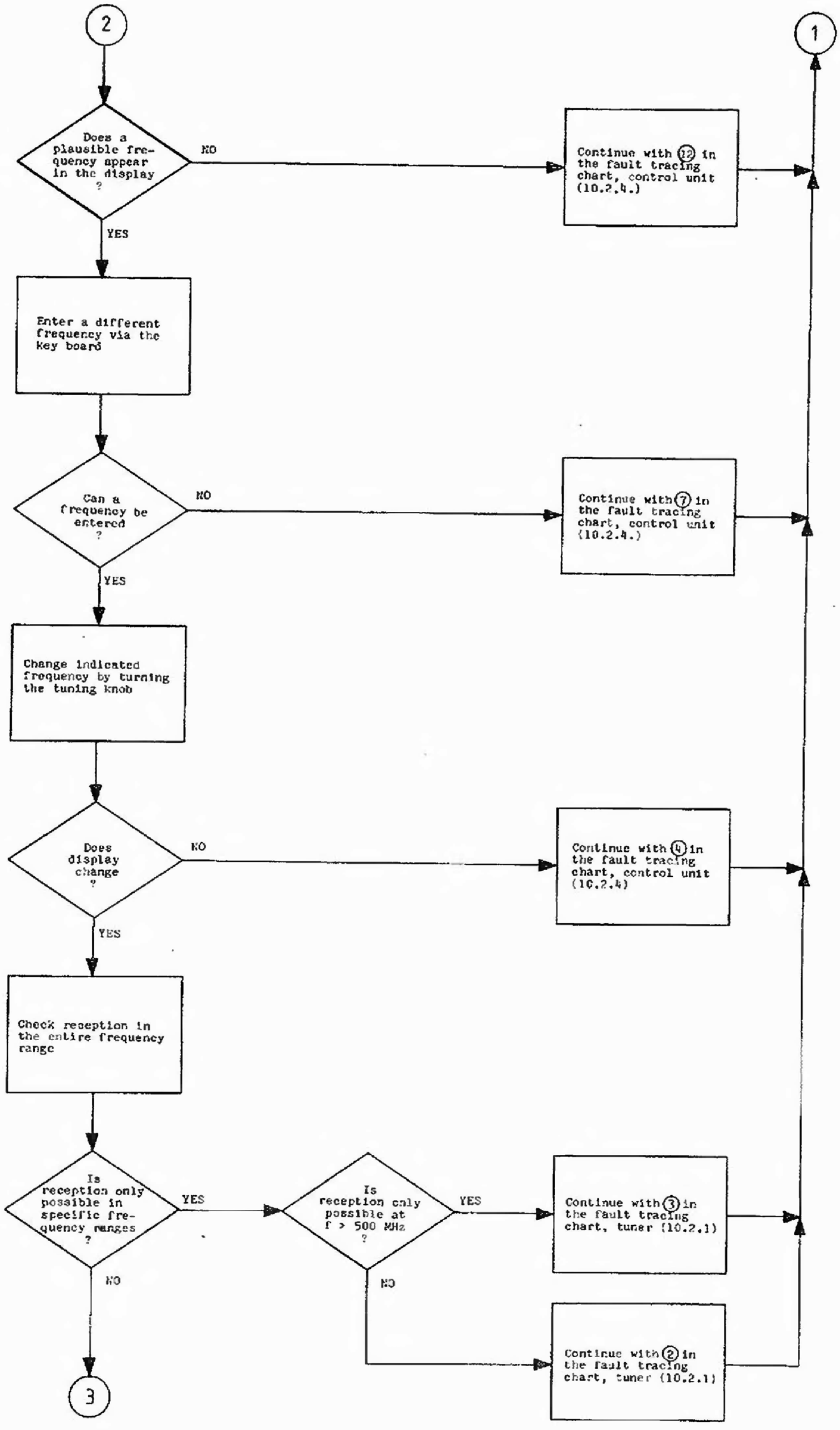
(For test set-up, see Fig. 11-1)

- Set signal generator to f = 150 MHz, level 50 dBµV.
- Measure IF level at the IF output (X20) into 50 Ω using a selective voltmeter.
- Nominal values: f = 10.7 MHz, 15 dB above the antenna level.

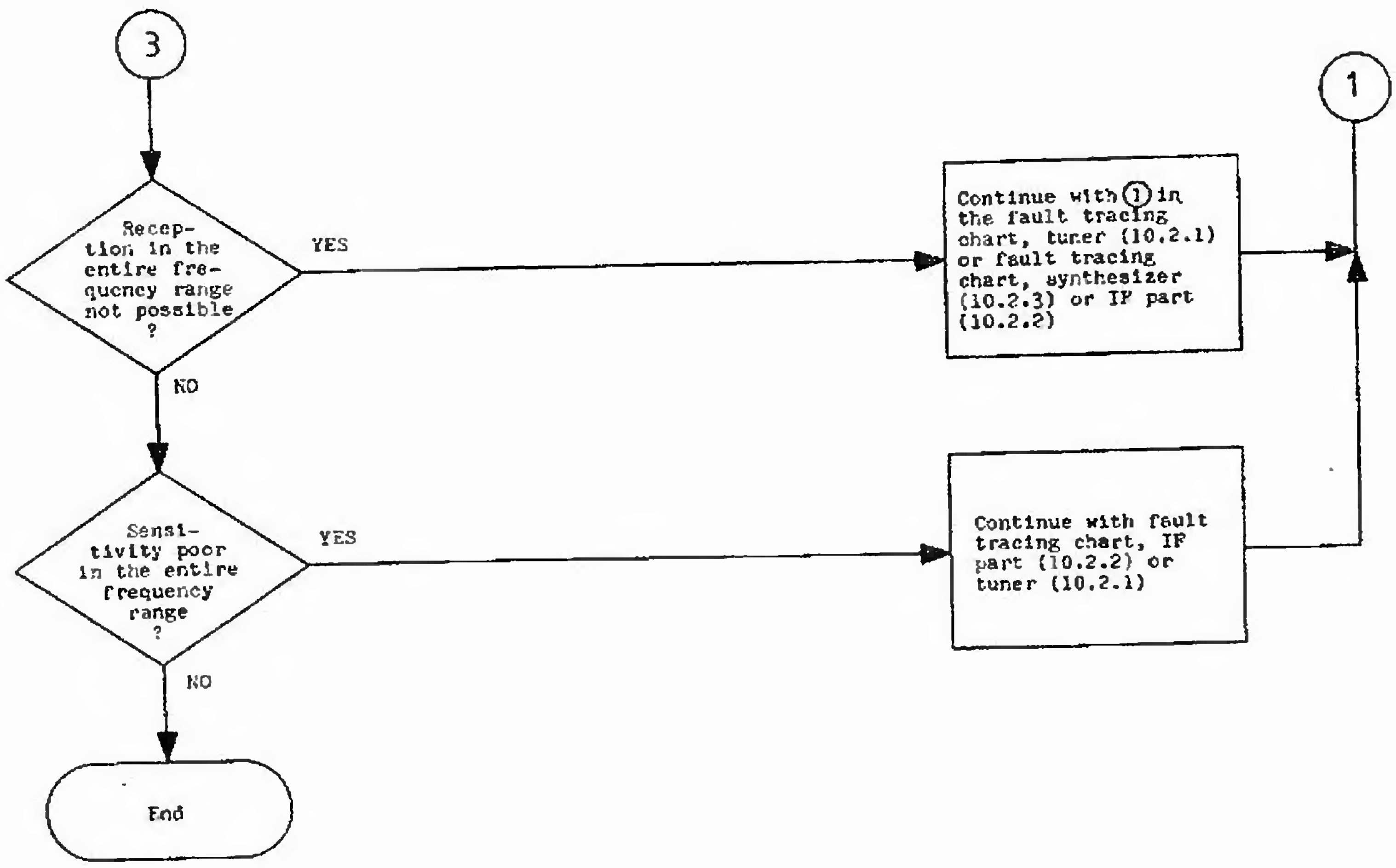
7. Troubleshooting of Subassembly

In the event of a system failure it is recommended to proceed in compliance with the following fault tracing chart to locate the faulty subassembly. Subsequently, the fault must be localized using the fault tracing chart of the corresponding subassembly.





2
1
Does a plausible frequency appear in the display ?
NO
YES
Continue with 12 in the fault tracing chart, control unit (10.2.4.)
Enter a different frequency via the key board
Can a frequency be entered ?
NO
YES
Continue with 7 in the fault tracing chart, control unit (10.2.4.)
Change indicated frequency by turning the tuning knob
Does display change ?
NO
YES
Continue with 4 in the fault tracing chart, control unit (10.2.4)
Check reception in the entire frequency range
Is reception only possible in specific frequency ranges ?
YES
NO
Is reception only possible at f > 500 MHz ?
YES
NO
Continue with 3 in the fault tracing chart, tuner (10.2.1)
Continue with 2 in the fault tracing chart, tuner (10.2.1)
3



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8. Removal of Subassemblies

(See Figs. 11-4 and 11-5)

Preliminary remarks

If the synthesizer (11-4/3) or the tuner (11-4/4) is established as faulty at the subassembly level the course of the trouble-shooting of subassemblies (section 7), further tracing of the fault and the subsequent repair can be performed in situ.

After removing the top cover as well as a screw (11-4/21 and /20), the two subassemblies can be swung out of the receiver such that the components and test points are accessible with the unit being completely operational following the opening of the spring lids on both sides (see also Fig. 8-1);

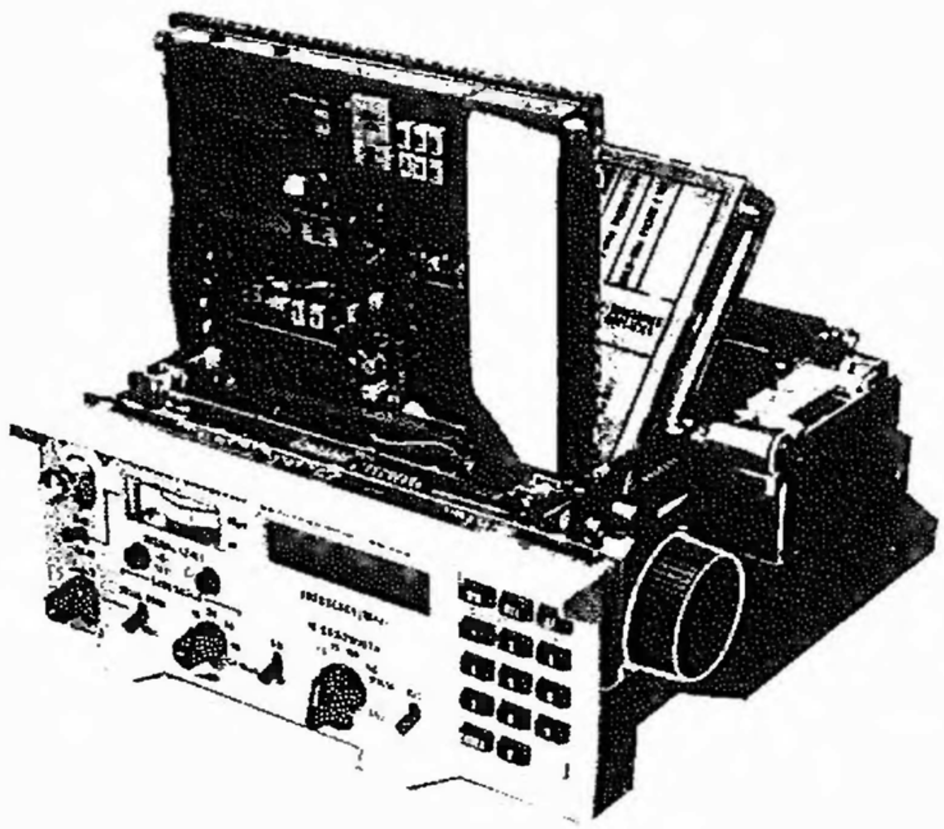

Fig. 8-1 EB 100 with swung-out subassemblies

Preliminaries:

a) Remove six screws (11-4/1) and take off top cover (11-4/2).

b) Remove six screws (11-4/15) and take off bottom cover (11-4/14).

8.1 Synthesizer

Preliminaries: see a)

- Remove two screws (11-4/21 and /19).
- Undo three RF cables (W11, W12, W15) and female connector X57.
- Remove synthesizer (11-4/3) from the top of the receiver.

8.2 Tuning Unit

Preliminaries: see a) and b)

- Disconnect male connector X47 (11-4/12).
- Unsolder two battery cables (11-4/6) from the terminals on the tuning unit (11-4/13).
- Remove six screws (11-4/8) and take off tuning unit.

8.3 Tuner

Preliminaries: see a), 8.1 and 8.2

- Remove screw (11-4/20).
- Extract locking ring (11-4/11) from shaft (11-4/18) and withdraw completely at the side of the receiver.
- Disconnect female connector X67.
- Disconnect four RF cables (W13 to W16).
- Remove tuner (11-4/4) from the top of the receiver.

8.4 IF Section

Preliminaries: see a), b) and 8.2

- Remove four screws (11-4/9).
- Remove battery brackets (11-4/5) from rear of receiver.
- Undo hexagonal socket screw (11-4/16) from IF bandwidth switch and remove control knob (11-4/17).
- Disconnect four RF cables (W11 to W14).
- Undo two screws (11-4/10).
- Pull out IF section (11-4/7) from rear of receiver.

8.5 Control Unit

Preliminaries: see a), b) and 8.1 to 8.4

- Remove hexagonal socket screws (11-5/9) on the AF and level threshold controller (11-5/10) and pull off control knobs.
- Take off four black rubber caps (11-5/11) from the toggle switches of the front panel.
- Move front panel (11-5/8) toward the front.
- Unsolder four wires (11-5/5) from the level meter.
- Disconnect RF cable (11-5/6).
- Remove six screws (11-5/7).
- Lift PC board (11-5/4) from the front panel.
- Remove four screws (11-5/2) and swing out PC board (11-5/3).
- Undo four screws (11-5/1).

9. Circuit Description

9.1 Tuner

(see circuit diagram 641.8124 sheet 1 and 2)

The RF signal coming from the antenna is routed to the tuner 20 to 1000 MHz via female connector X66. The RF signal is transmitted to the PIN diode switches D11 and D12 via the 40-dB attenuator N11 wich can be switched on at high field strengths. The diode switches route the RF signal to the input selections via signals R1 to R4 depending on the receive frequency and governed by the microprocessor control. The signal path runs via one of the bandpass filters from 20 to 108 MHz (L11 to L15, C11 to C15), 108 to 220 MHz (L20 to L23, L25, C20 to C23, C25) or 220 to 500 MHz (L30 to L34, C30 to C34) for receive frequencies below 500 MHz. An IF trap each (L26, C27 or L35, C35), all tuned to 629.3 MHz, is connected following the bandpass filters of 108 to 220 MHz and 220 to 500 MHz in order to increase the IF rejection. The bandpass filter L40, C40, C41 and the following UHF amplifier with the transistor V46 serve as a preselection for receive frequencies above 500 MHz with the transistor V45 providing the operating point stabilization of transistor V46. A tracking filter comprising the coils L51 to L53 and the tuning diodes V50 to V55 serves for oscillators re-radiation in this frequency range. The filter is tuned by the tuning voltage which is supplied by the microprocessor control via male connector X67.6 depending on the receive frequency.

The RF signal is routed to the broadband amplifier V66 via the PIN diode switch D60 or D61 following preselection. The operating point of V66 is stabilized by transistor V65. The broadband amplifier compensates the attenuation of the preceding filters before the RF singal is routed to the first mixer N80 via a 1000-MHz lowpass filter made up of the coils L70 to L74 and the capacitors C70 and C71. Here, the RF signal is converted to the first IF by means of the oscillator signal supplied by the synthesizer via female connector X65 and amplified by the amplifier N81 in the range 617.3 to 1129.3 MHz. Receive signals below 500 Hz are converted into an IF of 629.3 MHz and those above 500 MHz into an IF of 117.3 MHz.

The 117.3-MHz or 629.3-MHz IF signals are routed to the PIN diode switch D91 via the subsequent 650-MHz lowpass filter and the VHF/UHF amplifier V96. The 650-MHz lowpass filter is made up of the coils L90 and L91 as well as the capacitors C90, C91 and C92. The transistor V95 serves to stabilize the operating point of the VHF/UHF amplifier. The IF of 117.3 MHz is conveyed to PIN diode switch D100 by means of the PIN diode switch D91. The IF is routed from the diode switch D100 to the IF section via a 117.3-MHz filter and the female connector X64. The IF filter comprises the coils L112 to L116 and the capacitors C111 to C115.

The IF of 629.3 MHz produced by receive frequencies below 500 MHz is conveyed by the PIN diode switch D91 to the 629.3-MHz filter made up of the coils L100, L101, L104, L105 and the capacitors C103 and C104. The frequency conversion to 117.3 MHz is performed in the subsequent mixer N100 using the 512-MHz signal derived by the crystal oscillator in the IF section. The mixer N100 has a broadband termination of 50 Ω formed by the coils L102, resistor R101 and capacitor C105. The transistor V106 serves as an amplifier for the 117.3 MHz. Its operating point is stabilized by means of the transistor V105. The transistor V107 inhibits the IF amplifier V106 by interrupting the operating voltage for receive frequencies above 500 MHz.

Having passed the IF amplifier, the IF signal is routed to the PIN diode switch D100 which applies the signal to the subsequent 117.3-MHz filter from where it is routed to the IF section via female connector X64.

9.2 IF Section

(See circuit diagram 708.9503.01 S)

The IF signal of 117.3 MHz coming from the tuner is routed to the IF section via female connector X74. From there it is routed to mixer N70 where the signal is converted into an IF of 10.7 MHz with the 128-MHz oscillator signal. The IF signal amplified with the IF amplifier V70 is then routed to an IF selection consisting of the IF filters Z1 to Z3. The filters have bandwidths of 7.5 kHz, 15 kHz and 150 kHz and are switched into the signal path using switches S1-A and S1-B. The IF signal is further amplified by means of transistor V40 which compensates the insertion loss of the IF filters. Filter Z40 whose bandwith is 150 kHz is designed for postselection and determines the maximum IF bandwidth. The IF signal is mixed with the oscillator signal of 11.7 MHz produced in the crystal oscillator V50 in the combined IF amplifier/detector N40. Coil L41 and capacitor C46 filter the 1-MHz signal from the mixture products at the output of the mixer, terminal 8 of the IF amplifier/detector N40 and route it to the AM demodulator, terminal 13 of the IF amplifier/detector N40 as well as to the FM demodulator N60. The AF signal produced in the AM demodulator is sent to the control unit via the AF amplifier A72 and the male connector X77.B3. The AF signal produced in the FM demodulator is routed to the AF amplifier A72 whose gain is adjusted according to the selected IF bandwidth by switch S1-B. This AF signal, too, is routed to the control unit via male connector X77.A3.

The operating voltage supply for the 11.7-MHz oscillator V50, the combined IF amplifier/detector N40 and the FM demodulator N60 is performed via the separate regulating circuit A77. This prevents noise pickup via the supply voltage.

The frequency deflection of the receive signal is monitored by analyzing the discriminator DC voltage using the window discriminator N3. A reference voltage is generated by means of the voltage attenuator chain R11 to R15 corresponding to the output voltage of the discriminator N60 at the centre frequency. The reference voltage is adjusted using the potentiometer R13. If there is a deflection from the centre frequency, the window discriminator N3 produces the signals ABL POS (positive defelction), ABL NEG (negative deflection) and ABL GSW (deflection exceeding step size) which are routed to the microprocessor control for evaluation via male connectors X77.A8, .A7 and .B8.

The level indicator voltage is derived from the instantaneous log device and distributed for plug X77.B4 at a level of 0.1 - 3.5 V through the operational amplifiers N1-C and N1-D operating as rectifiers. On switch position "150 kHz Pulse" of the bandwidth control the rectifier is working as a peak rectifier.
This ensures that the indicator voltage is reacting for tempo-

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rary alterations of input voltages (pulses). On switch position 7.5 kHz, 25 kHz, and 150 kHz the level mean value will be indicated. The potentiometer R101 is for standardization of the level. The level blanking at search run (automatic station finder) is performed by OP N1-B which triggers the FET V97. At V70 collector the level for IF-output 10.7 MHz is taped, amplified and decoupled by N20 and feed to plug X20.

For generating the squelch signal which is routed to the tuning unit via male connector X77.A5, comparator N1-A compares the level voltage to the threshold voltage set on the squelch potentiometer which is provided by male connector X77.B7. The squelch signal inhibits the AF amplifier on the tuning unit if the level voltage is lower than the set threshold voltage.

The amplified level voltage is compared to the switching threshold set on the potentiometer R30 using comparator A73. If the level voltage is above the switching threshold, the ENAFC signal is sent via male connector X77.A4 enabling AFC control by means of the microprocessor control. Thus, the AFC control only responds to receive signals > -10 dBµV.

The temperature-stabilized crystal oscillator V80 with the crystal B80 which oscillates at 128 MHz serves as a reference oscillator supplying the mixture frequencies for the tuner, the synthesizer and the IF section. The oscillator signal generated is increased to a level of +5 dBm using amplifier N80 and directed to the mixer N70. The signal is routed at a level of -6 dBm to the synthesizer via female connector X71 where it is required as a reference signal.

The 512-MHz signal required for the synthesizer and the tuner are derived from the 128-MHz oscillator signal by multiplication. For this, the characteristic of the tuning diode V81 produces even-numbered harmonics from the 128-MHz oscillator signal amplified by the amplifier N81. The resonant circuits L90/C100, L91/C103 and L92/C102 filter out the fourth harmonic of the oscillator signal from this spectrum. The level of this 512-MHz signal is increased in the amplifier N90 to +5 dBm. The signal is fed to the tuner at this level via female connector X73 and to the synthesizer at a level of -15 dBm via female connector X72.

9.3 Synthesizer

(See circuit diagram 641.8147 S)

The PLL circuit D9 provides the tuning voltage required for the control of the oscillator. The 128-MHz oscillator signal provided by the crystal oscillator in the IF section via female connector X51 serves as a reference. The level is matched to the attenuator D10 using the transistor V16. The attenuator divides the 128-MHz oscillator signal by 40 and routes it to the PLL circuit D9 where the signal is divided by 640 so that an internal reference signal of 5 kHz is available for the PLL circuit.

To obtain the required frequency, the mixer B1 mixes the 512-MHz signal supplied by the IF section via female connector X52 with the frequency of 617.3 to 1129.3 MHz provided by the main oscillator. Amplifier N1 matches the level of the oscillator signal with that of the mixer. The level of the output signal of mixer B1 in the range 105.3 to 617.3 MHz is matched in the amplifiers N2 and N4 with the following divider chain D2, D3, D4 and D8 where the signal is divided by variable divider factors to 5 kHz and 500 Hz which are fed to the PLL circuit D9 as actual value at the terminals 1 and 2. Integrator N3 generates the tuning voltage for the main oscillator from the control voltages derived by comparison from the reference signal and the actual value. The operating voltage of N3 (26 V) is generated from the +12 V voltage using converter U1.

Switchover of the programmable divider D8 is performed by the microprocessor control in the control unit as a function of the receive frequency.

9.4 Control Unit

(See circuit diagram 708.9461.01 S sheet 1 to 3)

The core of the control unit is the microprocessor D301, type 80C39 which is an 8-bit processor with two integrated bidirectional I/O ports and an internal RAM having a capacity of 128 bytes.

The integrated RAM together with the RAM D306 serves to store operational data. The operating program is stored in the

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EPROM D305. Selection of low-order addresses for RAM or EPROM from the multiplexed address/data bus is performed using latch D307. As it is not possible to address the entire EPROM by means of the 8-bit address, the top 4 bits of the address are supplied when accessing via port 2 of the CPU D301. Using the 12-bit address which is thus available, the lower 4 Kbyte of the EPROM ranging from ØØØØH to ØFFFH can be addressed.
Access is made possible to the upper 4 Kbyte of the EPROM in the range 1ØØØ to 1FFFH by changing the plug-in jumpers X301 to position 1-2.

Port 1 of the D301 accesses the internal strobe bus via which the LCD display and the data transfer to the synthesizer are controlled. The 3 high-order bits of port P2 of the D301 are directed to the 1-out-of-8 decoder D302 from which the various CS (chip-select) signals are generated. The 4 low-order bits of port 2 are split up into eight bidirectional ports of 4 bits each by means of the I/O expanders D201 and D202 which are informed via a 4-bit control word - transmitted prior to the data - to which port the data are to be transferred. The PROG signal is used to distinguish between the control word and data; the negative edge of the signal denotes a control word and its positive edge marks data.

The evaluation of the receiver operating elements such as keypad in the control unit, tuning knob on the tuning unit and bandwidth converter in the IF section is interrupt-controlled, i.e. an interrupt signal is generated on actuating any of the operating elements and transferred to the D301.

The key encoder D303 evaluates the key matrix. The IRKEY signal is activated by the key encoder D303 on pressing a pushbutton triggering an interrupt of the D301. For this, the D flip-flop D205-B stores the IRKEY signal and generates the interrupt signal using the NOR gate D203. As various operating elements can trigger an interrupt request, the state of the interrupt request lines is read in following activation of the interrupt signal via the port lines 4.1, 4.2 and 5.0 of the I/O expander D201; at the same time it is determined which of the operating elements triggered the interrupt. If triggering was performed by the key encoder D303, the $\overline{\text{KEYACK}}$ signal is issued via port line

7.0 of the I/O expander D201; the signal resets the D flip-flop D205-B thus preparing further interrupt request. At the same time, the key encoder D303 is enabled via the OR gate D308; the encoder places the information concerning the pressed push-button on outputs D0 to D4 of the data bus from where they are read into the D301.

The $\overline{\text{BRUACK}}$ signal is issued via port line 7.1 of the I/O expander D201 and thus the interrupt request stored in the D flip-flop D205-A is reset if the bandwidth changeover switch triggered the interrupt. Information on the new position of the bandwidth changeover switch in the IF section is read in via port lines 5.1 to 5.3 of I/O expander D201.

On triggering the interrupt by the tuning knob on the tuning unit, port line 7.2 of I/O expander C201 sends out the $\overline{\text{TUNACK}}$ signal resetting the interrupt request. The information on the direction the tuning knob is turned is read in by port lines 5.2 and 5.3 of the I/O expander D202.

The tuning voltage for the tracking filter in the tuner is generated via the D/A converter D304. It converts the 8-bit data word supplied by the CPU D301 via the data bus into an analog voltage. The following operational amplifiers N301 and N304 serve for level matching. The tuning voltage is adjusted using potentiometer R322. The rest of the control signals for the tuner are generated by the 3-to-8 decoder D206 from the port lines 6.0 to 6.3 of the I/O expander D202. The corresponding read-in signal (port 1/D7) is supplied by D301 via pin 34.

The astable multivibrator D107 provides the clock frequency for the LCD display P110. The LCD display P110 is selected by means of the BCD to 7-segment decoders/drivers D101 to D106. Select signals are output via port lines 4.0 to 4.3 of the I/O expander D202. Data are output byte-serially, i.e. data for the separate decades of the LCD display P110 are transferred one after the other. The enable signals for the corresponding decoder/driver D101 to D106 arrive from the strobe bus of the synthesizer via the inverting driver D112.

The LCD display P110 (e.g. in the absence of ligth) is illuminated by the lamps H102 and H103 which are switched on using pushbutton S120 which simultaneously switches on lamp H104 for illuminating meter B101.

The indication can be switched over using switch S119. Signal level is indicated in position 2-3/8-9 and battery test is performed in position 3-4/7-8. The voltage difference between the battery voltage and the derived 5-V operating voltage serves as a criterion for the charging state of the battery.

Switch S116 generates the logic signal AFC-ON which is interrogated by the microprocessor via I/O expander D201 ensuring AFC (in the activated state). The 40-dB attenuator is connected in the tuner using switch S121.

Switch S118 has two tasks. In position 2-3/5-6 it turns on the AF signal selected by switch S117 to the volume potentiometer R111 and the control voltage for the display range of 80 dB to meter B101 and in position 2-1/5-4 the level tone is switched through to the volume potentiometer and the control voltage for the extended display range or 30 dB for the level meter.

9.5 Tuning Unit

(See circuit diagram 708.9484.01 S)

The evaluation logic for the tuning knob, the AF amplifier for the loudspeaker or headphone, the level tone generator and the voltage stabilization for the operating voltage +5 V as well as the DC/DC converter for the ±12 V supply voltage.

The tuning knob consists of two electronic switches with magnetic locking which operate on the Hall effect, sending out pulses on actuation. The following logic circuit recognizes the direction of rotation from the pulse sequence and sets the D flip-flops D4-A and D4-B. At the same time, the IRQTUN signal is generated triggering an interrupt in the microprocessor control of the control unit. The output of the IRQTUN signal can be inhibited by means of switch S2 preventing inadvertent change of the set frequency by means of the tuning knob.

The AF amplifier N1 serves to amplify the AF signal coming from the control unit. The AF amplifier is switched off by the signal SQLEIN which is activated when the receive level falls short of a set threshold value. The AF signal is reproduced via loudspeaker B3 if no headphone is connected to the jack plug X5. If a headphone is connected, the switch integrated into the jack plug interrupts the signal path to the loudspeaker B5 such that the AF signal can only be heard via the headphone.

The voltage-frequency converter N2 serves as a level tone generator which generates signals of variable pitch depending on the indicated receive level. A control voltage which is proportional to the IF level in dB is generated in the IF section; this voltage is routed to the voltage-frequency converter via female connector X47.14. The level tone resulting from the control voltage is directed to the control unit via female connector X47.15 and can there be inserted into the AF signal path via a switch.

The operating voltages of +5 V and ±12 V required in the receiver are generated from the 6-V battery voltage. The voltage regulator U1 stabilizes the +5-V operating voltage. The DC/DC converter U2 generates the ±12-V operating voltage with the low-pass filters L1, C3, C4 and L2, C6, C7 filtering the DC current.

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10. Troubleshooting and Repair of Subassemblies

10.1 Preliminary Remarks

When performing RF measurements make sure to use correctly matched cables and connectors as well as to employ short cable connections.

Among others there are MOS, MOSFET and CMOS components integrated in the subassemblies. These components are extremely sensitive to high external voltages. Static charges may lead to very high discharge surges which could destroy these components.

For this reason, the following minimum requirements must be adhered to when working near these components, if no special working place for CMOS is available:

- Conductive table and floor coverings,
- Working chair with conductive coverings,
- Grounded metallic working top, conductive wristbands with a protective impedance of > 200 kΩ, < 1 MΩ and an insulated lead via a plug,
- Soldering irons with safety grounding,
- All conductive coverings, wristbands and working tops must be interconnected via insulated lines,
- Supply voltage must be switched off during soldering.

10.1.1 Spare Parts

All components and subassemblies have undergone a severe quality control prior to assembly.

A component found to be faulty beyond any doubt by means of measurements, adjustments and operational tests is only to be exchanged in compliance with the parts lists in the annex of this service manual.

This is the only way of guaranteeing the specifications laid down in the operating manual, part 1.

Component manufacturers have been provided with special specifications defined by R & S to ensure maximum reliability for components such as resistors, capacitors, diodes, transistors, integrated and highly integrated components. That is why we recommend to replace faulty components whenever possible, by original ones.

When ordering spare parts, please state the following specifications:

type, order no. and serial no. of the unit, part no. of the parts list as well as designation and part no. of component.

All these details are stated in the attached circuit diagrams, parts lists and parts location drawings.

The components will be changed according to common workshop practice with no particular instructions being required.

10.1.2 Required Measuring Equipment and Accessories

The following test equipment is required for performing the measurements described in this section. Similar test equipment may be used provided the specifications are at least of equal standing.

Item	+ Type of unit, required specifications * Recommended R&S unit	Type	Order No.	Appli-cation
1	+ RF signal generator 0.1 to 1000 MHz AM/FM can be modulated -97 to -27 dBm * Signal Generator	SMPD	376.8011.52	10.3.1.1 10.3.1.2 10.3.1.4 10.3.2.1 10.3.2.3 10.3.2.4 10.3.3.3
2	+ Frequency analyzer 0 to 1.4 GHz			10.3.1.1 10.3.1.2 10.3.1.4 10.3.3.1 10.3.3.2
3	+ Sweep tester 0.1 to 1300 MHz * Polyskop with Log. Amplifier * Scalar Network Analyzer	SWOB 5 SWOB 5-E1 ZAS	333.0019.53 333.5610.02 393.0015.02	10.3.1.3 10.3.1.5 10.3.1.6 10.3.1.7 10.3.1.8 10.3.1.9 10.3.1.10 10.3.1.11 10.3.1.12
4	+ Oscilloscope DC to 10 MHz Sensitivity 1 mV * Oscilloscope	BOP	374.0020.02	10.3.2.1 10.3.2.3 10.3.5.1 10.3.5.3
5	+ Power meter -10 to 0 dBm 20 to 600 MHz * RF Millivoltmeter with terminated unit	URV 5 URV 5-Z5	394.8010.02 395.2115.55	10.3.2.2 10.3.2.5
6	+ Frequency counter 1 Hz to 1500 MHz Sensitivity 1 mV			10.3.2.2 10.3.3.3 10.3.3.4
7	+ Power supply unit 0 to 30 V * DC Power Supply	NGT 35	191.2019.02	10.3.3.2

Item	+ Type of unit, required specifications * Recommended R&S unit	Type	Order No.	Appli-cation
8	+ AF Generator 1 Hz to 10 kHz * Generator	 SPN	 336.3019.02	10.3.5.2
9	+ Digital multimeter 0 to 30 V * Digital Multimeter	 UDL 33		10.3.1... 10.3.5
10	+ Termination 2 x 50 Ω * Termination	 RNA	 272.4510.50	10.3.2.5 10.3.3.2
11	+ DC isolation * DC Isolation		 708.9026.00	10.3.11
12	+ Squarewave/puls generator * Function generator	 AFG	 377.2100.02	 10.3.2.4
13	+ Test mixer	e.g. MD 108		 10.3.2.4

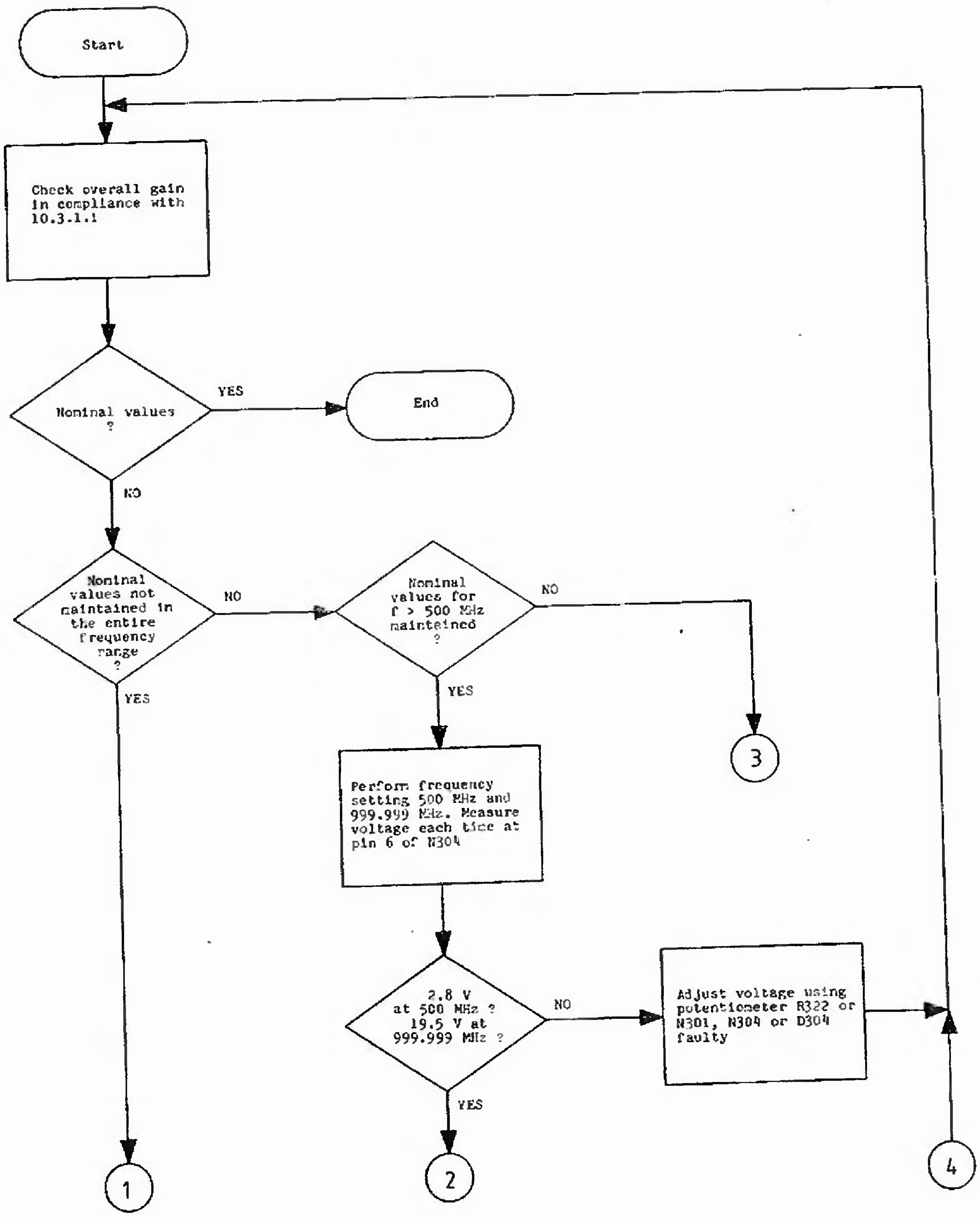
10.2 Troubleshooting

For determining a defective component it is recommended to localize the error by checking the nominal values using the systematic instructions given under 10.2.1 to 10.2.5.

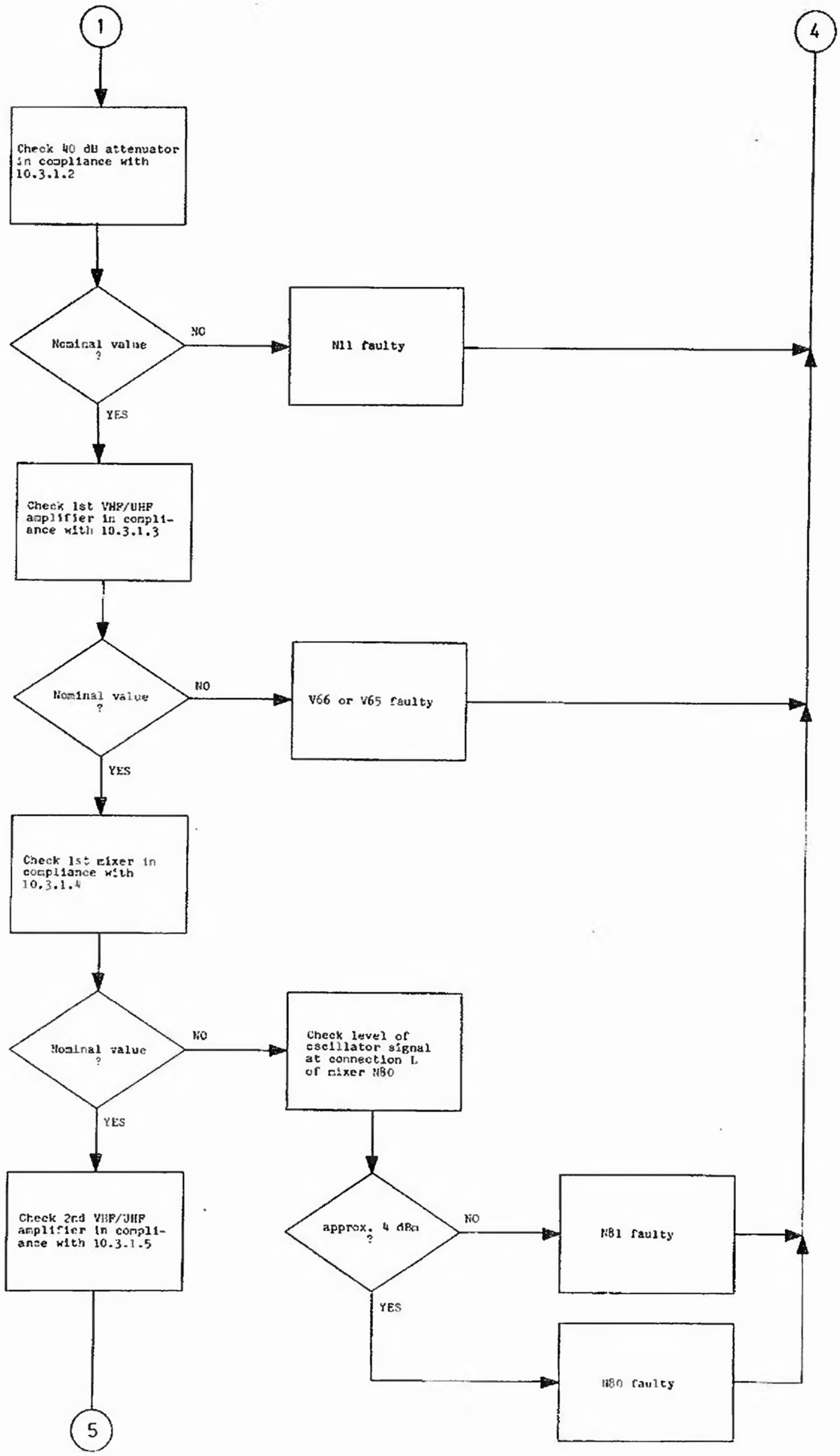
10.2.1 Tuner Fault Tracing Chart

Prerequisites for troubleshooting:

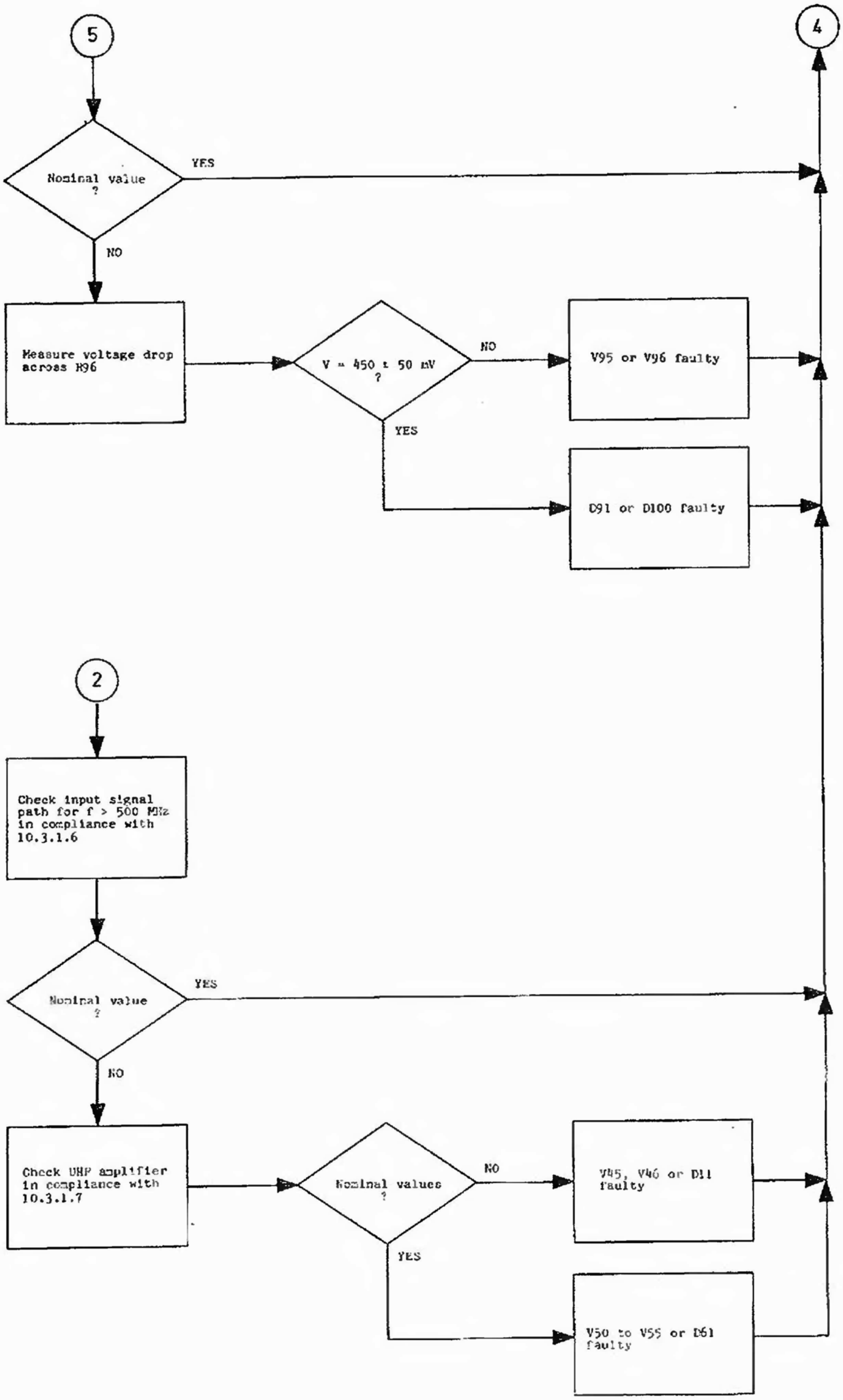
- tuner is adapted in the receiver,
- operational voltages are available.



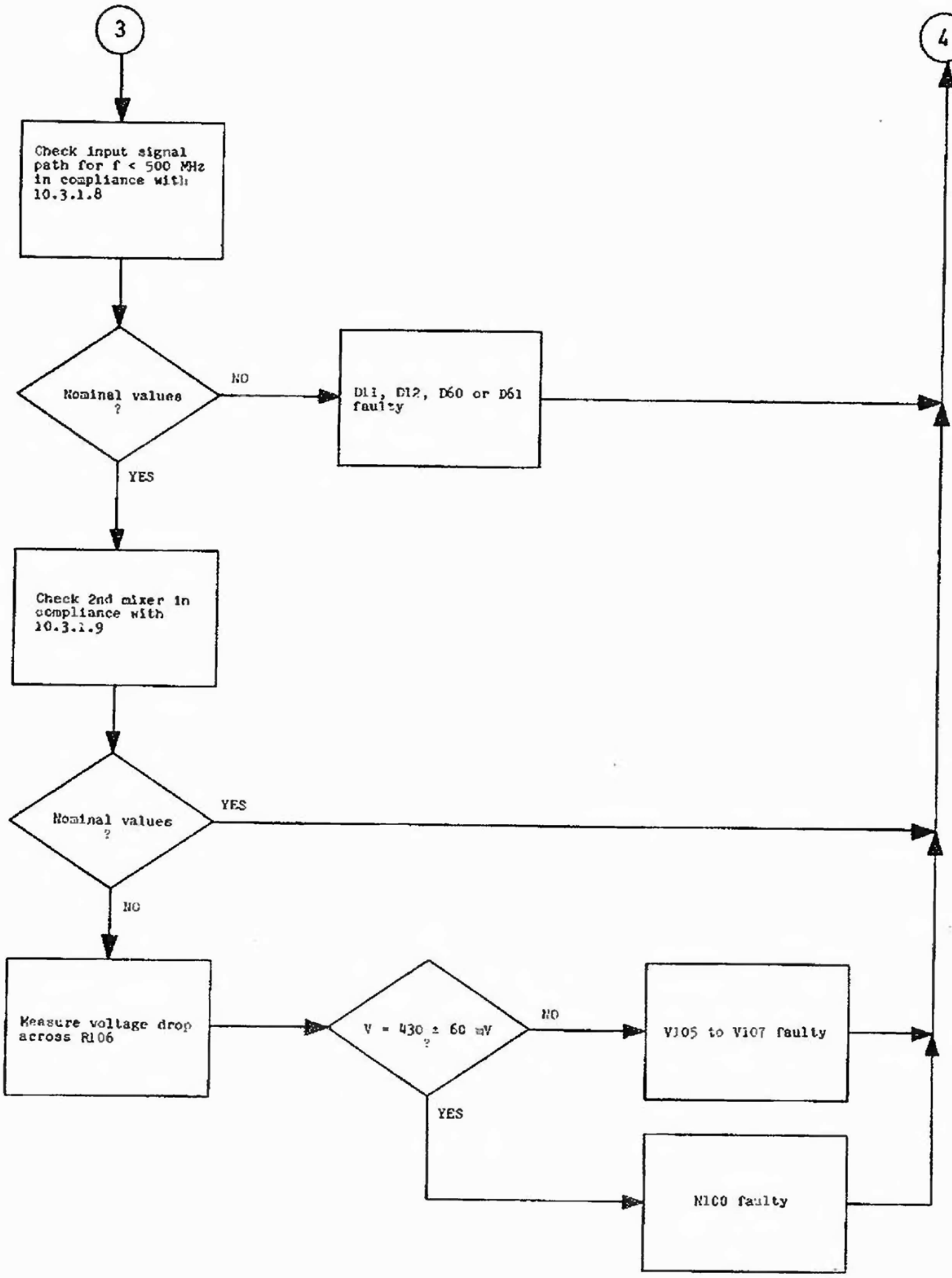
(continued) Tuner fault tracing chart



(continued) Tuner fault tracing chart



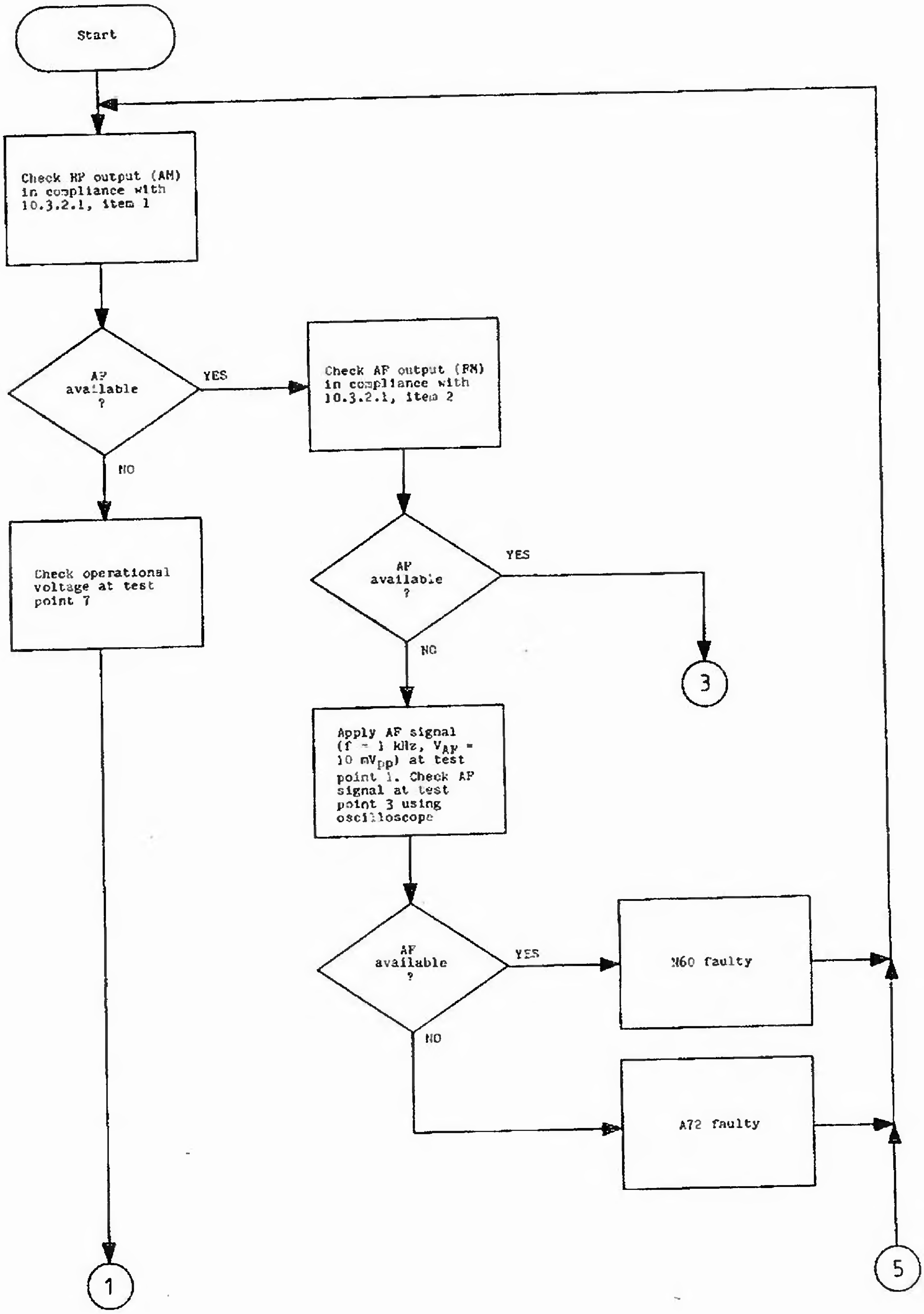
(continued) Tuner fault tracing chart



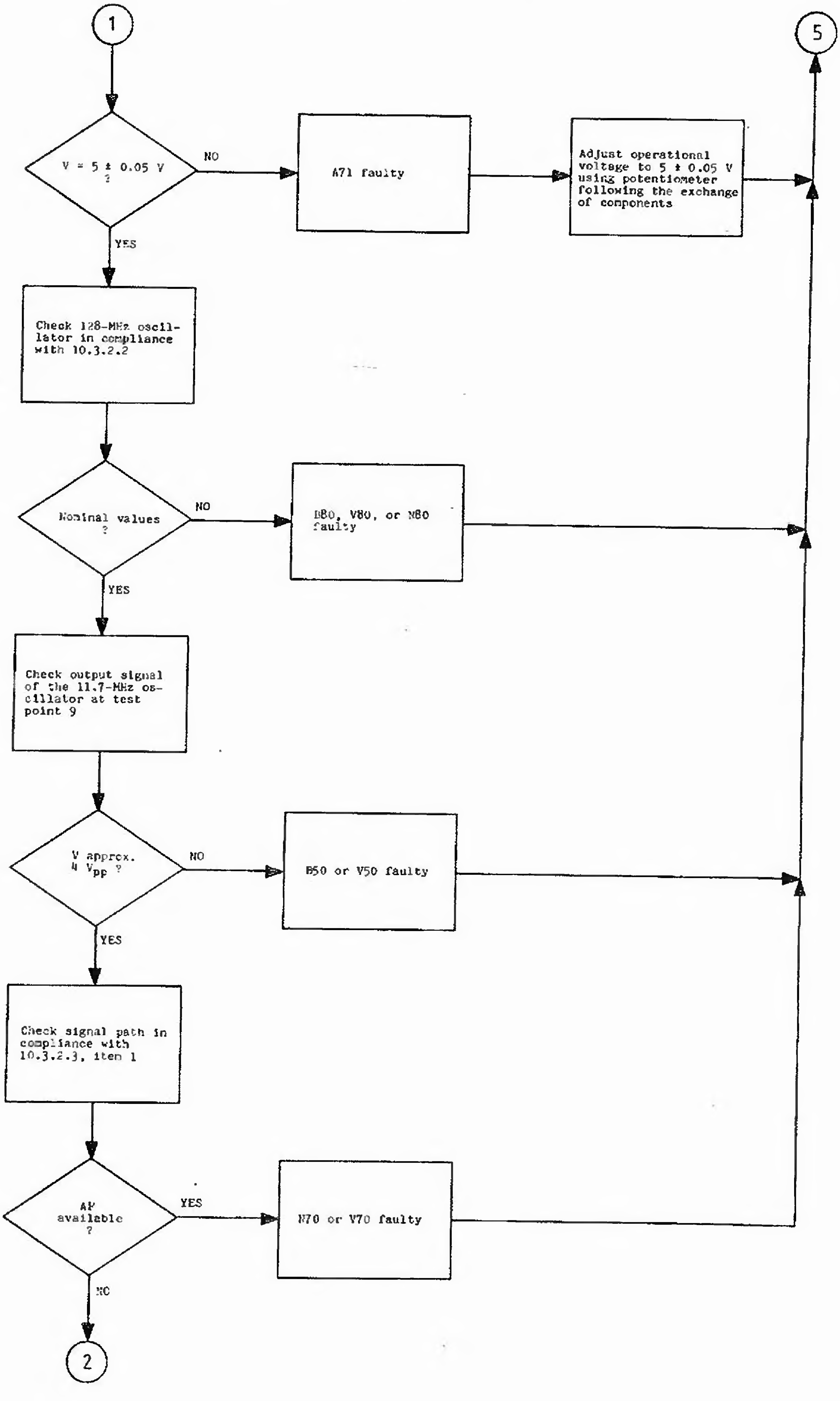
10.2.2 IF Section Fault Tracing Chart

Prerequisites for troubleshooting:

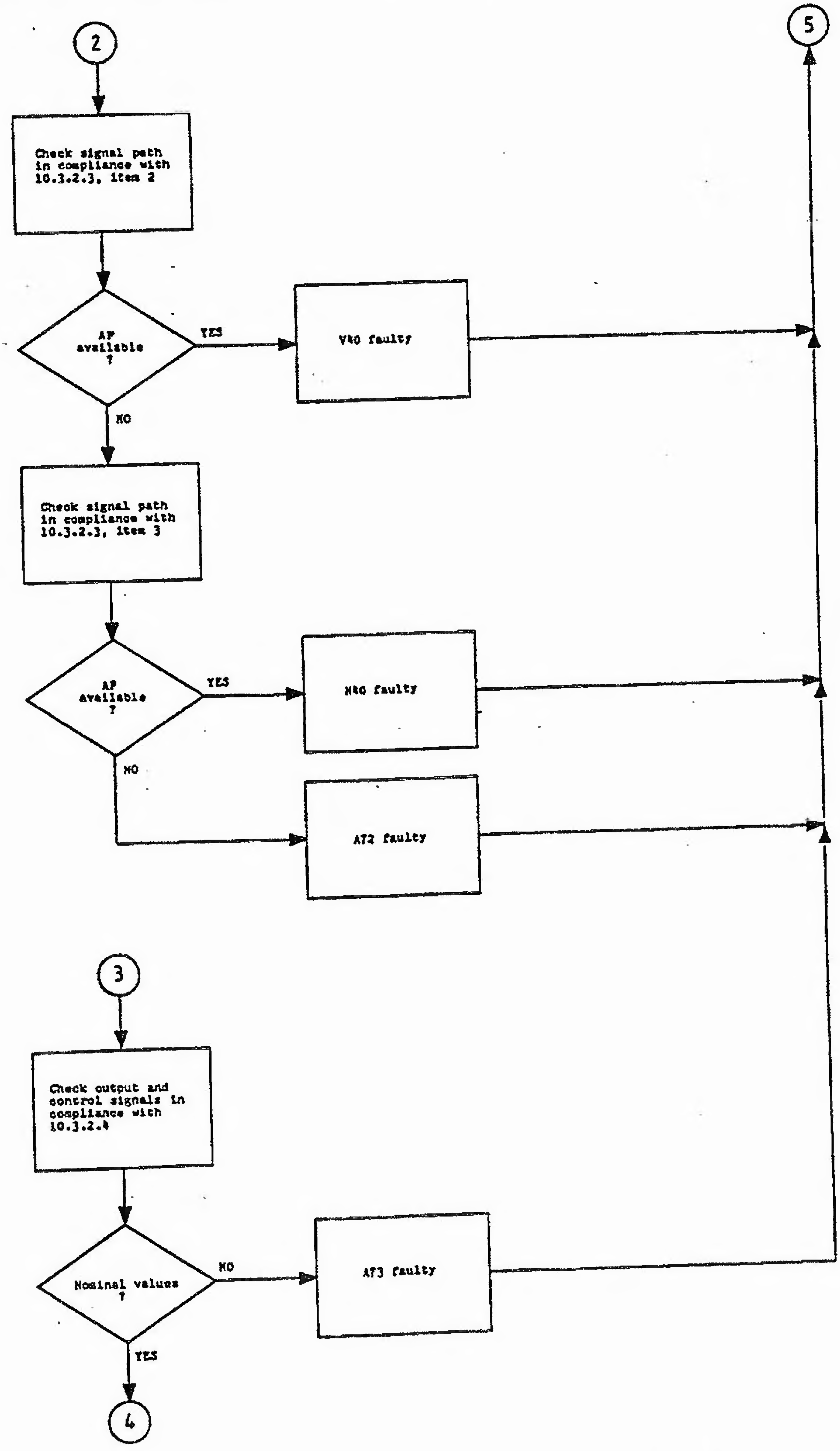
- IF section is adapted in the receiver,
- operational voltages are available.



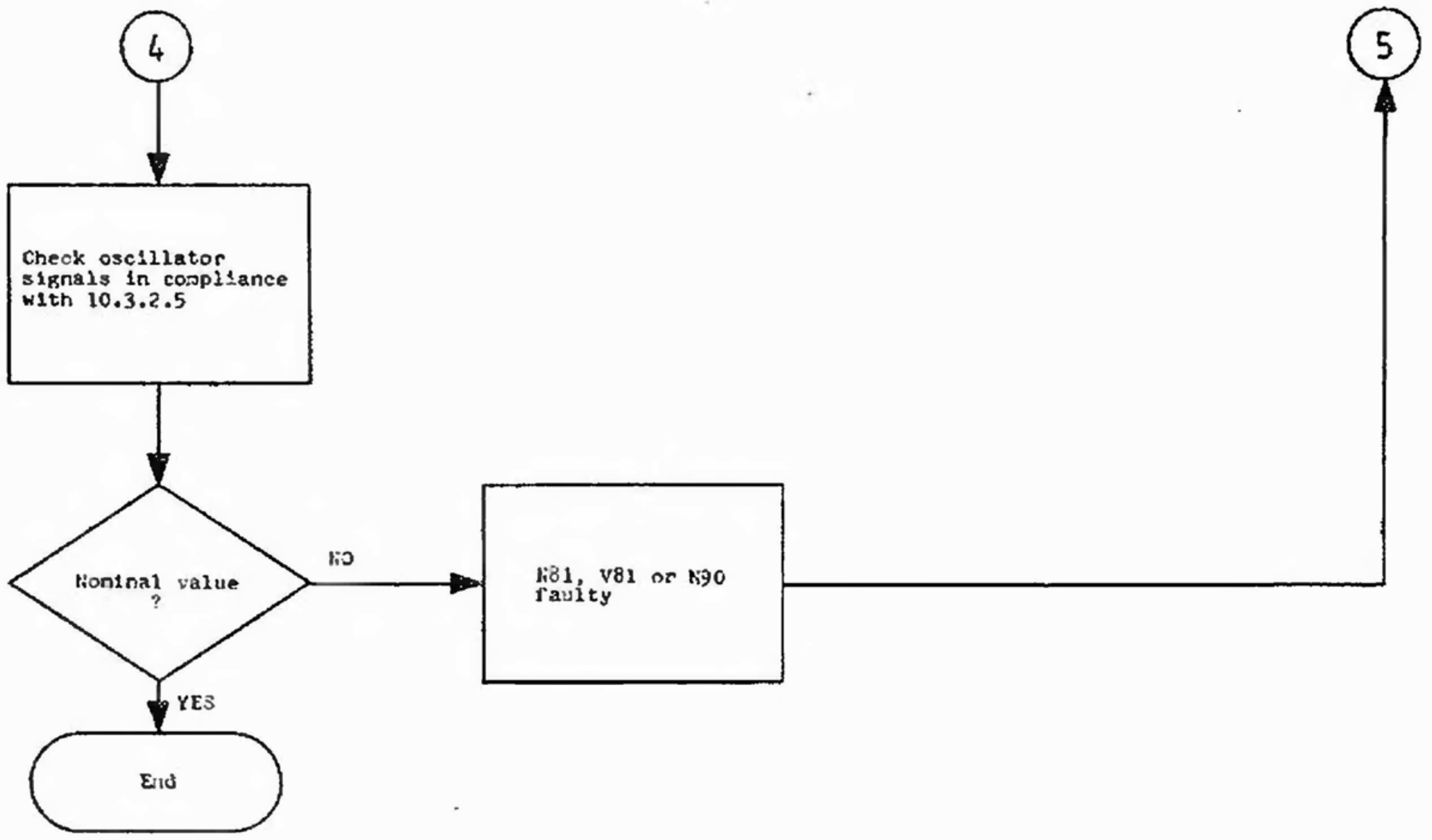
(continued) IF Section fault tracing chart



(continued) IF Section fault tracing chart



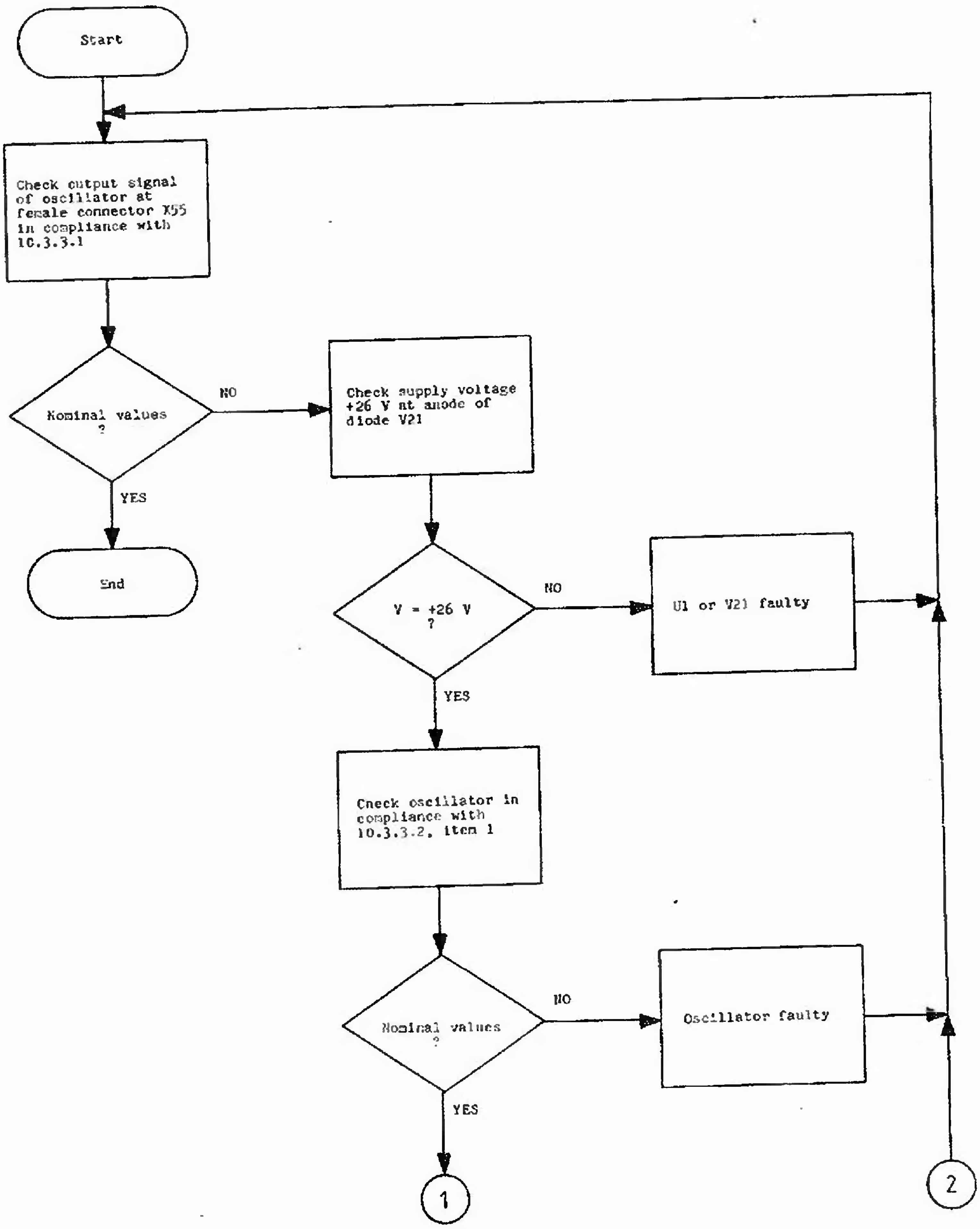
(continued) IF Section fault tracing chart



10.2.3 Synthesizer Fault Tracing Chart

Prerequisites for troubleshooting:

- synthesizer is adapted in the receiver,
- operational voltages are available.



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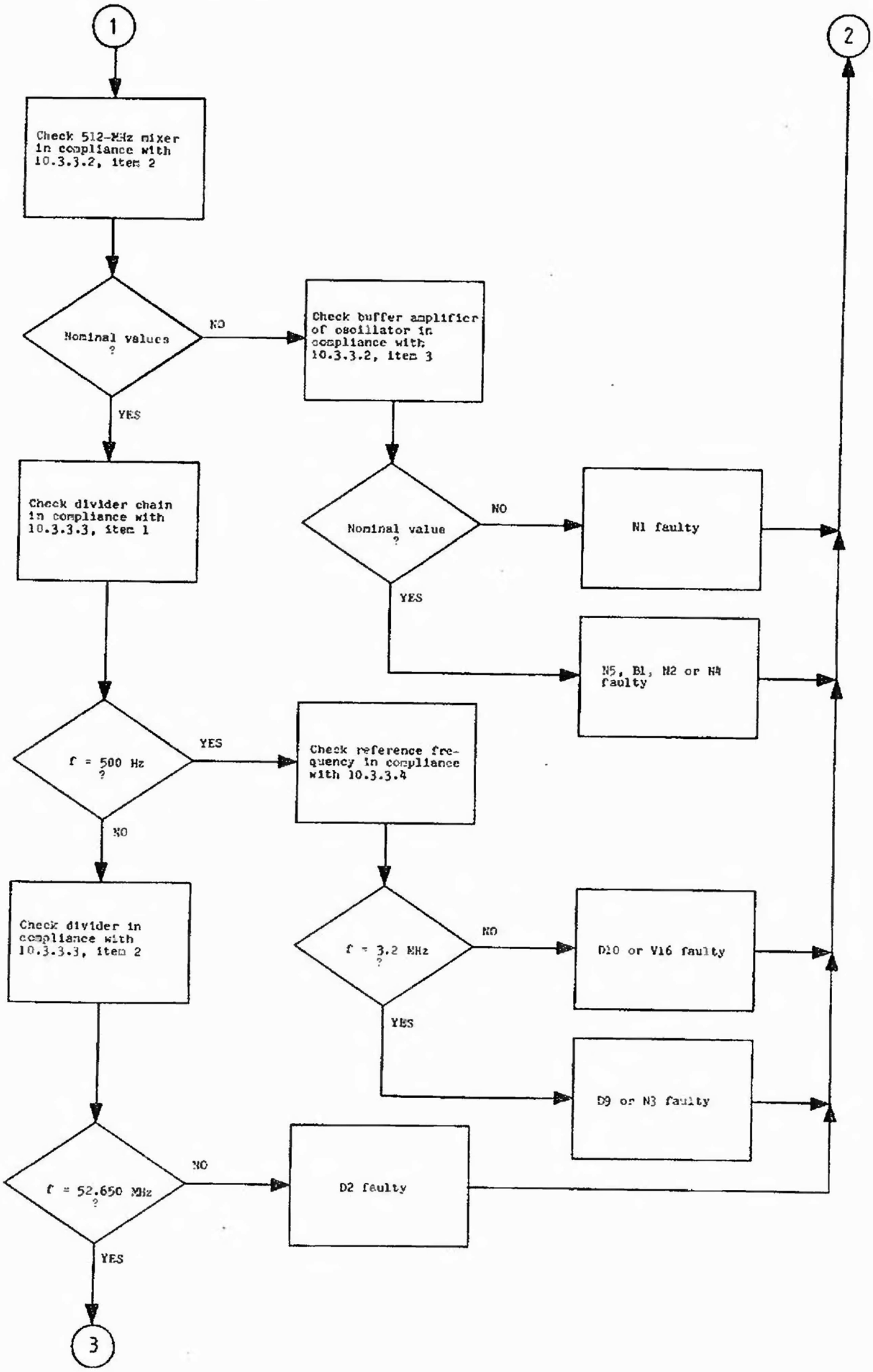
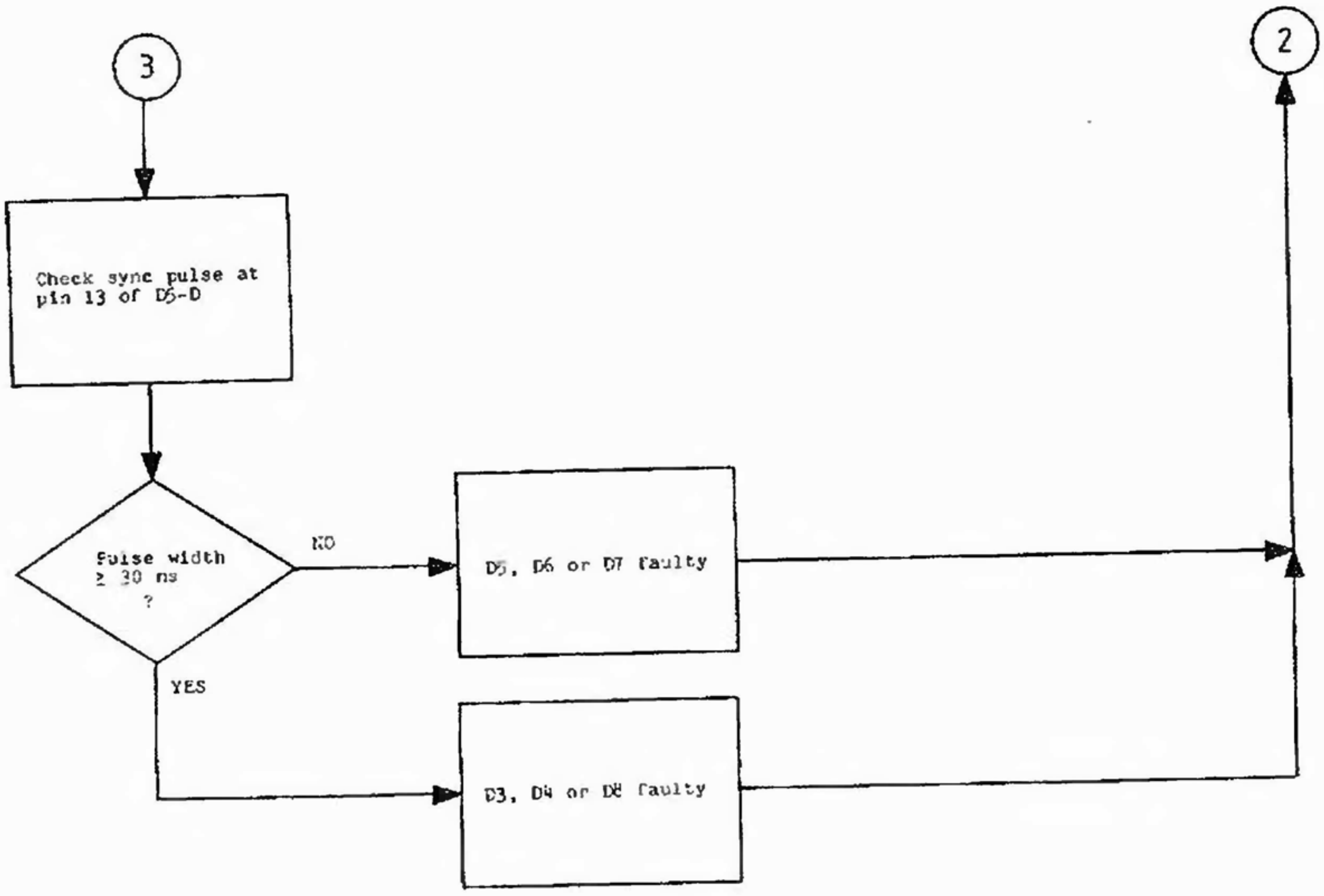
(continued) Synthesizer fault tracing chart



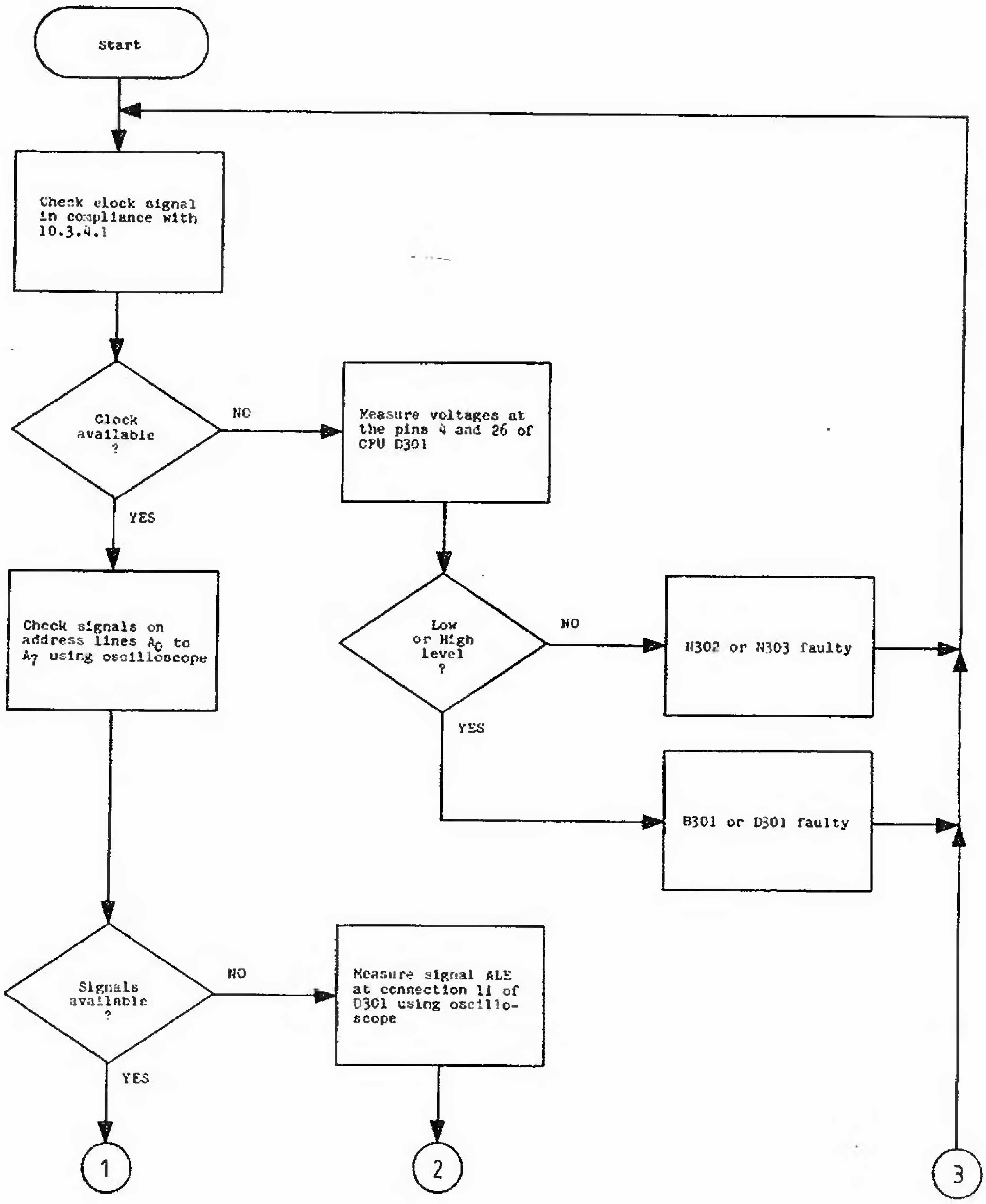
(continued) Synthesizer fault tracing chart



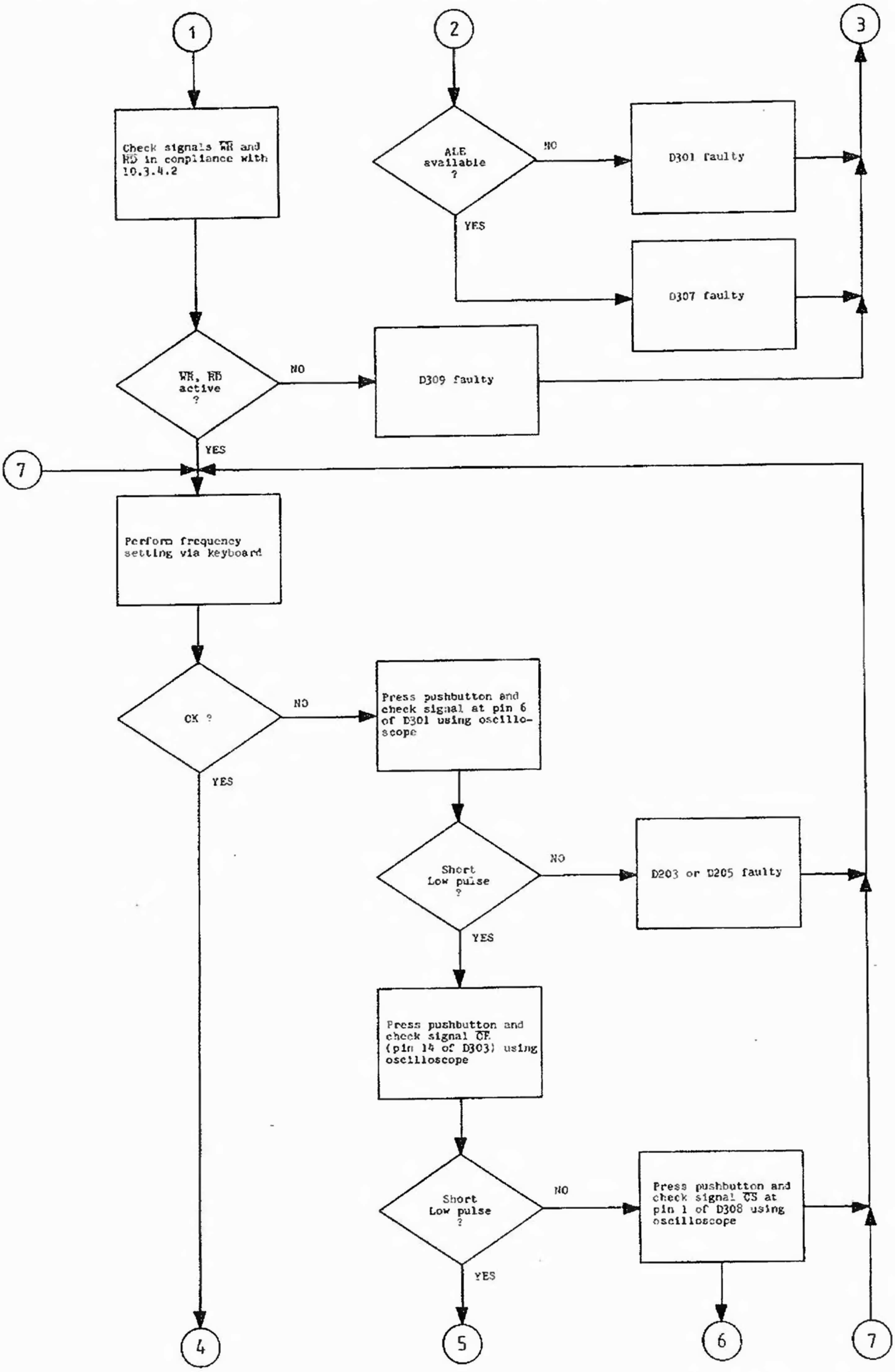
10.2.4 Control Unit Fault Tracing Chart

Prerequisites for troubleshooting:

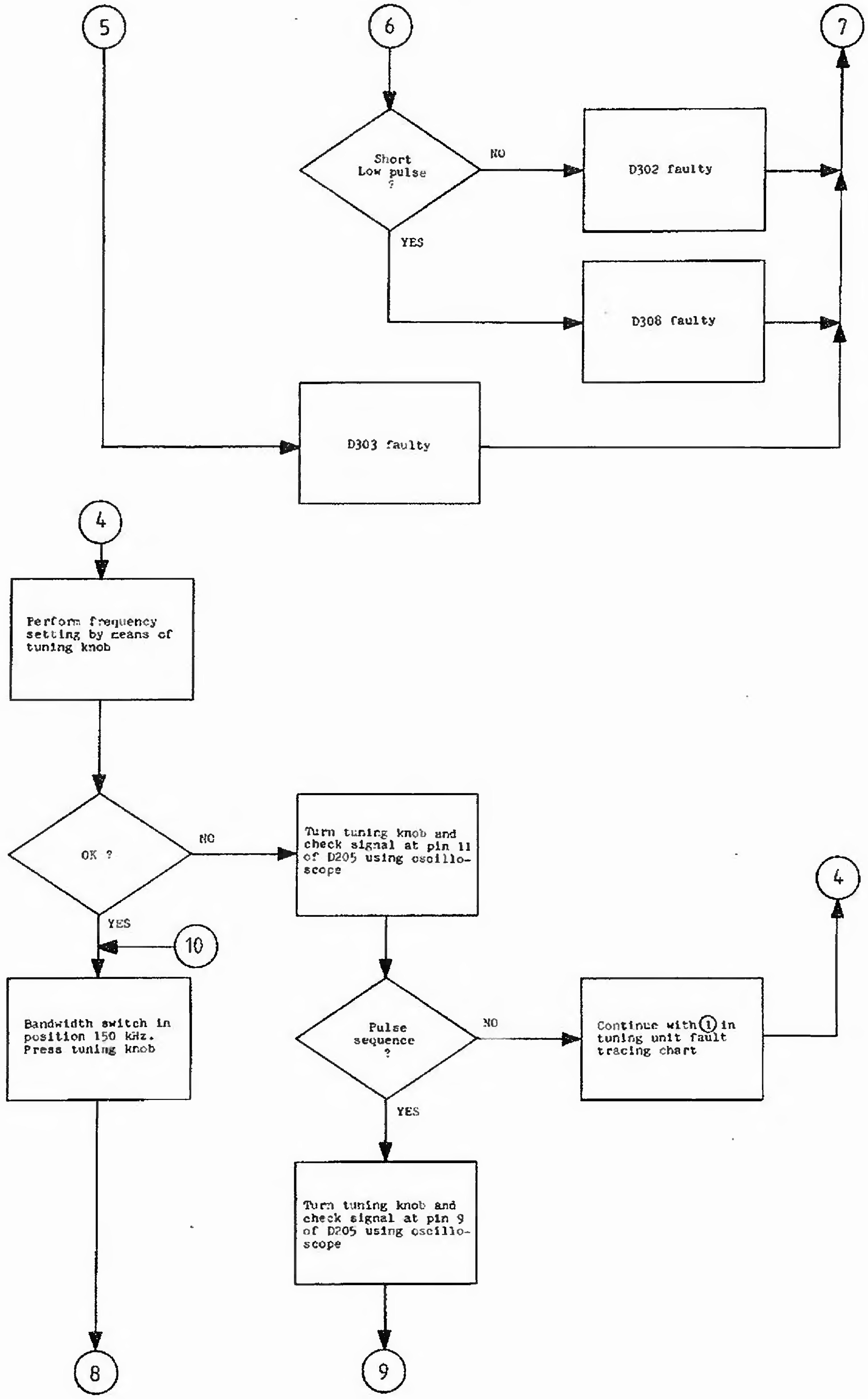
- control unit is adapted in the receiver,
- operational voltages are available.



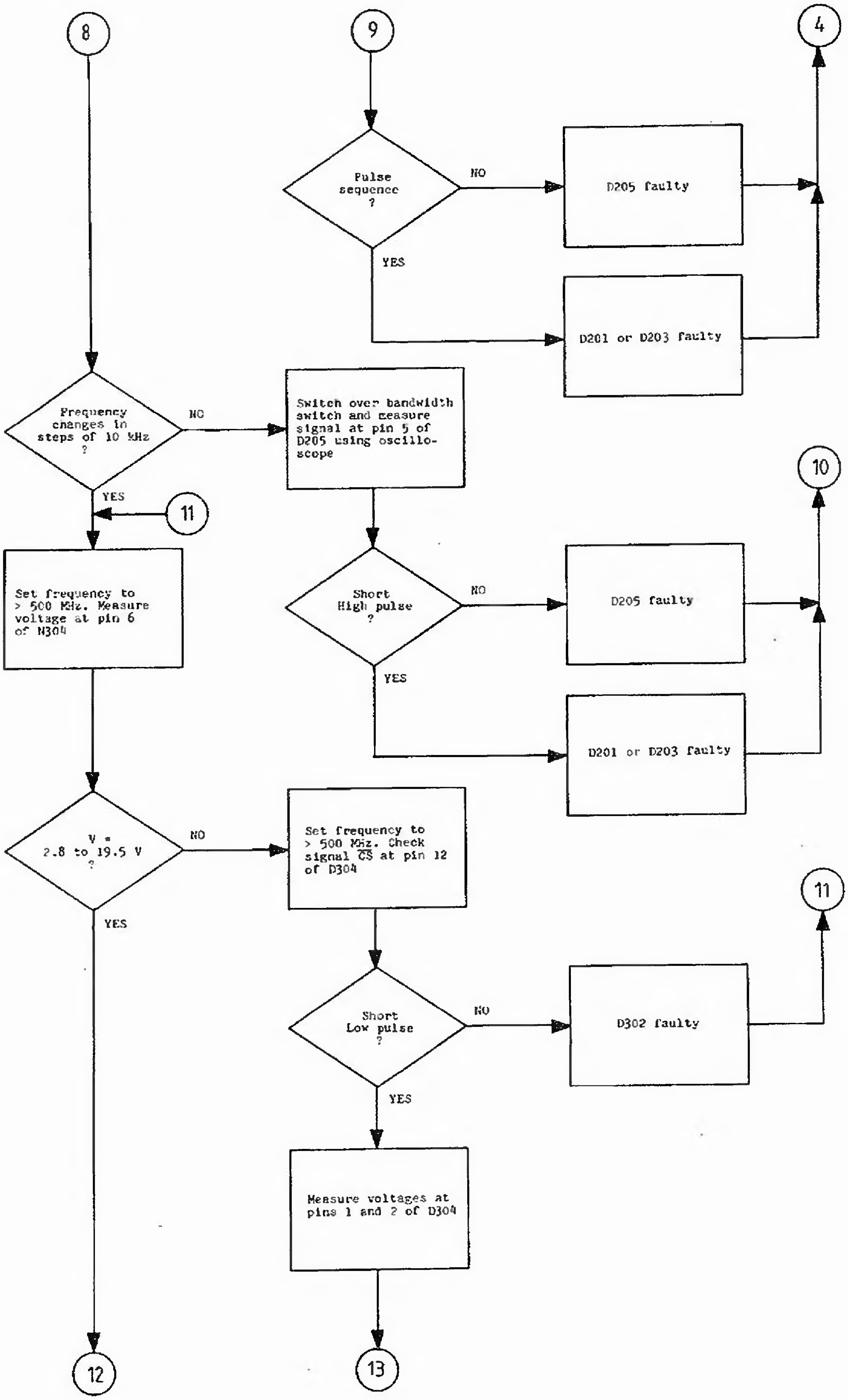
(continued) Control Unit fault tracing chart



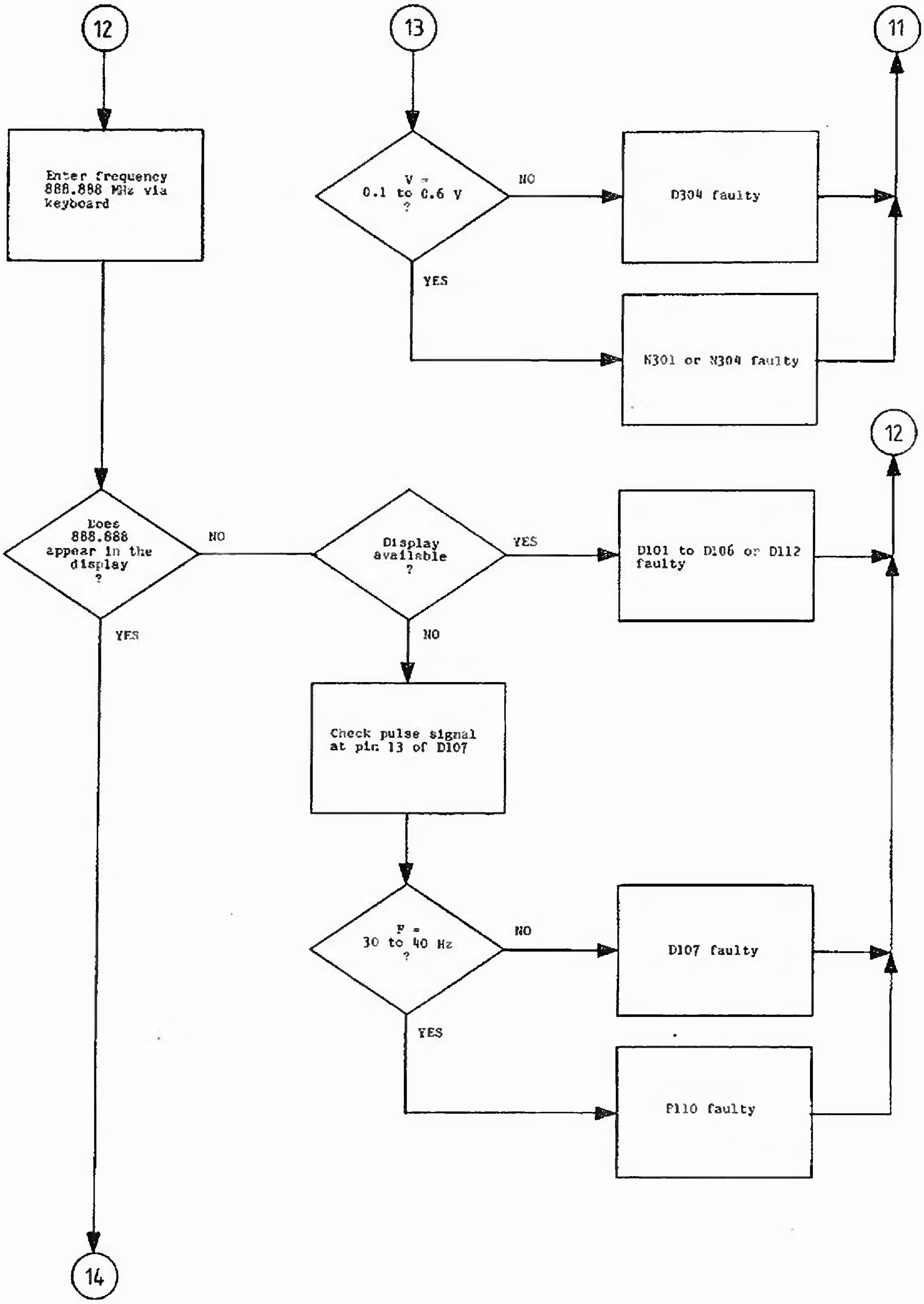
(continued) Control Unit fault tracing chart



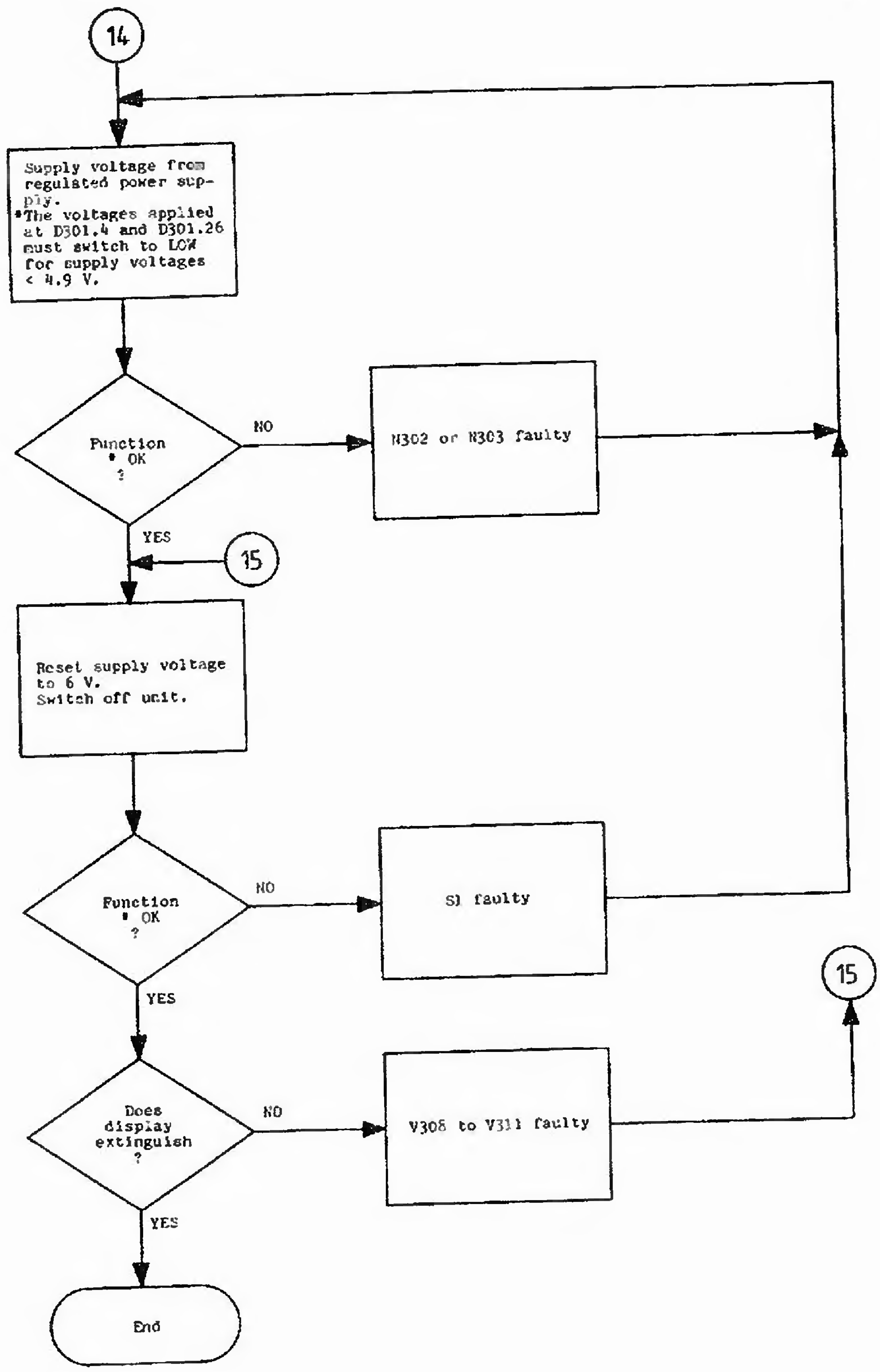
(continued) Control Unit fault tracing chart



(continued) Control Unit fault tracing chart



(continued) Control Unit fault tracing chart



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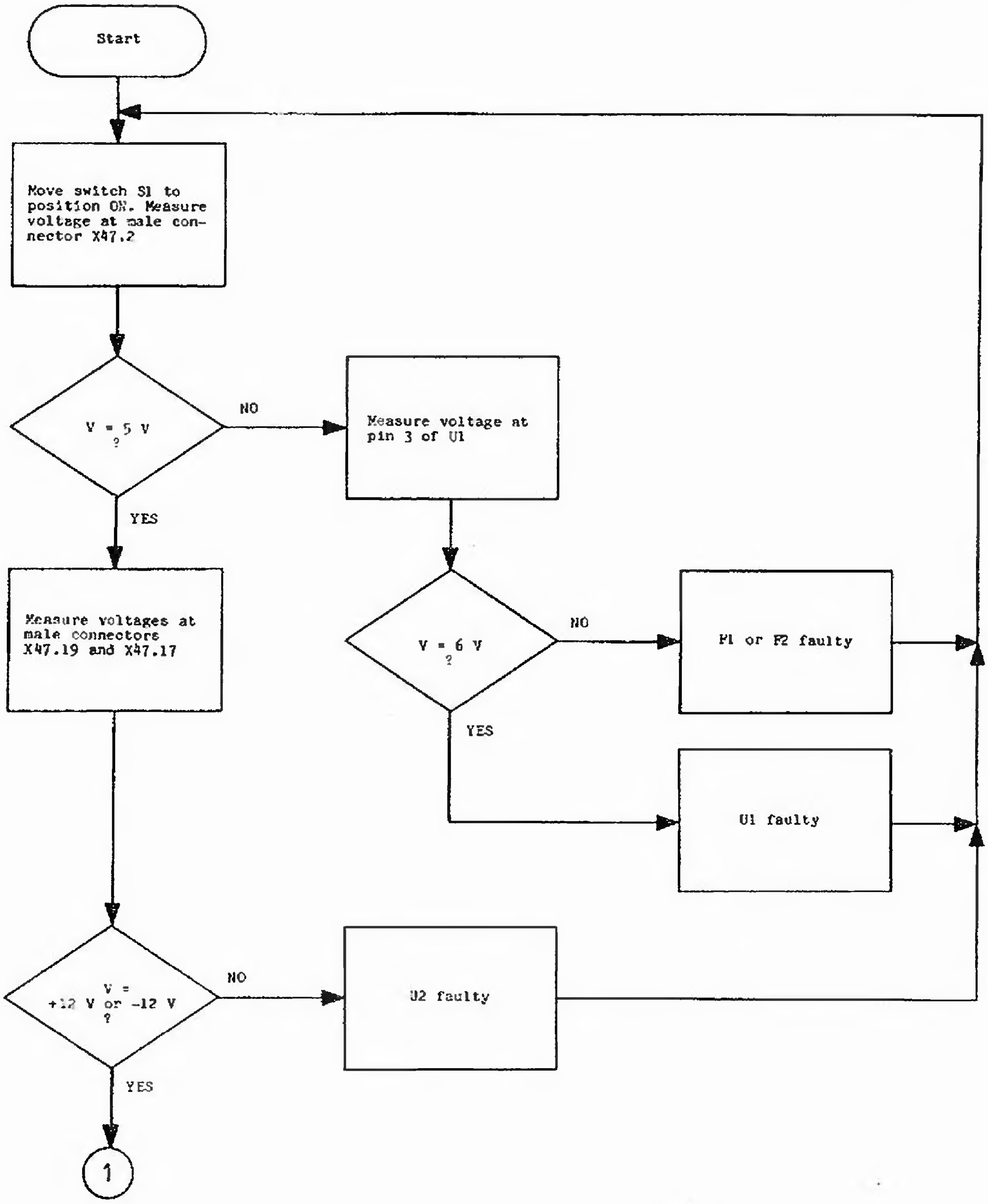
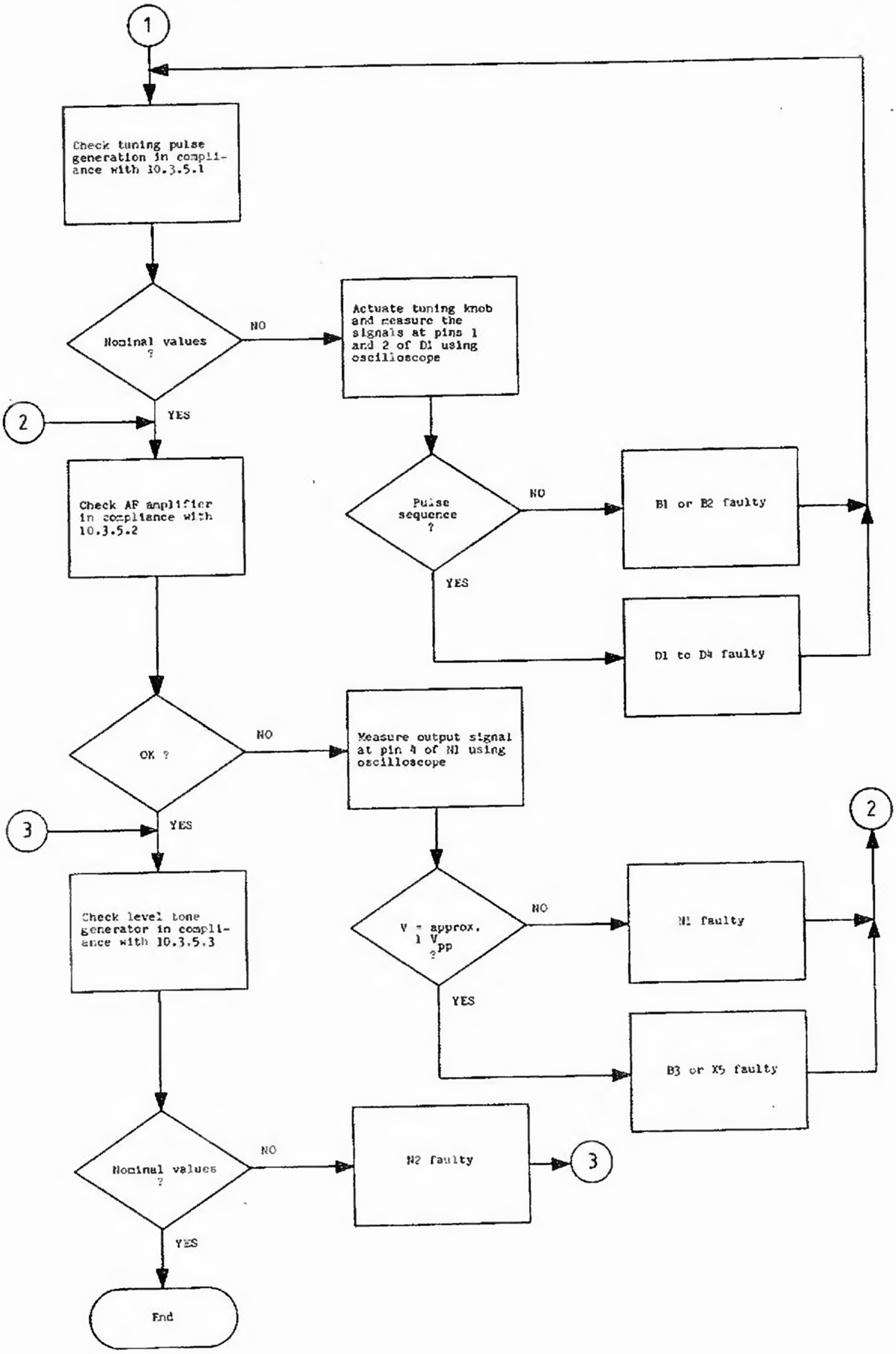
10.2.5 Tuning Unit Fault Tracing Chart

Prerequisites for troubleshooting:

- tuning unit is adapted in the receiver,
- operational voltage is applied.



(continued) Tunig Unit fault tracing chart



10.3 Electrical Test and Adjustment of Subassemblies

The service manual comprises the following accessories for the electrical test and adjustment of subassemblies:

- Circuit descriptions (section 9)
- Circuit diagrams
- Parts lists
- Parts location plans

The circuit diagrams list the parts location plans which are also included in the annex. The plans indicate the layout of the components and printed tracks. The following sections describe electrical testing and adjustments of the individual subassemblies. Testing of the data sheet specifications is performed in compliance with section 6.

10.3.1 Tuner

The tuner must be adapted in the receiver EB 100 for the performance of the following measurements and adjustments.

10.3.1.1 Checking the Overall Gain

Connect signal generator having an output level of -60 dBm to female connector X66 via DC blocking and frequency analyzer to female connector X64.

Set the following frequencies consecutively on the EB 100 and on the signal generator and measure gain at 629.3 MHz or 117.3 MHz:

Nominal values:

f_R(MHz) (X66)	f_{IF}(MHz) (X64)	Gain
20 100 200 300 400 499,999	629,3	+10 $^{+2}_{-3}$ dB
500 600 700 800 900 999,999	117,3	+10 $^{+6}_{-5}$ dB

10.3.1.2 Checking the 40-dB Attenuator

Connect signal generator having an output level of -60 dBm to female X66 via DC blocking.

Unsolder cable W11 from terminal 8 of the 40-dB attenuator and solder test cable for frequency analyzer to terminal 8.
Set f = 200 MHz on signal generator and move the switch for the attenuator from position 0 dB to -40 dB on the EB 100.

The indication on the frequency analyzer must decrease by 40 dB.
Resolder cable W11.

10.3.1.3 Checking the 1st VHF/UHF Amplifier and 1000-MHz Lowpass Filter

Unsolder cable W62 from terminal 5 of the PIN diode switch D60 and connect to test cable. Open line connecting 1000 MHz lowpass filter to mixer and solder second test cable. Connect sweep tester to test cables and sweep in the range 20 to 1300 MHz.

Nominal values:	gain	10 ±3 dB
	attenuation at 1250 MHz	≧ 15 dB

Set passband characteristic of the 1000 MHz lowpass filter using trimmer C70 and C71 such that the passband characteristic does not decrease at 1000 MHz.
Unsolder test cable and restore original connections.

10.3.1.4 Checking 1st Mixer

Open signal path at terminal X of mixer N80 and solder test cable to terminal X.
Connect signal generator to female connector X66 via DC blocking having an output level of -60 dBm and frequency analyzer to test cable.
Set several frequencies ranging from 20 to 499.999 MHz on the signal generator and on the EB 100.
Measure mixture product at f = 629.3 MHz using frequency analyzer.

Nominal value of gain: $2 \begin{smallmatrix} +4 \text{ dB} \\ -2 \text{ dB} \end{smallmatrix}$

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Set several frequencies ranging from 500 to 999.999 MHz on the signal generator and on the EB 100.
Measure mixture product at f = 117.3 MHz using frequency analyzer.

Nominal value of gain: $4 \begin{smallmatrix} +7 \text{ dB} \\ -4 \text{ dB} \end{smallmatrix}$

Unsolder test cable and restore original connection.

10.3.1.5 Checking 2nd VHF/UHF Amplifier

Open signal path preceding capacitor C93 and solder test cable there.
Connect sweep tester to test cable and to female connector X64 and sweep in the range of 100 to 130 MHz. Set a frequency ranging from 500 to 999.999 MHz on the EB 100.

Nominal value of gain at 117.3 MHz: 6 to 9 dB

Adjust the top of the characteristic of the 117.3-MHz bandpass filter for optimum symmetry in compliance with 10.3.1.12, if necessary.
Unsolder test cable and restore original connection.

10.3.1.6 Checking the Input Signal Path for f ≥ 500 MHz

Unsolder cable W62 from terminal 5 of PIN diode switch D60 and solder test cable in its place.
Connect sweep tester to female connector C66 and to test cable via DC blocking and sweep in the range of 500 to 1000 MHz.

Set frequencies consecutively from 500 to 999.999 MHz in steps of 50 MHz and measure the gain of the set frequency.

Nominal value: 3 ±4 dB

Trim gain in the 999.999 MHz setting to maximum using potentiometer R2 for adjustment of tracking filter.

Unsolder test cable and restore original connection.

10.3.1.7 Checking the UHF Amplifier

Unsolder inner conductor of cable W40 from coil L51 and connect to inner conductor of test cable. (Solder outer conductor of test cable to shield).
Set a frequency in the range from 500 to 999.999 MHz on the EB 100 and move the switch for the 40-dB attenuator in 0-dB position.
Connect sweep tester to female connector X66 and to test cable via DC isolation and sweep in the range of 500 to 999.999 MHz.

Nominal values:	Gain at 500 MHz	11 ±2 dB
	Gain at 1000 MHz	2 ±2 dB

Unsolder test cable and restore original connection.

10.3.1.8 Checking the Input Signal Path for f < 500 MHz

Unsolder inner conductor of cable W62 from terminal 5 of PIN diode switch D60 and solder test cable in its place.

Connect sweep tester to female connector X66 and to test cable via DC isolation and sweep in the range of 10 to 600 MHz.

Move switch for 40-dB attenuator to the 0-dB position on the EB 100 and set consecutively one frequency each from the ranges 20 to 107.999 MHz, 108 to 219.999, 220 to 499.999 MHz and to measure the passband attenuation.

Nominal values: -4 ±1 dB

The filter for the range of 108 to 219.999 MHz can be adjusted by bending the air-cored coils L20 to L23 and L25 with L22 being primarily used for the bandwidth. The air-cored coils L20, L21 and L25 determine the edge of passband and the ripple.

Nominal value of attenuation at 60 MHz: -35 ±5 dB
Nominal value of attenuation at 300 MHz: -35 ±5 dB

Adjust the IF trap to 629.3 ±1 MHz using trimmer C27.

The filter for the range of 220 to 499.999 MHz can be adjusted by bending the air-cored coils L30 to L33 and L35.

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Nominal value of attenuation at 125 MHz: -35 ±1 dB

Nominal value of attenuation at 550 MHz: -15 ±3 dB

Adjust the IF trap to 629.3 ±1 MHz using trimmer C35.

10.3.1.9 Checking 2nd Mixer and Subsequent Amplifier

Open signal path preceding capacitor C93 and solder test cable.

Connect sweep tester to test cable and to female connector X64 and sweep in the range of 600 to 650 MHz.
Set a frequency in the range of 20 to 499.999 MHz on the EB 100.

Nominal value of gain at 629.3 MHz: 5 to 11 dB

Adjust the 629.3-MHz filter in compliance with 10.3.1.11 and the 117.3-MHz bandpass in compliance with 10.3.1.12.

Unsolder test cable and restore original connection.

10.3.1.10 Adjustment of the 650-MHz Lowpass Filter

Open signal path between terminal X of the mixer N80 and the capacitor C89.
Solder test cable to capacitor C89.
Unsolder capacitor C93 and solder test cable to the connection between coil L91 and capacitor C92.
Connect sweep tester to test cable and sweep in the range of 20 to 1000 MHz.
Adjust passband by bending coils L90 and L91 such that the characteristic does not decrease at 630 MHz.

Nominal value of transmission loss at 117.3 MHz: 1 ±0.5 dB

Nominal value of transmission loss at 629.3 MHz: 1 ±0.5 dB

Unsolder test cable and restore original connections.

10.3.1.11 Adjustment of the 629.3-MHz Bandpass Filter

Unsolder capacitors C100 and C101 and solder two test cables in their places.
Connect sweep tester to test cable and sweep in the range of 500 to 700 MHz.
Adjust centre frequency to 629.3 MHz using trimmers C103 and C104. The filter characteristic must have a symmetrical top.

Change distance between coils L100, L101 and the PC board by bending and set 3-dB filter bandwidth to 5.8 MHz.

Nominal values:		
	Centre frequency	629.3 MHz
	3-dB bandwidth	5.8 MHz ±10 %
	Transmission loss	4 +0.5 dB / -1 dB
	Attenuation at 700 MHz ...	> 40 dB

Unsolder test cable and restore original connections.

10.3.1.12 Adjustment of 117.3-MHz Bandpass Filter

Unsolder inner conductor of cable W90 from terminal 8 of PIN diode switch D100 and solder test cable in its place.
Connect sweep tester to test cable and female connector X64 and sweep in the range of 100 to 130 MHz.
Set a frequency in the range of 500 to 999.999 MHz on the EB 100.

Adjust centre frequency to 117.3 MHz using cores of L112, L114 and L115. A symmetrical characteristic must be produced in the passband.

Nominal values:		
	Centre frequency	117.3 MHz ±20 kHz
	3-dB bandwidth	2 MHz ±15 %
	Transmission loss	7 +0,5 dB / -1 dB
	Attenuation at 128 MHz ...	> 45 dB
	Attenuation at 138 MHz ...	> 50 dB

Unsolder test cable and restore original connections.

10.3.2 IF Section

The IF section must be adapted in the receiver EB 100 for performing the following measurements and adjustments.

10.3.2.1 Overall Check of IF Section

1) Connect signal generator to female connector X74 and perform the following settings:

   f = 117.3 MHz at a level of 40 dBµV (-67 dBm).
   AM with f_{mod} = 1 kHz and m = 0.5

   Set IF bandwidth to 150 kHz on the EB 100.
   Measure the AF signal at test point 3 using oscilloscope.

   Nominal values: f = 1 kHz at a level of 150 mV_{pp} ±3 dB

   Decrease output level of signal generator to 10 dBµV (-97 dBm) to adjust AF signal.
   Measure AF signal at pin 15 of N40 using oscilloscope and IF control voltage at pin 16 of N40 using voltmeter.

   Adjust to maximum AF level and minimum IF control voltage using coil L41.

   Nominal values: V_{AF} = 20 mV_{pp} ±5 mV
   V_{con} = 2.3 V

2) Switch signal generator to FM and increase output level once more to 40 dBµV (-67 dBm).
   Set deviation on signal generator and IF bandwidth of the EB 100 in compliance with the following table.

   Nominal values:

Deviation	IF Bandwidth	AF Voltage
22 kHz	150 kHz	300 mV_{pp}
6 kHz	15 kHz	200 mV_{pp}
2.2 kHz	7.5 kHz	150 mV_{pp}

   Set deviation on signal generator to 40 kHz and IF bandwidth to 150 kHz for adjusting the FM discriminator.

Connect oscilloscope at test point 1 and adjust AF signal to obtain an optimum sine curve using coil L61.
The AF signal is superimposed upon a DC voltage of 3.5 V.

10.3.2.2 Checking the 128-MHz Oscillator

Connect power meter to female connector X71 and measure output level.

Nominal value: $-6\ {}^{+1}_{-2}$ dBm

Connect frequency meter to female connector X71 and measure frequency of oscillator signal.

Nominal value: 128 MHz ±100 Hz

Set output frequency to the nominal value using the trimmer in the oscillator B80.

10.3.2.3 Checking the Signal Path

1) Unsolder capacitor C41 and apply an IF signal of 10.7 MHz at a level of 40 dBµV (-67 dBm) amplitude-modulated at 1 kHz and m = 50% via a coupling capacitor (C = 1 nF) using a signal generator. Check at test point 3 using the oscilloscope whether an AF signal is available.

   Nominal value: U_{AF} = 150 mV_{pp} ±3 dB

2) Unsolder capacitor C42 and apply an IF signal at pin 18 of N40 via a coupling capacitor (C = 1 nF) using the signal generator (same setting as for 1)).
   Check at test point 3 using the oscilloscope whether an AF signal is available.

   Nominal value: U_{AF} = 150 mV_{pp} ±3 dB

   Resolder capacitors C41 and C42.

3) Apply an AF signal of 1 kHz at a level of 10 mV_{pp} at pin 15 of N40 using signal generator.
Check at test point 3 using the oscilloscope whether an AF signal is available.

10.3.2.4 Checking the Output and Control Signals

1) Frequency deviation

Connect signal generator to female connector X74 and enter f = 117.3 MHz at a level of 40 dBµV.
Measure logic level at male connector X77.B8 using voltmeter.

Nominal value: L level (0 to 1 V)

Set L level (0 to 1 V) at male connector X77.B8 using potentiometer R13 for adjustment of window discriminator at f = 117.3 MHz.
Detune signal generator in steps of 100 Hz from nominal frequency until signal switches to H level (3.5 to 5 V) at male connector X77.B8.

Nominal value: squelch switching point
< ±1.5 kHz from f_{centre}

2) Signal level (0 to 80 dB)

Apply f = 117.3 MHz at a level of 10 dBµV (-97 dBm) into the female connector X74 using the signal generator.
Measure voltage at male connector X77.B4.

Nominal value: V = 0.47 V

Increase input level to 80 dBµV (-27 dBm) and measure voltage at male connector X77.B4.

Nominal value: V = 3.50 V

Adjustment to the nominal values is to perform with potentiometer R101. At an input level 40 dBµV (-67 dBm) set an output voltage of 1.85 V with potentiometer R101. The nominal values must be checked at 10 dBµV and 80 dBµV. When the level characteristic of the first 20 dB is too flat it can be compensated with potentiometer R37. This adjustment is to repeat several times.

Set bandwidth control to 150 kHz "Pulse" and repeat the above measuring. When increasing the input level the indicator voltage is following quickly the indexed value. When decreasing the input level (e.g. -10 dB) the indicator voltage declines slowly to the nominal value.

3) Level blanking

Set bandwidth control to 150 kHz, feed an input level 50 dBµV and measure a scale level (aprox. 2.3 V) at plug X77.B4.

Low level = 0 V at plug X77.A7.
Scale level breaks down to 0 V.

High level = 5 V at plug X77.A7. The nominal scale level is indicated.

4) AFC Enable (ENAFC)

Apply f = 117.3 MHz at a level of 10 dBµV into the female connector X74.
Measure voltage at male connector X77.A4.

Nominale value: L level (0 to 1 V)

To adjust to nominal value, set L level (0 to 1 V) at male connector X77.A4 using potentiometer R30 at an input level of 10 dBµV (-97 dBm).

10.3.2.5 Checking the Oscillator Reference Signals

Terminate female connectors X71 and X72 into 50 Ω.
Connect power meter to female connector X73 and measure output level at 512 MHz.

Nominal values:	Output power	5 dBm +2 dB / -1 dB
	Nonharmonics	< 75 dB

Set output power to maximum using trimmers C100 to C102 for adjustment.

10.3.3 Synthesizer

The synthesizer must be adapted in the EB 100 for performing the following measurements.

10.3.3.1 Checking the Oscillator Signal

Set EB 100 to 500.000 MHz.
Measure frequency and level of output signal at female connector X55 using frequency analyzer.

Nominal value: f = 617.3 MHz at -4 ±3 dBm

10.3.3.2 Checking the Oscillator and the 512-MHz Mixer

1) Remove plug-in jumper X5.
Unsolder tuning voltage lead to oscillator from solder terminal 7.
Connect power supply 0 to 25 V to solder terminal 7 and apply tuning voltage.
Measure frequency and level of output signal at female connector X55 using the frequency analyzer.

Nominal values: 2,5 ±0.3 V → f = 617 MHz, -4 ±3 dBm
23 ±0.5 V → f = 1129 MHz, -4 ±3 dBm

2) Terminate female connector X55 into 50 Ω.
Tune oscillator over the entire frequency range by changing the tuning voltage (2.5 to 23 V) and measure the mixture product (105 to 617 MHz) at male connector X5.2 using the frequency analyzer.

Nominal value: 0^{+4}_{-2} dBm

3) Remove plug-in jumper X4.
Tune oscillators over the entire frequency range by changing the tuning voltage (2.5 to 23 V).
Measure frequency and level of oscillator signal using frequency analyzer.

Nominal value: $0 \begin{smallmatrix} +2 \text{ dBm} \\ -4 \text{ dBm} \end{smallmatrix}$

Disconnect power supply from solder terminal 7 and resolder tuning voltage lead.
Plug in jumpers X4 and X5 in position.

10.3.3.3 Checking the Divider Chain

1) Remove plug-in jumper X5.
   Bridge resistor R48 permitting the frequency indication to be changed.
   Set EB 100 to 500.000 MHz.

   Apply f = 105.300 MHz at a level of 0 dBm at male connector X5.3 via an isolating capacitor of C = 1 nF using the signal generator.
   Measure frequency at test point 5 using frequency counter.

   Nominal value: f = 500 Hz

2) Measure frequency at male connector X6 using frequency counter.

   Nominal value: f = 52.650 MHz

   Plug in jumper X5.

10.3.3.4 Checking the Reference Frequency Generation

Measure frequency at test point 4 using frequency counter.

Nominal value: f = 3.2 MHz

10.3.4 Control Unit

The control unit must be adapted in the receiver EB 100 for performing the following measurements.

10.3.4.1 Checking the System Clock

Measure clock signal at pins 2 and 3 of CPU D301 using the oscilloscope.

Nominal value: $f = 6$ MHz

10.3.4.2 Checking the Reading and Writing Signals

Check by means of the oscilloscope whether the signals $\overline{WR}$ (pin 21) and $\overline{RD}$ (pin 20) of D306 are activated.

Nominal values: Low level when accessing a memory or external circuits

10.3.5 Tuning Unit

The tuning unit must be adapted in the receiver EB 100 for performing the following measurements.

10.3.5.1 Checking the Tuning Pulse Generation

Move switch S2 in position ⌉↑⌈.
Turn tuning knob clockwise.
Measure the output signals at male connectors X47.8 (IRQTUN), X47.7 (DOWN) and X47.6 (UP).

Nominal values:	X47.8	Pulse sequence, frequency depends on rotating speed
	X47.7	L level
	X47.6	Pulse sequence, frequency depends on rotating speed

10.3.5.2 Checking the AF Amplifier

Unsolder capacitor C12 and apply an AF signal of $f = 1$ kHz and a level of 150 mV_{pp} at pin 1 of N1 via a coupling capacitor ($C = 2.2$ µF) using the AF generator.

Turn threshold controller on front panel of receiver fully to the left.

The 1-kHz signal must be audible in the loudspeaker.

Resolder capacitor C12.

10.3.5.3 Checking the Level Tone Generator

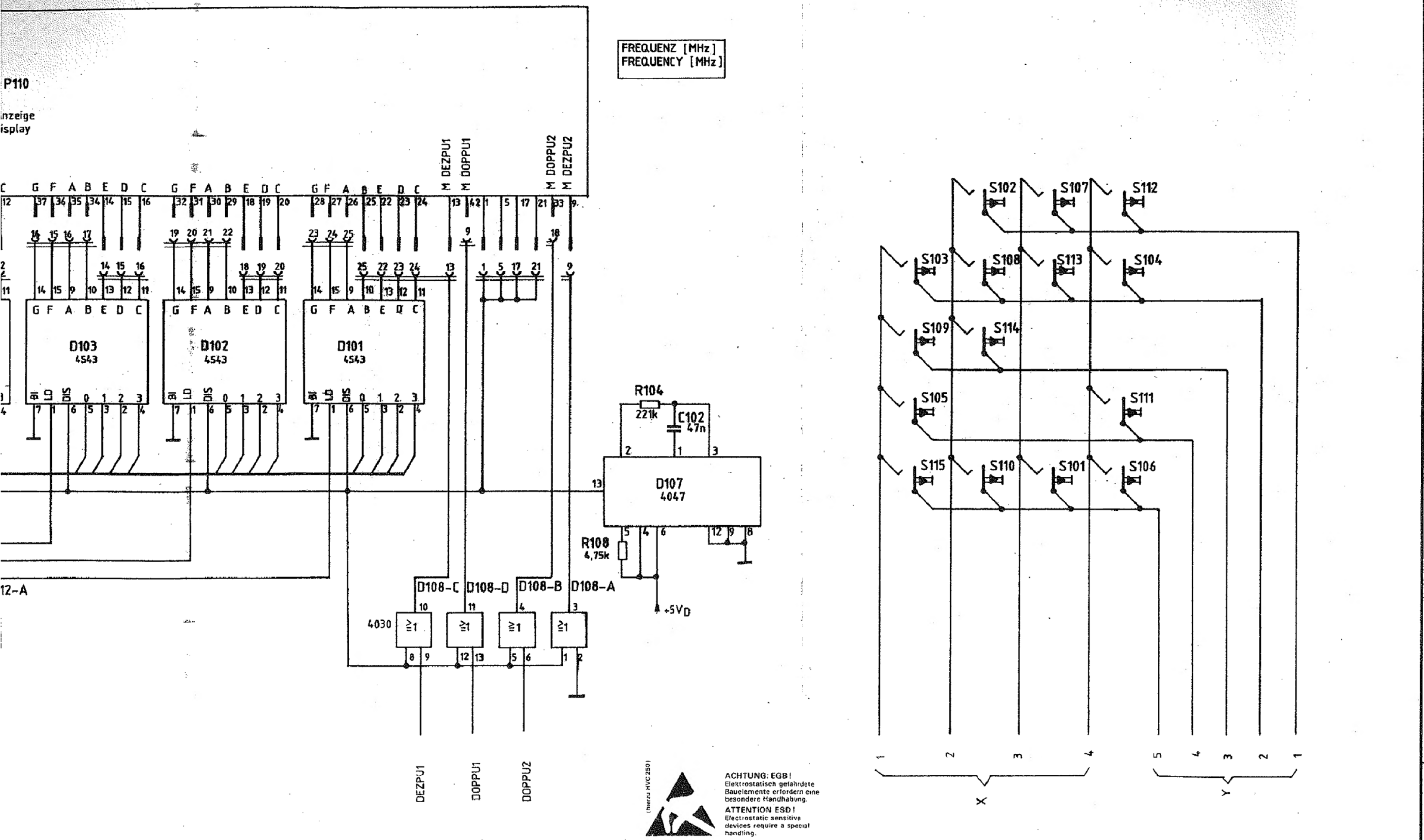
Unsolder resistor R26.

Connect power supply via resistor R27 and vary voltage from 0.1 to 3.5 V.

Check output signal at test point 5 using the oscilloscope.

Nominal value: f = 200 Hz to 1 kHz at a level of 150 mV_{pp}.

Resolder resistor R26.



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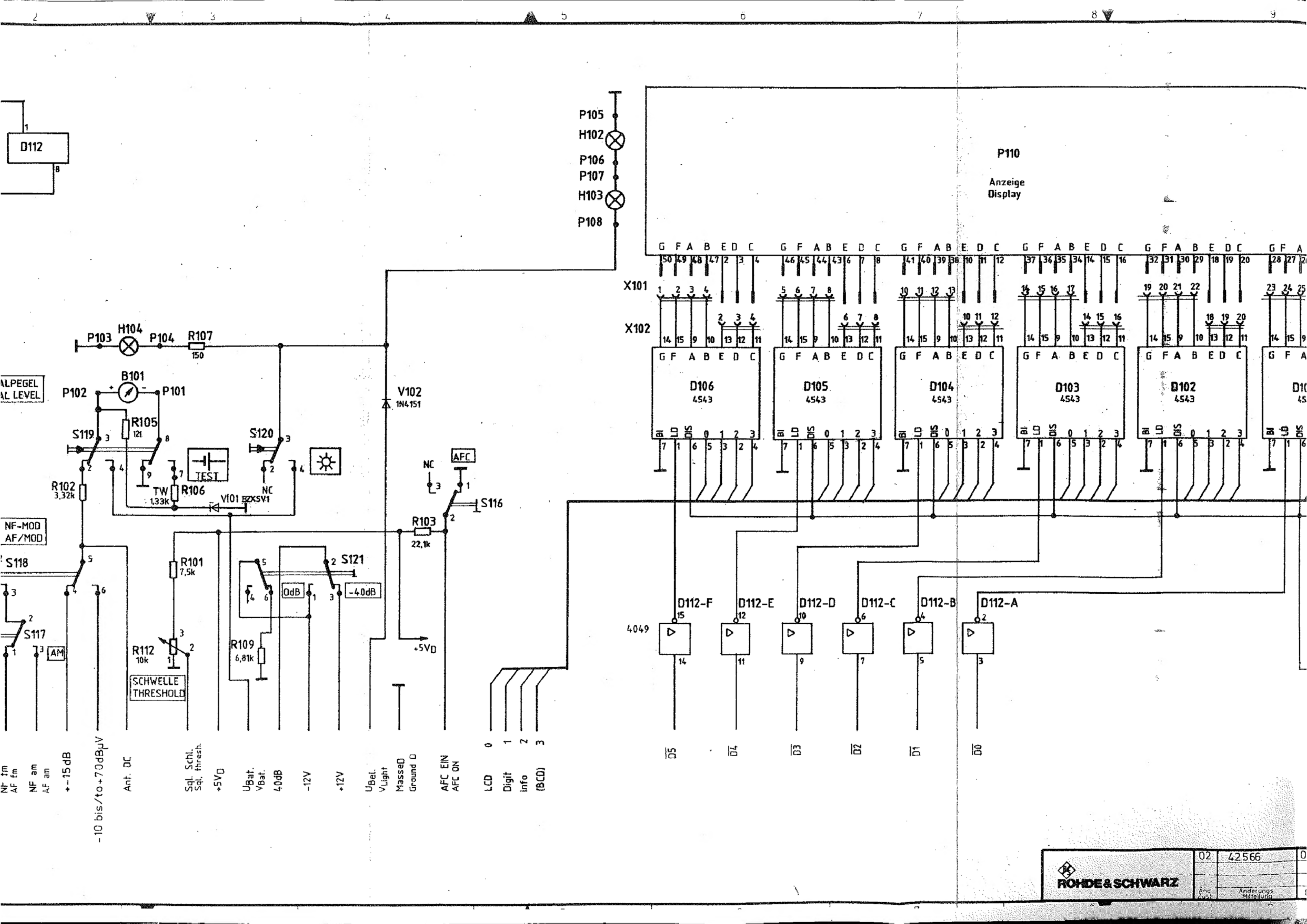
									Gepr			zu Gerät EB100	reg. v 708.8507 V	erste Z 641.8018
									Norm					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Anzeige
Display
P105
H102
P106
P107
H103
P108
X101
X102
D106
4543
D105
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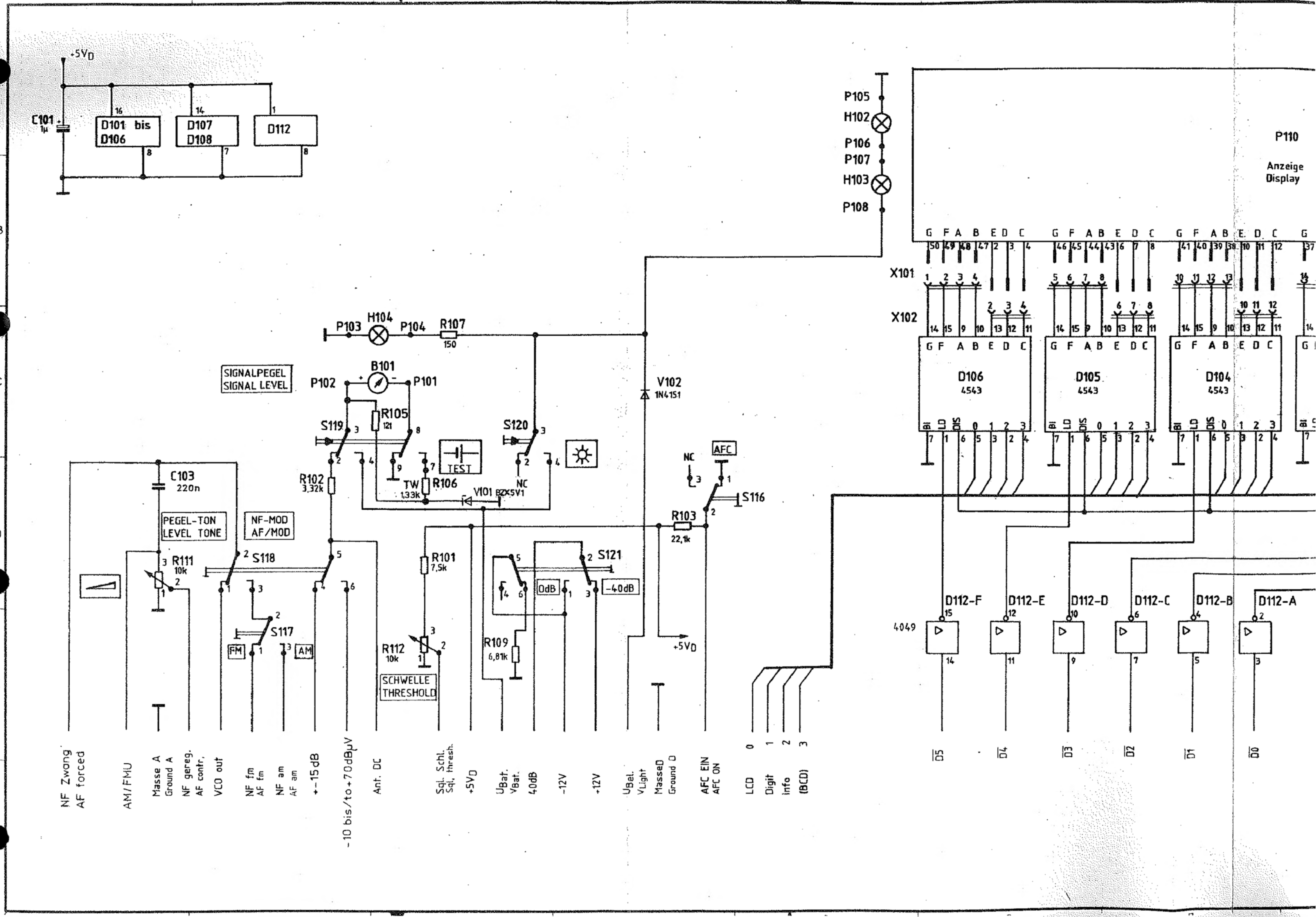
D104
4543
D103
4543
D102
4543
D112
D112-A
D112-B
D112-C
D112-D
D112-E
D112-F
4049
D0
D1
D2
D3
D4
D5
P103
H104
P104
R107
150
B101
P102
P101
R105
121
S119
S120
TEST
TW
R106
1,33k
V101 BZX5V1
V102
1N4151
NC
AFC
S116
R103
22,1k
R102
3,32k
R101
7,5k
R112
10k
SCHWELLE
THRESHOLD
R109
6,81k
S121
0dB
-40dB
+5VD
S118
S117
AM
NF-MOD
AF/MOD
ALPEGEL
AL LEVEL
NF fm
AF fm
NF am
AF am
+-15dB
-10 bis/to+70dBμV
Ant. DC
Sql. Schl.
Sql. thresh.
+5VD
UBat.
VBat.
40dB
-12V
+12V
UBel.
VLight
MasseD
Ground D
AFC EIN
AFC ON
LCD 0
Digit 1
info 2
(BCD) 3
ROHDE&SCHWARZ
02
42566
Änd.
Zust.
Änderungs
Mitteilung


P110
Anzeige
Display
D104
4543
D105
4543
D106
4543
X101
X102
D112-A
D112-B
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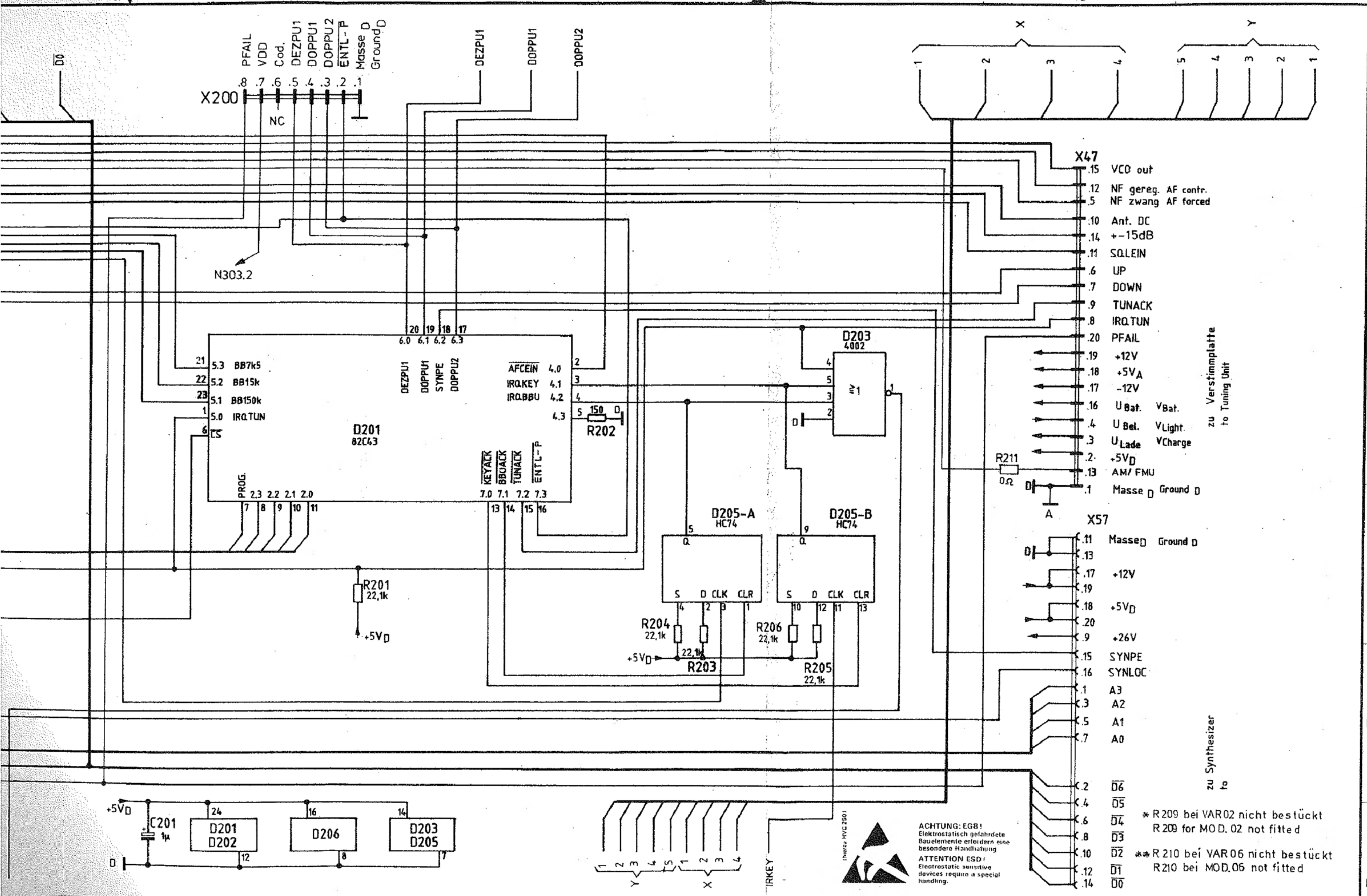
D112-D
D112-E
D112-F
4049
P105
H102
P106
P107
H103
P108
D101 bis
D106
D107
D108
D112
C101
+5V$_D$
SIGNALPEGEL
SIGNAL LEVEL
P103
H104
P104
R107
150
B101
P101
P102
R105
121
S119
S120
TEST
R106
1,33k
V101 BZX5V1
V102
1N4151
R102
3,32k
C103
220n
PEGEL-TON
LEVEL TONE
NF-MOD
AF/MOD
R111
10k
S118
S117
FM
AM
R101
7,5k
R112
10k
SCHWELLE
THRESHOLD
R109
6,81k
S121
0dB
-40dB
R103
22,1k
AFC
NC
S116
NF Zwang
AF forced
AM/FMU
Masse A
Ground A
NF gereg.
AF contr.
VCO out
NF fm
AF fm
NF am
AF am
+-15dB
-10 bis/to+70dBμV
Ant. DC
Sql. Schl.
Sql. thresh.
+5V$_D$
U$_{Bat.}$
V$_{Bat.}$
40dB
-12V
+12V
U$_{Bel.}$
V$_{Light}$
MasseD
Ground D
AFC EIN
AFC ON
LCD 0
Digit 1
Info 2
(BCD) 3
D5
D4
D3
D2
D1
D0



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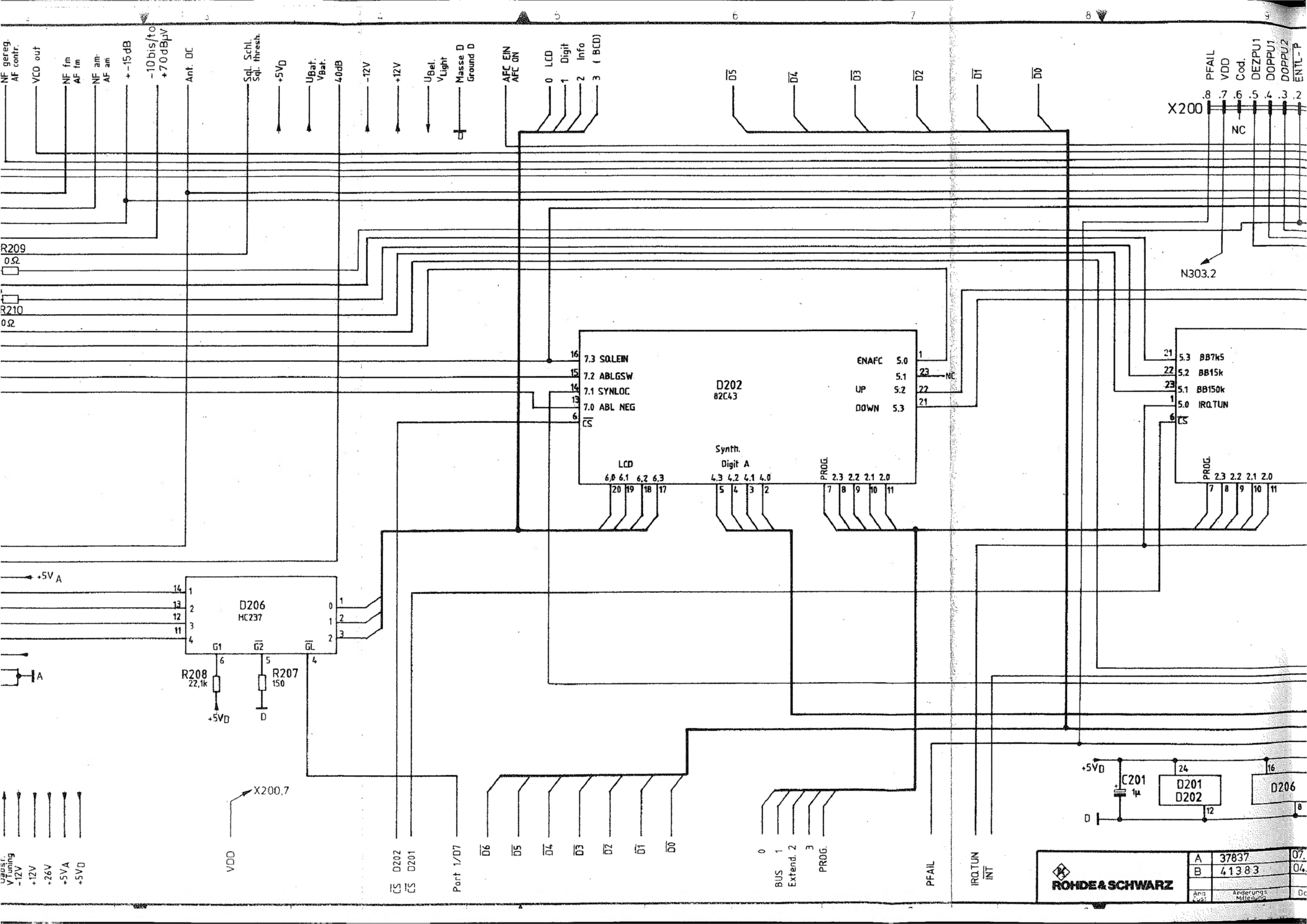
	Änd. Zust.	Änderungs-Mitteilung	Datum	Name	Gepr		
					Norm		

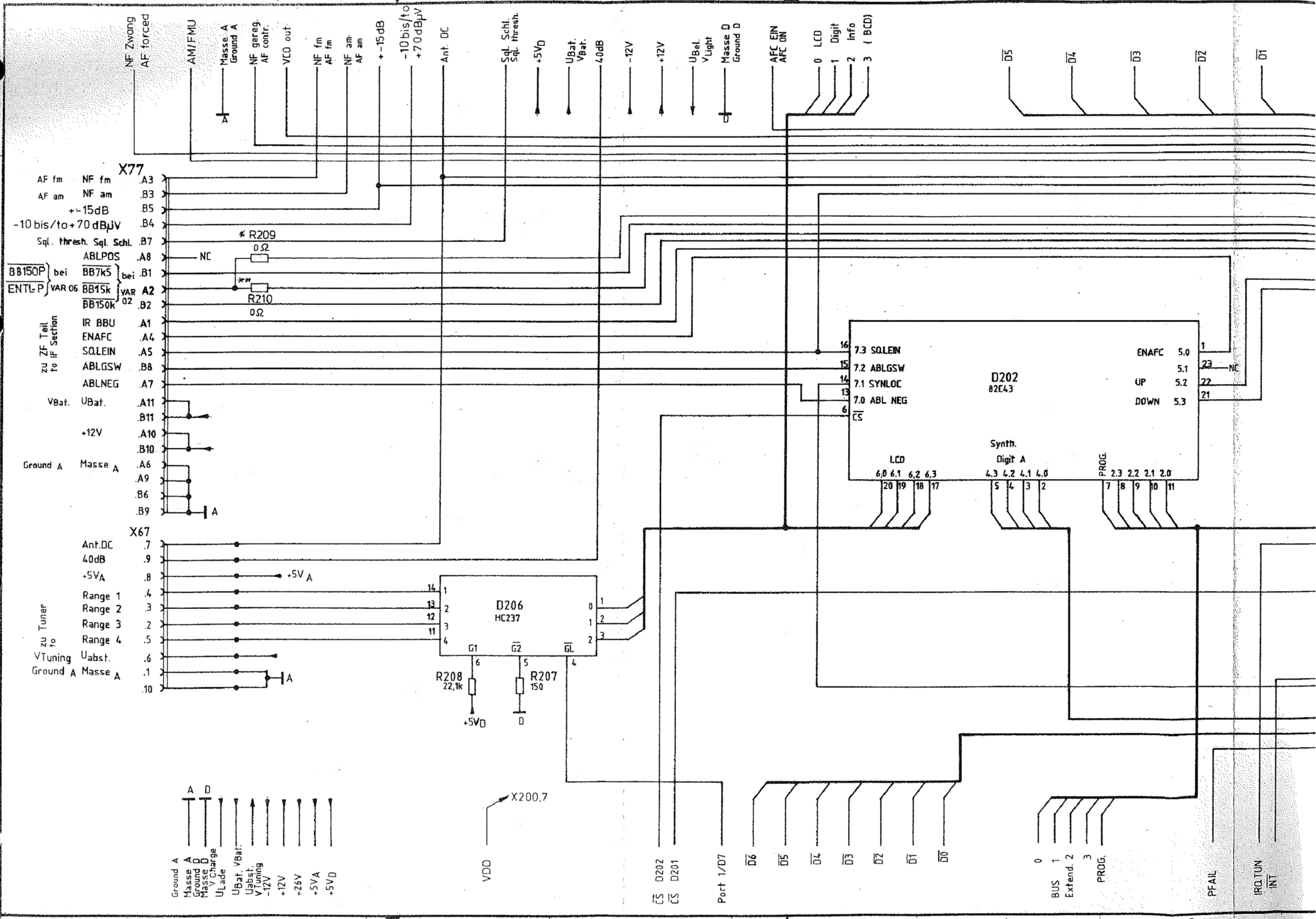
Benennung: **Bediengruppe** Control Unit — zu Gerät EB100

Zeichn.-Nr. **708.9461.01S** — Blatt-Nr 2 v 3 Bl

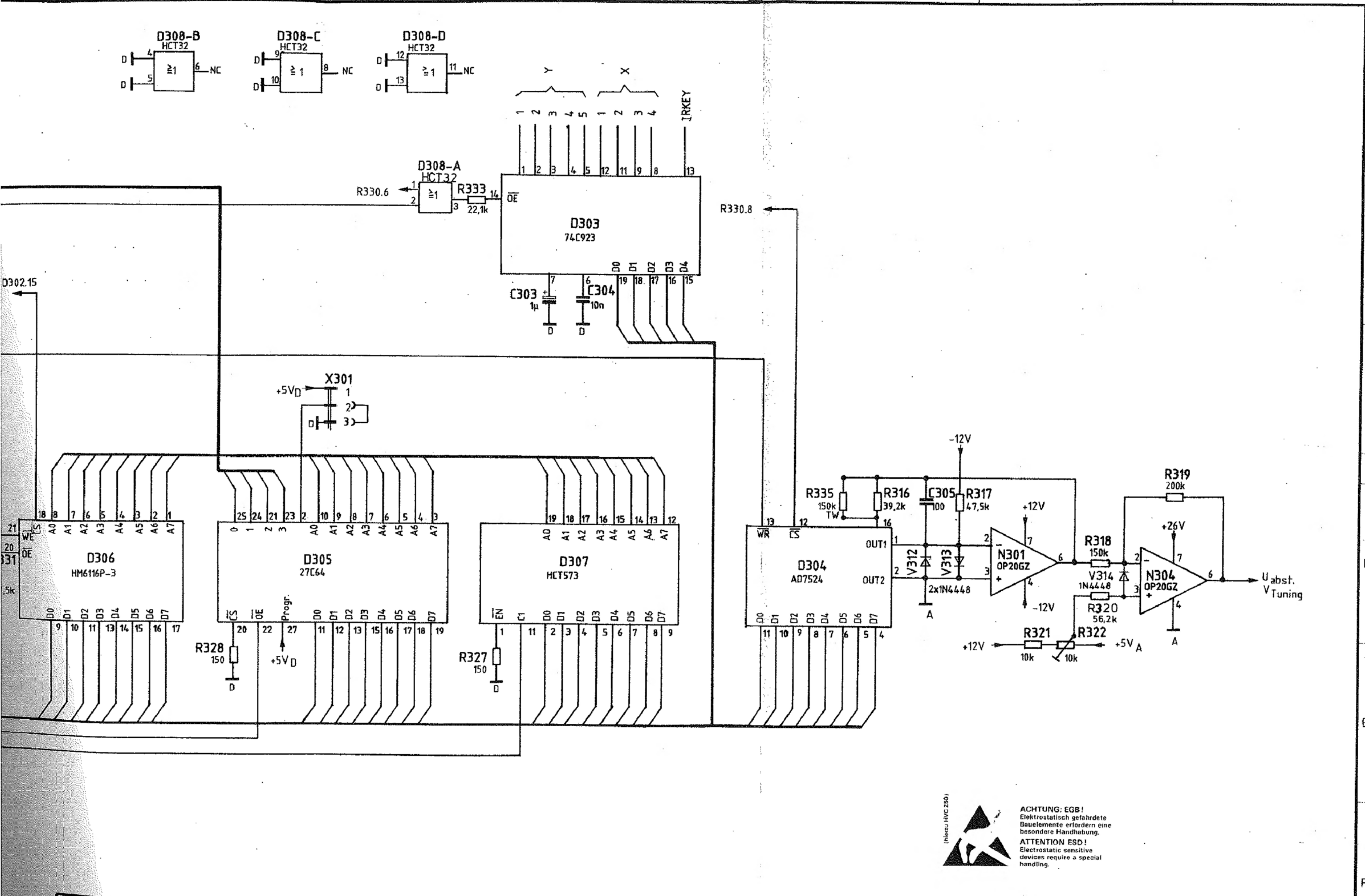
reg.: V 708.8507 V — erste Z 641.8018



NF gereg.
AF contr.
VCO out
NF fm
AF fm
NF am
AF am
+-15dB
-10bis/to +70dBµV
Ant. DC
Sql. Schl.
Sql. thresh.
+5VD
UBat.
VBat.
40dB
-12V
+12V
UBel.
VLight
Masse D
Ground D
AFC EIN
AFC ON
0 LCD
1 Digit
2 Info
3 (BCD)
D5
D4
D3
D2
D1
D0
PFAIL
VDD
Cod.
DEZPU1
DOPPU1
DOPPU2
ENTL-P
X200
NC
N303.2
R209
0Ω
R210
0Ω
D202
82C43
7.3 SQLEIN
7.2 ABLGSW
7.1 SYNLOC
7.0 ABL NEG
CS
ENAFC
UP
DOWN
LCD
Synth.
Digit A
PROG.
5.3 BB7k5
5.2 BB15k
5.1 BB150k
5.0 IRQ.TUN
D206
HC237
G1
G2
GL
R208
22,1k
R207
150
+5VA
X200.7
VDD
CS D202
CS D201
Port 1/D7
D6
D5
D4
D3
D2
D1
D0
0
BUS 1
Extend. 2
3
PROG.
PFAIL
IRQ.TUN
INT
C201
1µ
D201
D202
D206
V Tuning
-12V
+12V
+26V
+5VA
+5VD
ROHDE&SCHWARZ
A 37837
B 41383
Änderungs Mitteilung



X77
AF fm NF fm .A3
AF am NF am .B3
+-15dB .B5
-10 bis/to+70 dBµV .B4
Sql. thresh. Sql. Schl. .B7
ABLPOS .A8 NC
BB150P bei ENTL-P VAR 06
BB7k5 BB15k BB150k bei VAR 02
.B1 A2 .B2
R209 0Ω
R210 0Ω
zu ZF Teil to IF Section
IR BBU .A1
ENAFC .A4
SQLEIN .A5
ABLGSW .B8
ABLNEG .A7
VBat. UBat. .A11 .B11
+12V .A10 .B10
Ground A Masse A .A6 .A9 .B6 .B9
X67
Ant.DC .7
40dB .9
+5VA .8
zu to Tuner
Range 1 .4
Range 2 .3
Range 3 .2
Range 4 .5
VTuning Uabst. .6
Ground A Masse A .1 .10
NF Zwang
AF forced
AM/FMU
Masse A Ground A
NF gereg. AF contr.
VCO out
NF fm AF fm
NF am AF am
+-15dB
-10 bis/to +70dBµV
Ant. DC
Sql. Schl. Sql. thresh.
+5VD
UBat. VBat.
40dB
-12V
+12V
UBel. VLight
Masse D Ground D
AFC EIN AFC ON
0 LCD
1 Digit
2 Info
3 (BCD)
D5 D4 D3 D2 D1
D202
82C43
7.3 SQLEIN
7.2 ABLGSW
7.1 SYNLOC
7.0 ABL NEG
CS
ENAFC 5.0
5.1
UP 5.2
DOWN 5.3
NC
LCD 6.0 6.1 6.2 6.3
Synth. Digit A 4.3 4.2 4.1 4.0
PROG. 2.3 2.2 2.1 2.0
D206
HC237
G1 G2 GL
R208 22,1k
R207 150
+5VD
D
X200.7
VDD
Ground A Masse A Ground D Masse D V Charge ULade
UBat. VBat. Uabst. VTuning -12V +12V +26V +5VA +5VD
CS D202
CS D201
Port 1/D7
D6 D5 D4 D3 D2 D1 D0
BUS 0 1 Extend. 2 3 PROG.
PFAIL
IRQ.TUN INT



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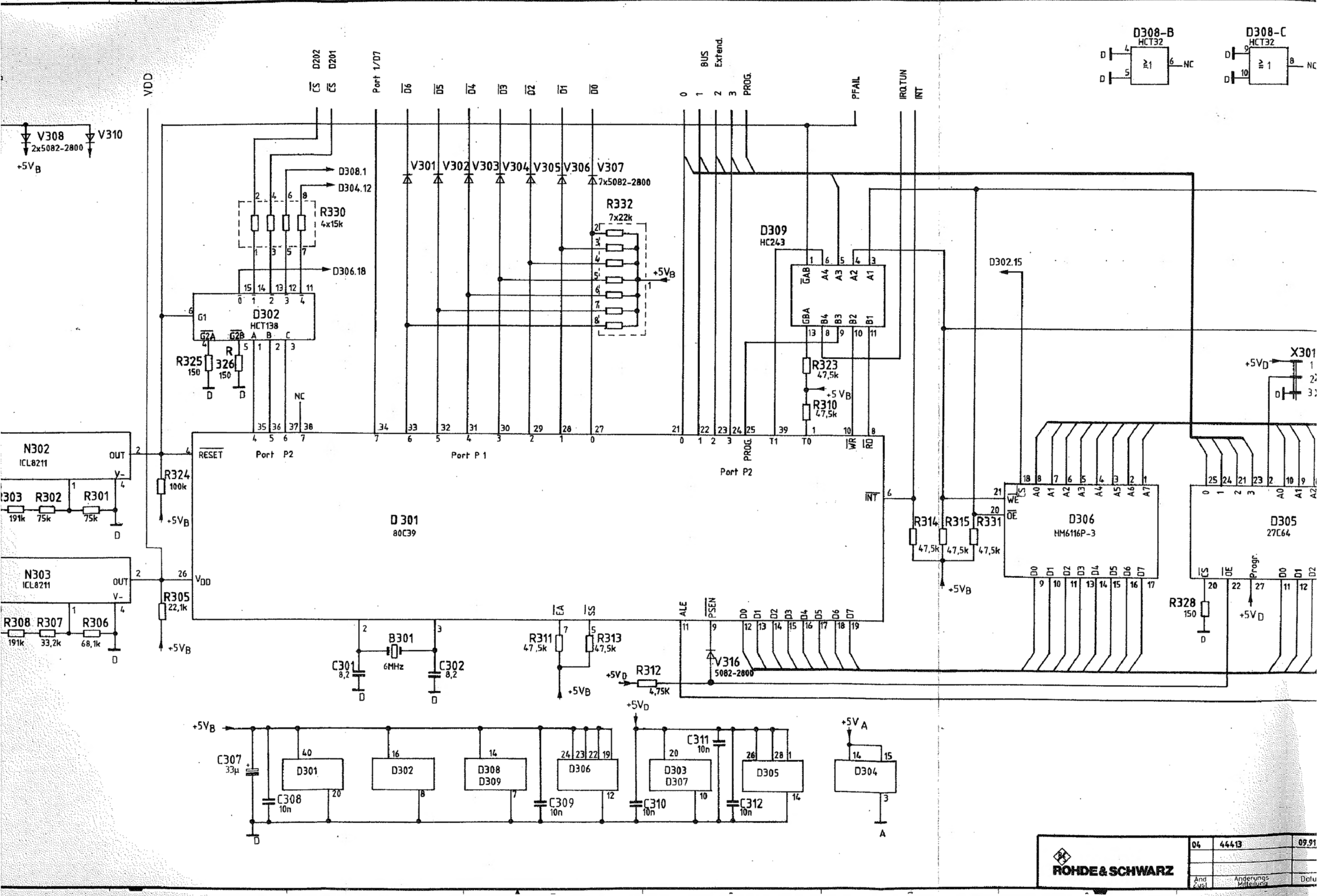
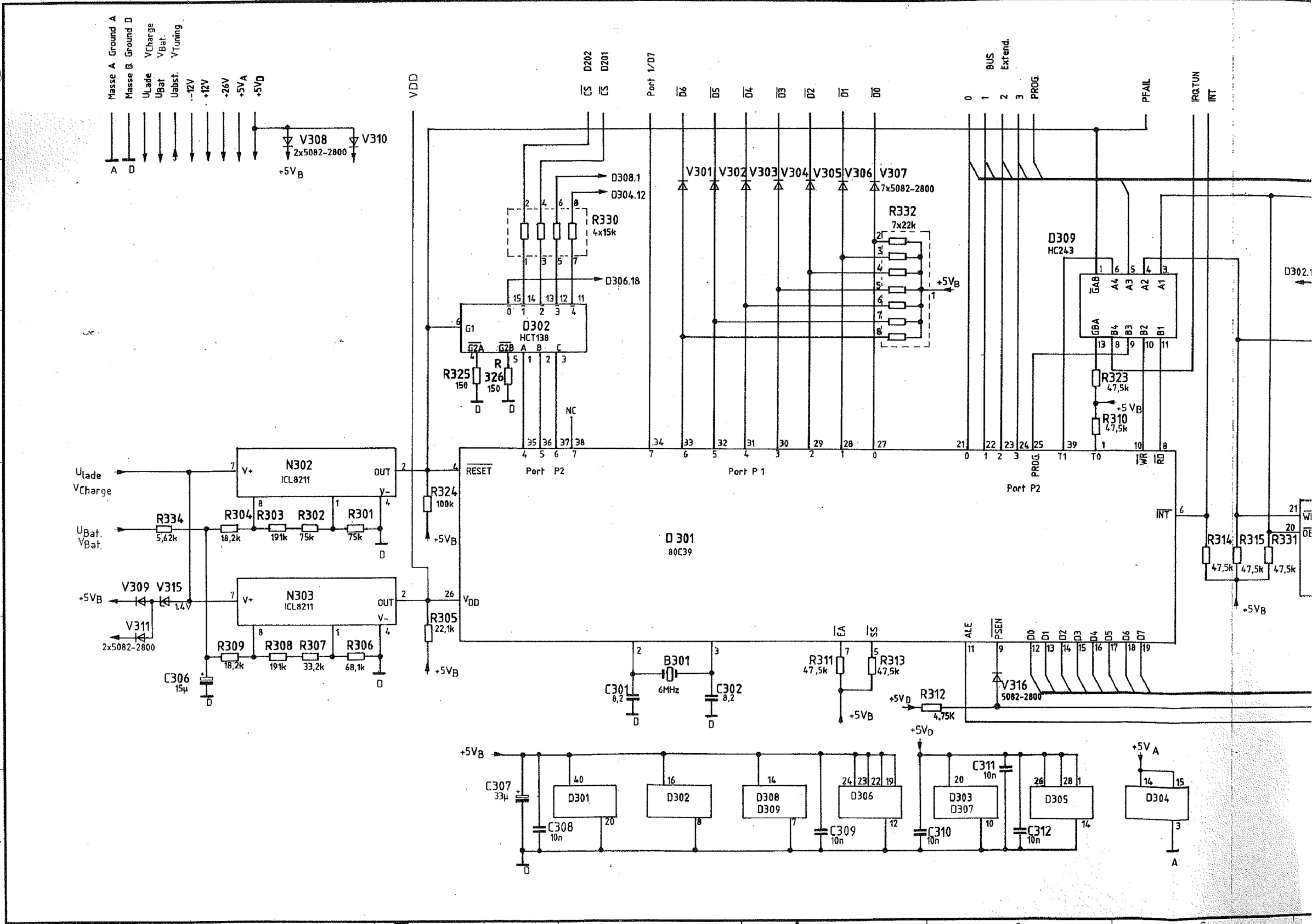
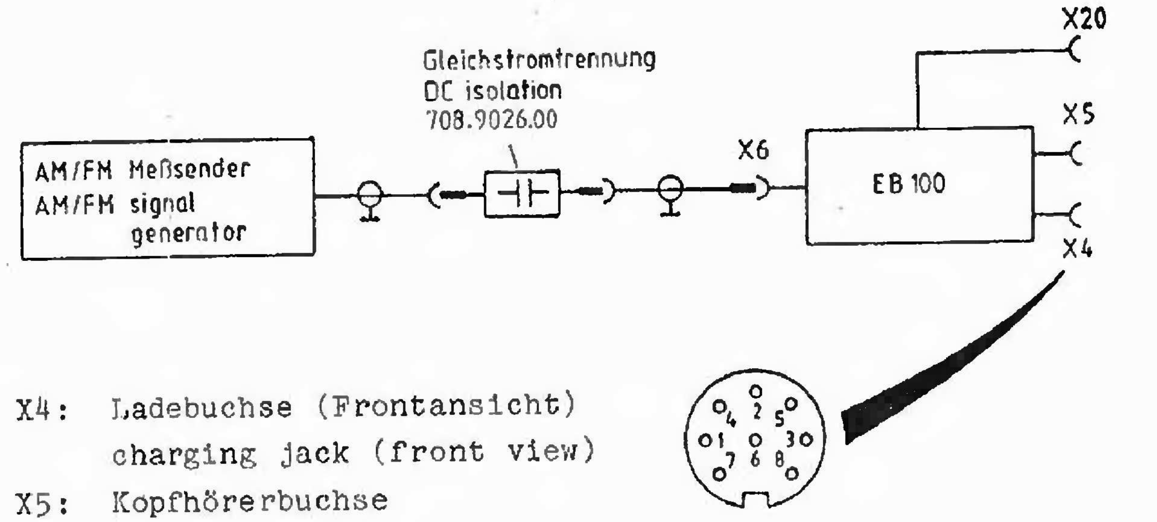
									Gepr.			zu Gerät EB100	reg. i. V. 708.8507 V	v 3 Bl
									Norm				erste Z 641.8018	


D301
80C39
Port P1
Port P2
RESET
VDD
INT
ALE
PSEN
D302
HCT138
D305
27C64
D306
HM6116P-3
D309
HC243
D308-B
HCT32
D308-C
HCT32
N302
ICL8211
N303
ICL8211
R330
4x15k
R332
7x22k
V307
7x5082-2800
V316
5082-2800
V308
2x5082-2800
B301
6MHz
X301
BUS
Extend.
PROG.
PFAIL
IRQ.TUN
Port 1/D7
D308.1
D304.12
D306.18
D302.15
ROHDE&SCHWARZ
04
44413
09.91
Änd
Zust
Änderungs-
Mitteilung



Masse A Ground A
Masse B Ground D
ULade VCharge
UBat VBat.
Uabst. VTuning
-12V
+12V
+26V
+5VA
+5VD
V308
V310
2x5082-2800
+5VB
VDD
CS D202
CS D201
Port 1/D7
D6
D5
D4
D3
D2
D1
D0
BUS
Extend.
PROG.
PFAIL
IRQTUN
INT
D308.1
D304.12
D306.18
R330
4x15k
D302
HCT138
R325
150
R326
150
NC
V301 V302 V303 V304 V305 V306 V307
7x5082-2800
R332
7x22k
D309
HC243
R323
47,5k
R310
47,5k
D302.1
N302
ICL8211
N303
ICL8211
ULade
VCharge
UBat.
VBat.
R334
5,62k
R304 R303 R302 R301
18,2k 191k 75k 75k
R324
100k
R305
22,1k
V309 V315
1,4V
V311
2x5082-2800
R309 R308 R307 R306
18,2k 191k 33,2k 68,1k
C306
15µ
RESET
Port P2
Port P1
D 301
80C39
VDD
INT
R314 R315 R331
47,5k 47,5k 47,5k
EA
SS
ALE
PSEN
B301
6MHz
C301
8,2
C302
8,2
R311
47,5k
R313
47,5k
R312
4,75K
V316
5082-2800
C307
33µ
D301
D302
D308
D309
D306
D303
D307
D305
D304
C308
10n
C309
10n
C310
10n
C311
10n
C312
10n
Für diese Unterlage behalten wir uns alle Rechte vor
Zeichn.-Nr.



X4: Ladebuchse (Frontansicht)
charging jack (front view)
X5: Kopfhörerbuchse
headphone jack
X6: Antennenbuchse
antenna jack
X20: ZF-Ausgang
IF output

1, 4	Ladegerät + charger +
6, 8	Ladegerät - charger -
2	$U_{Beleuchtung}$ $U_{illuminination}$
3	Signalpegel ($R_i \approx 0\ \Omega$) signal level ($Z_{out} \approx 0\ \Omega$) 0,1 ... 3,5 V
5	Squelch (TTL-Pegel) squelch (TTL level)
7	NF AF

Bild 11-1 Meßaufbau zur Funktionsprüfung
Fig. 11-1 Test set-up for functional test

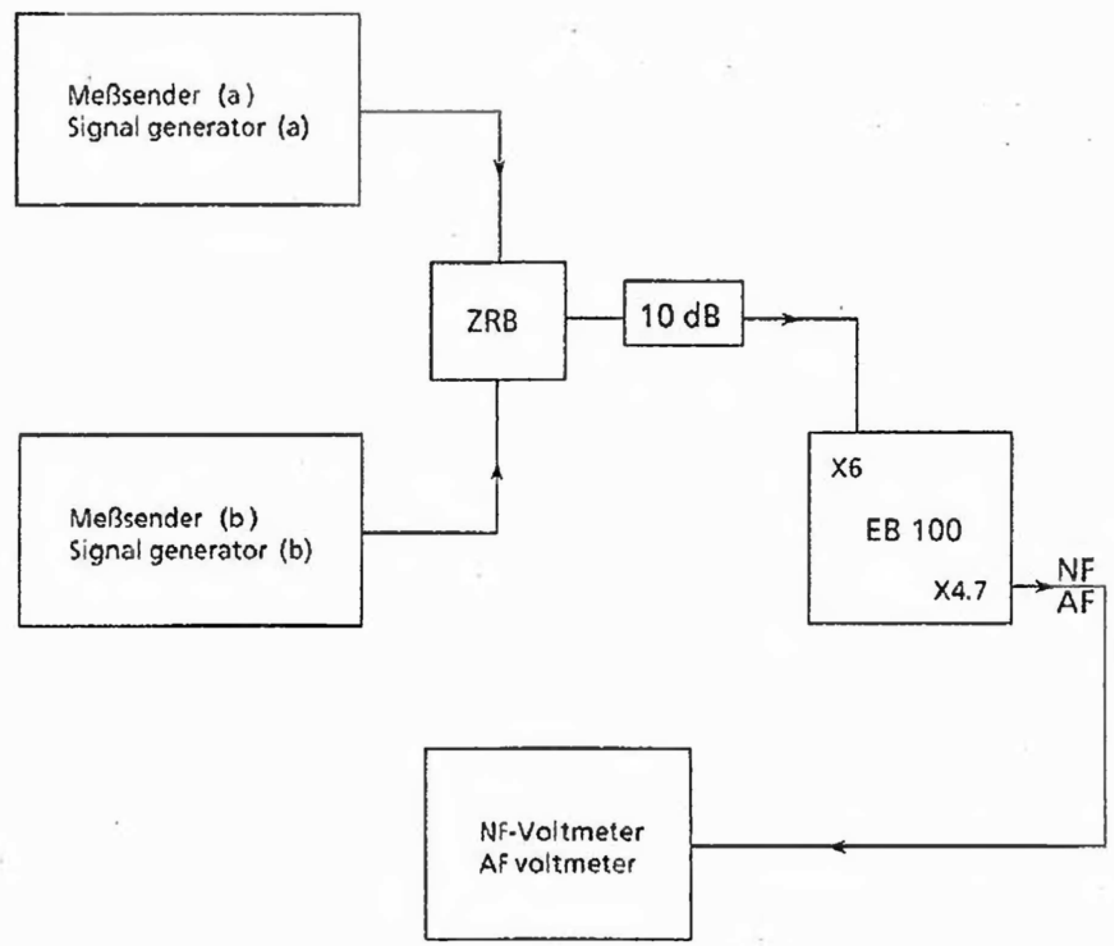


Bild 11-2 Meßaufbau zur Prüfung 3-dB-Bandbreite 150 kHz
Fig. 11-2 Test set-up for checking the 3-dB bandwidth 150 kHz

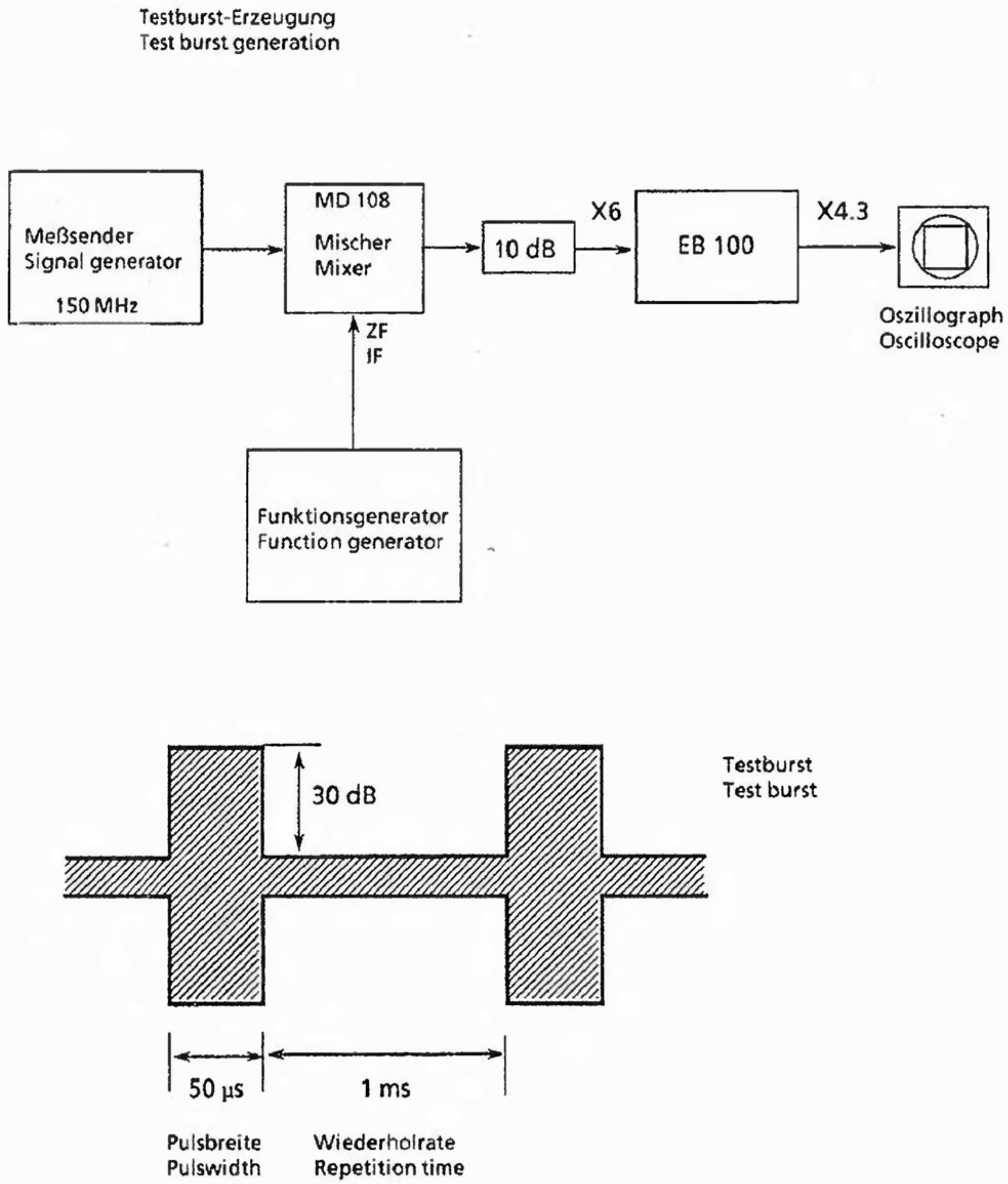


Bild 11-3 Meßaufbau zur Prüfung des Spitzengleichrichters
Fig. 11-3 Test set-up for checking the peak rectifier

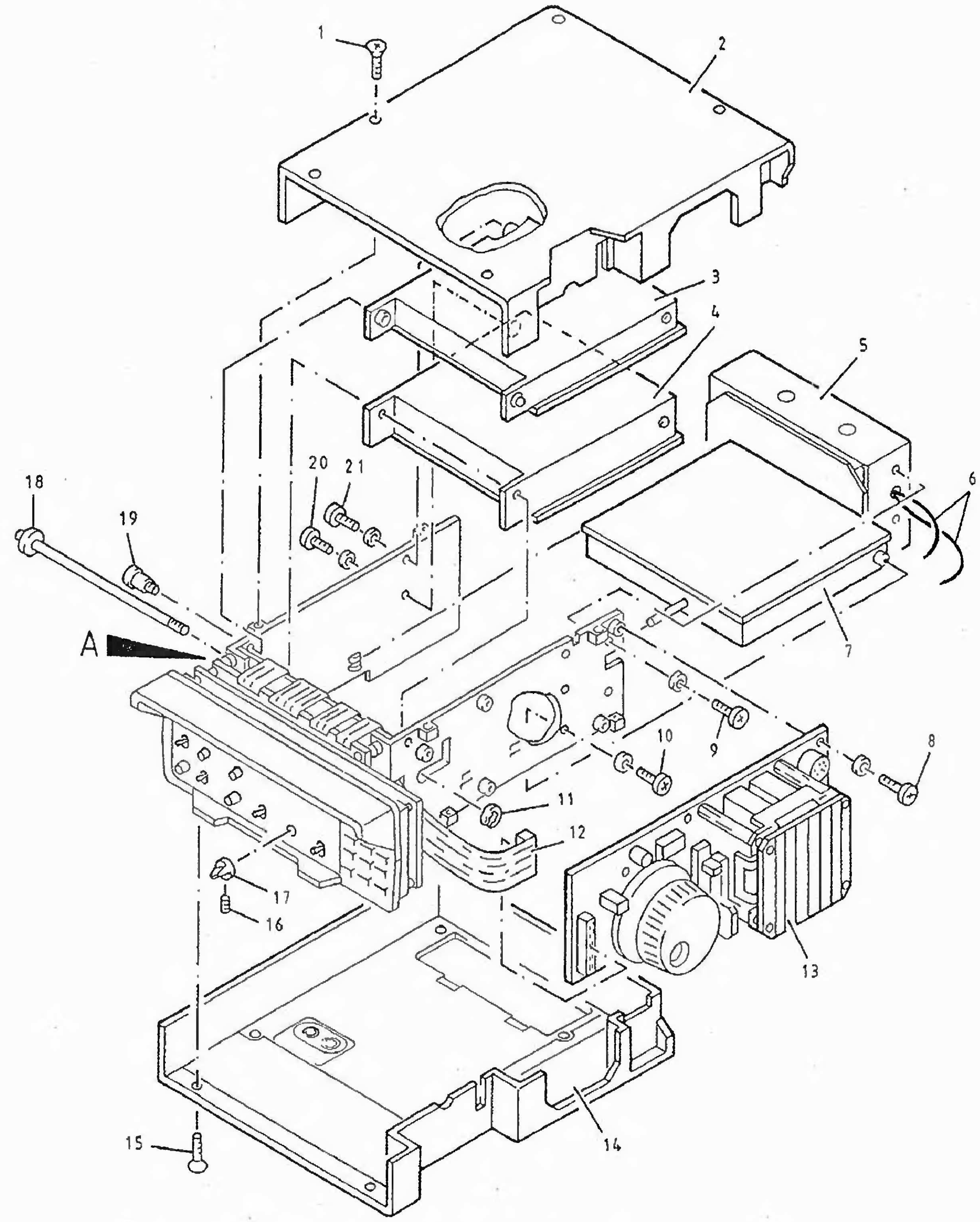
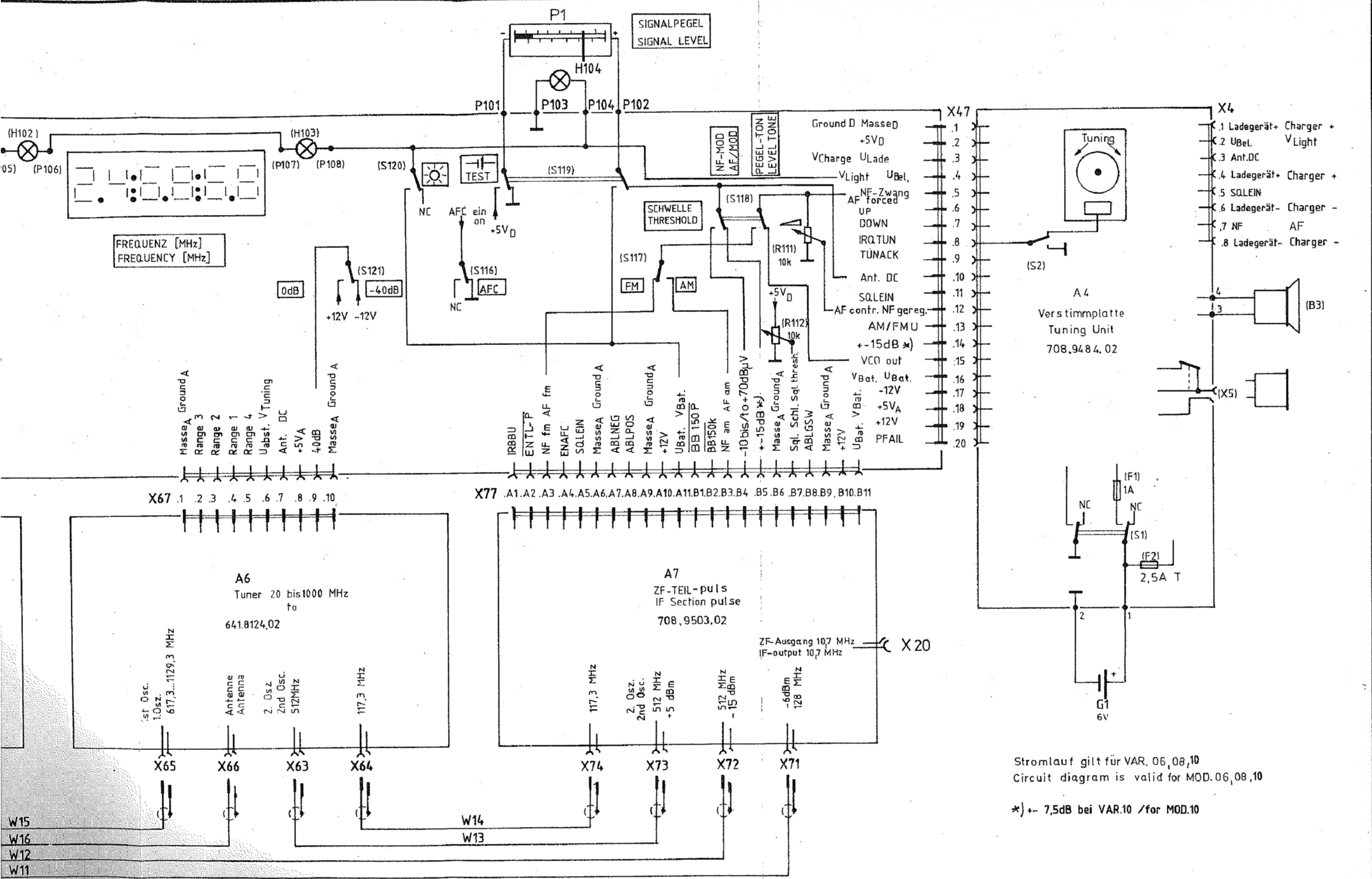


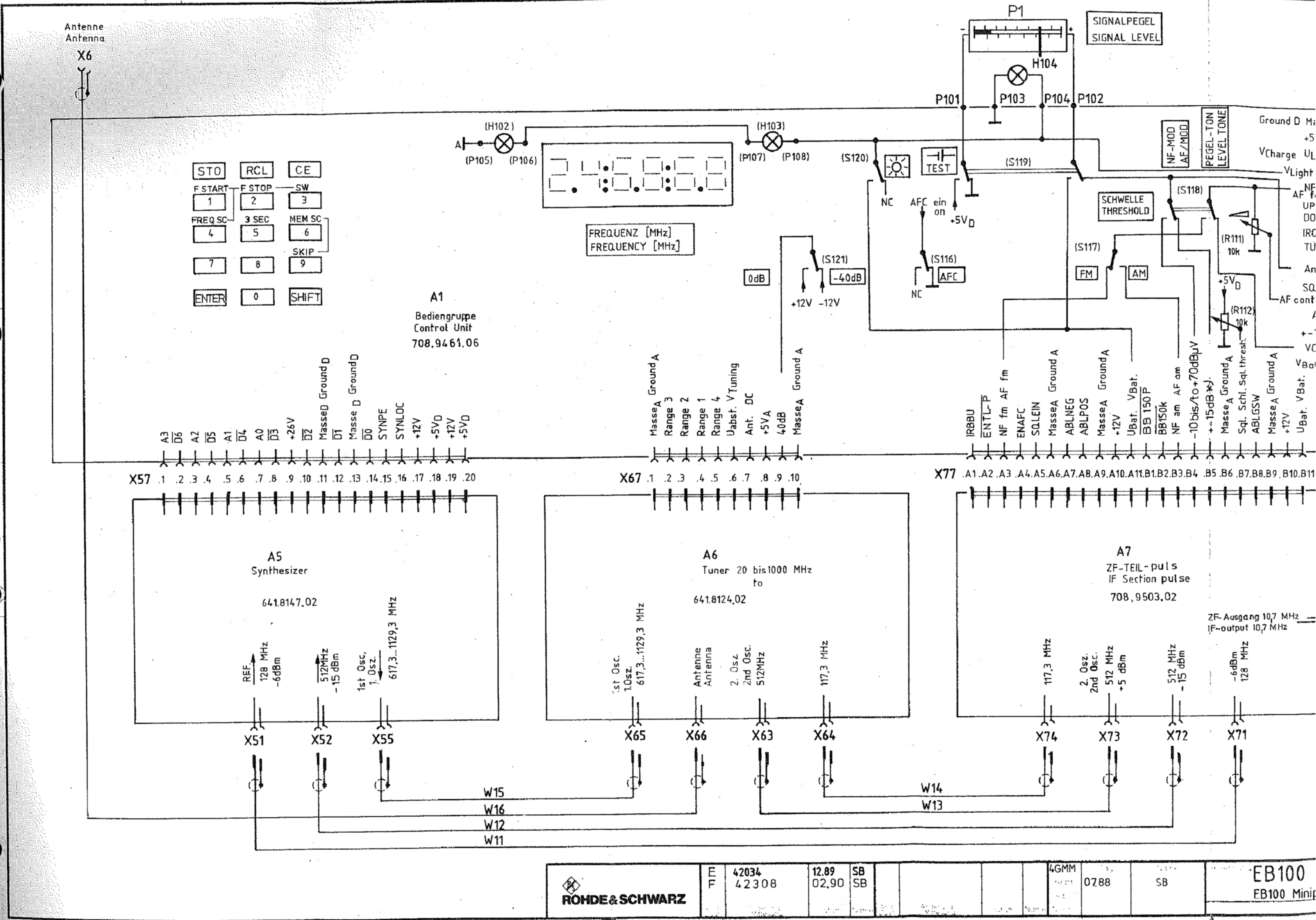
Bild 11-4 Ausbau der Baugruppen (ohne Bedienteil)
Fig. 11-4 Removal of assemblies (without control unit)



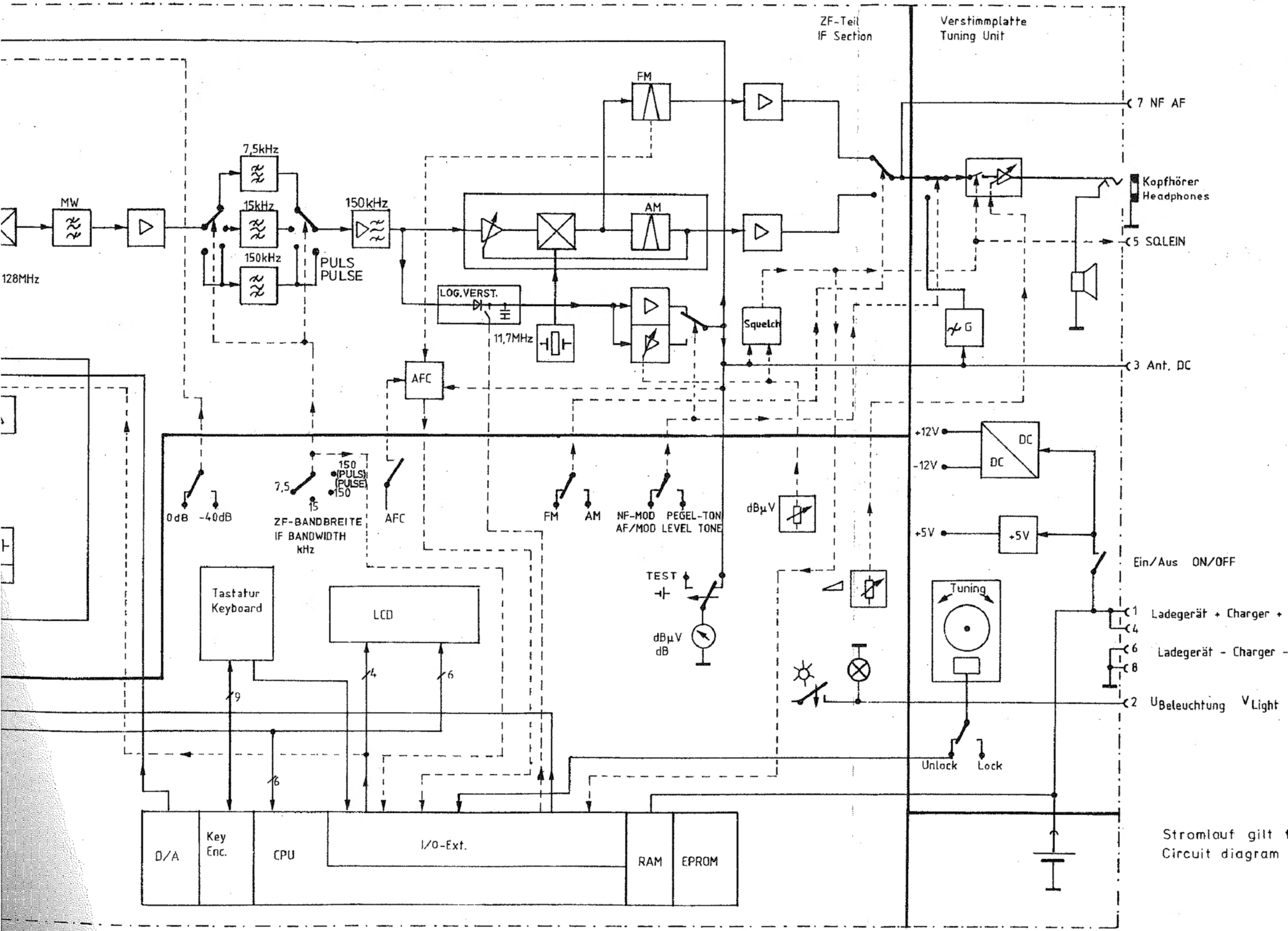
Stromlauf gilt für VAR. 06, 08, 10
Circuit diagram is valid for MOD. 06, 08, 10

*) +- 7,5dB bei VAR.10 /for MOD.10

ROHDE&SCHWARZ	E F	42034 42308	12.89 02.90	SB SB	4GMM	07.88	SB	EB100 Miniport Empfänger EB100 Miniport Receiver EB100	641.8018.01 S 641.8018 V	2 2

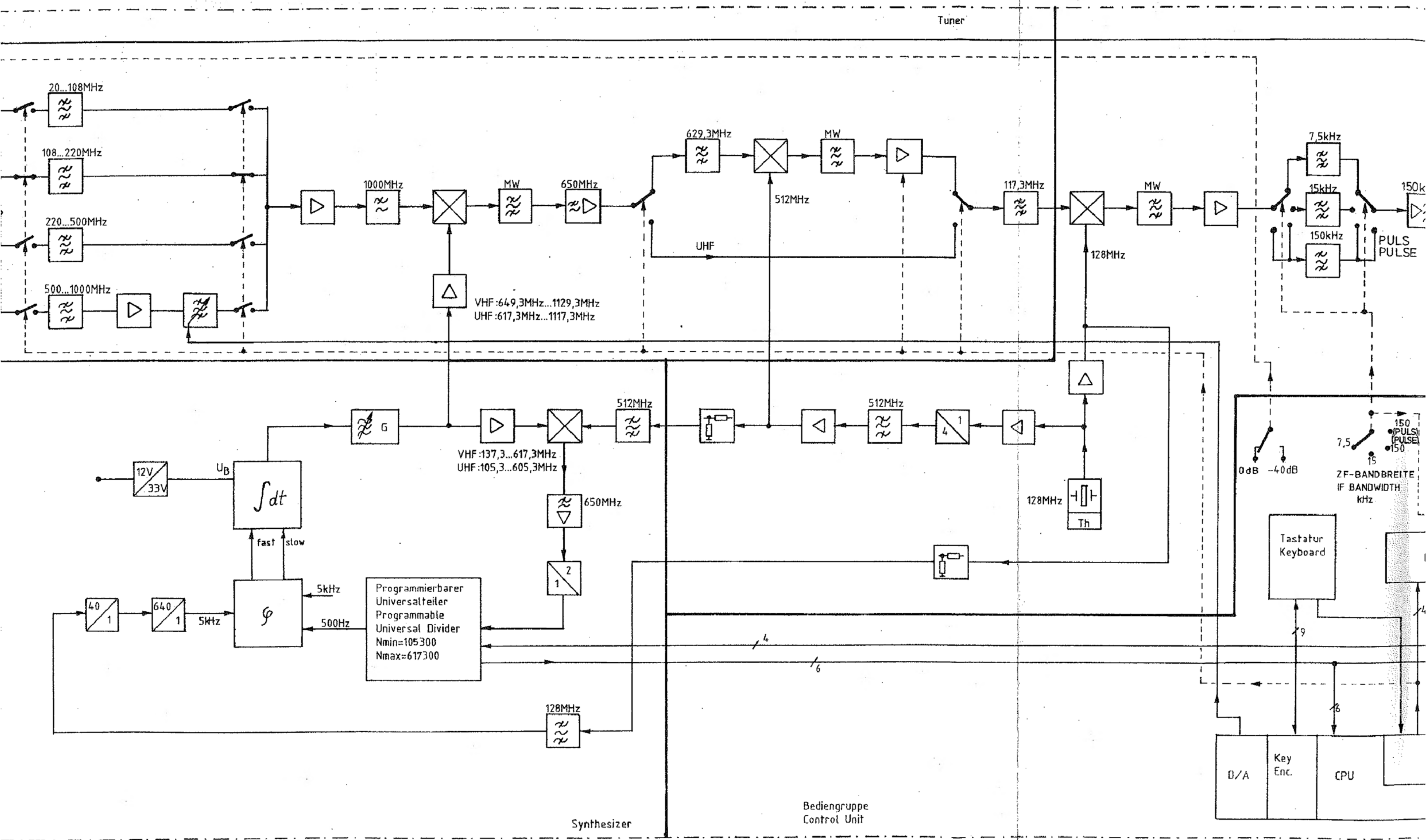


Antenne
Antenna
X6
P1
SIGNALPEGEL
SIGNAL LEVEL
H104
P101
P103
P104
P102
(H102)
(P105)
(P106)
(H103)
(P107)
(P108)
(S120)
TEST
(S119)
NF-MOD
AF/MOD
PEGEL-TON
LEVEL TONE
NC
AFC ein
on
+5VD
SCHWELLE
THRESHOLD
(S118)
(S117)
FM
AM
(R111)
10k
(R112)
10k
(S121)
0dB
-40dB
+12V -12V
(S116)
AFC
STO
RCL
CE
F START
F STOP
SW
FREQ SC
3 SEC
MEM SC
SKIP
ENTER
SHIFT
FREQUENZ [MHz]
FREQUENCY [MHz]
A1
Bediengruppe
Control Unit
708.9461.06
X57
X67
X77
A5
Synthesizer
641.8147.02
A6
Tuner 20 bis 1000 MHz
to
641.8124.02
A7
ZF-TEIL-puls
IF Section pulse
708.9503.02
ZF-Ausgang 10,7 MHz
IF-output 10,7 MHz
REF. 128 MHz -6dBm
512MHz -15 dBm
1st Osc, 1. Osz. 617,3...1129,3 MHz
1st Osc. 1.Osz. 617,3...1129,3 MHz
Antenne Antenna
2. Osz 2nd Osc. 512MHz
117,3 MHz
117,3 MHz
2. Osz. 2nd Osc. 512 MHz +5 dBm
512 MHz -15 dBm
-6dBm 128 MHz
X51
X52
X55
X65
X66
X63
X64
X74
X73
X72
X71
W15
W16
W12
W11
W14
W13
ROHDE&SCHWARZ
E 42034
F 42308
12.89 SB
02.90 SB
4GMM
07.88
SB
EB100
EB100 Minip



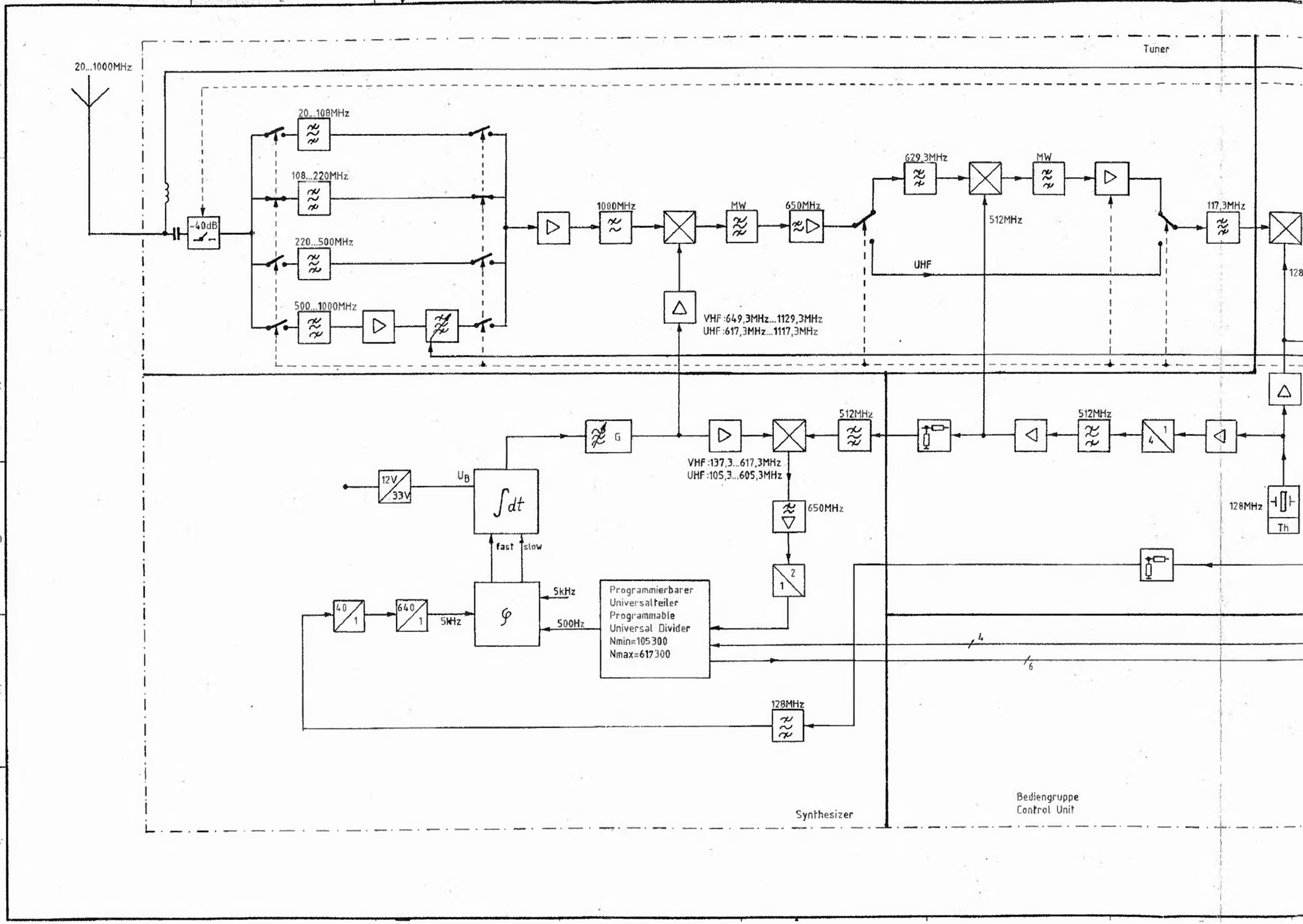
Stromlauf gilt für VAR 06,08,10
Circuit diagram is valid for MOD 06,08,10

ROHDE&SCHWARZ	C	42034	12.89	SB	4GMM	Tag 02.89	Name SB	EB100 Miniport Empfänger EB100 Miniport Receiver	Zeichn. Nr. 641.8018 FS	Blatt Nr. 2
	Änd. Zust.	Änderungs-Mitteilung	Datum	Name	Bearb / Gepr / Norm			zu Gerät EB100	reg. i. V. 641.8018 V	erste Z

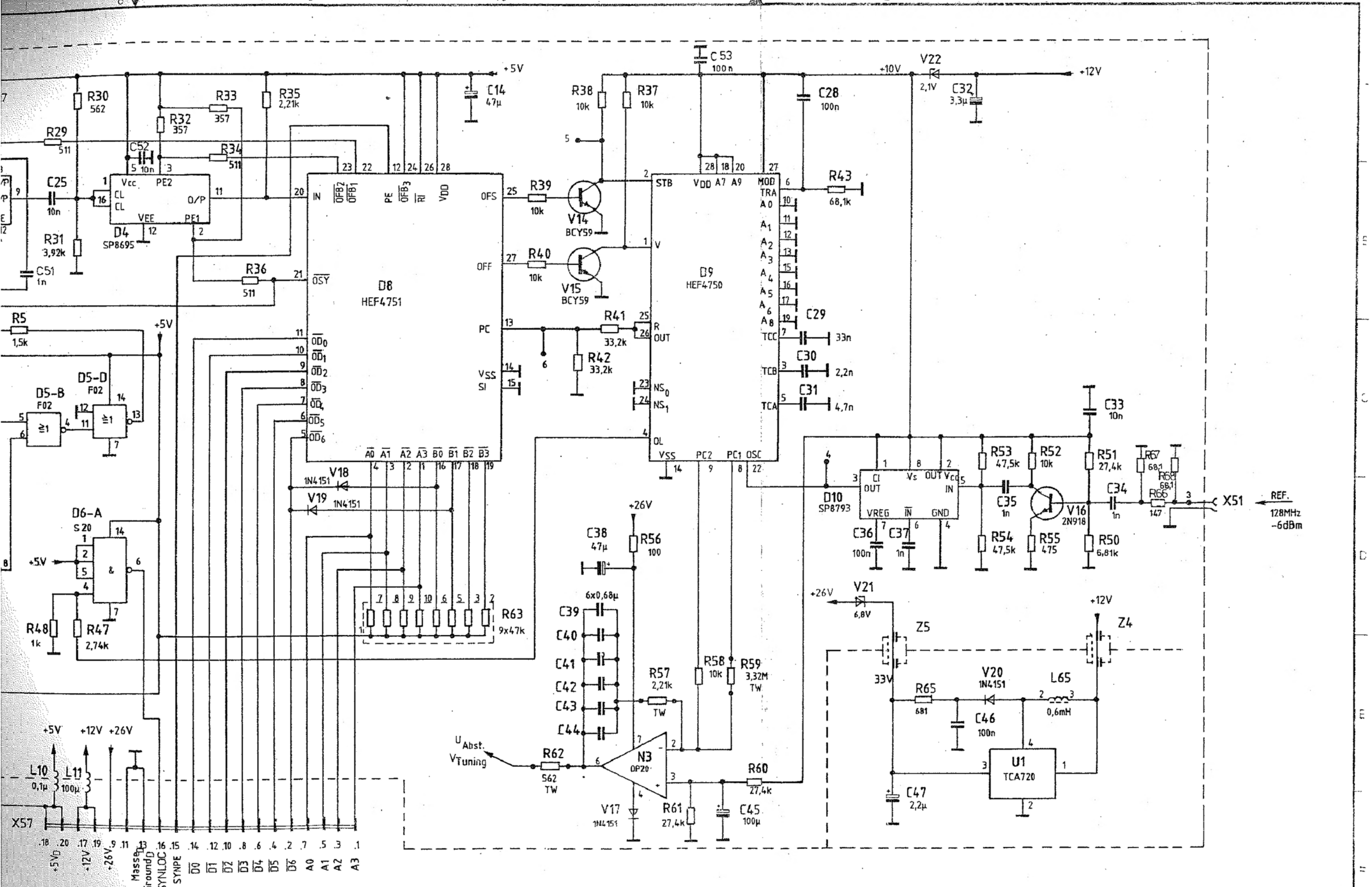


ROHDE&SCHWARZ

C 42034 12



Tuner
20...1000MHz
-40dB
20...108MHz
108...220MHz
220...500MHz
500...1000MHz
1000MHz
MW
650MHz
629,3MHz
MW
512MHz
UHF
117,3MHz
128
VHF :649,3MHz...1129,3MHz
UHF :617,3MHz...1117,3MHz
G
512MHz
512MHz
VHF :137,3...617,3MHz
UHF :105,3...605,3MHz
650MHz
128MHz
Th
12V
33V
U_B
fast
slow
5kHz
500Hz
5kHz
40
640
Programmierbarer
Universalteiler
Programmable
Universal Divider
Nmin=105300
Nmax=617300
128MHz
Synthesizer
Bediengruppe
Control Unit



A	———	6.85	SB	D	34497	06.86	SB	4PMM	Tag	Name	Benennung	Synthesizer
B	34497	10.85	SB	E	35858	09.86	SB	Bearb.	05.85	SB		
C	34497	01.86	SB	F	35858	09.86	SB	Gepr.				
Änd. Zust.	Änderungs-Mitteilung	Datum	Name	Änd. Zust.	Änderungs-Mitteilung	Datum	Name	Norm			zu Gerät	EB100

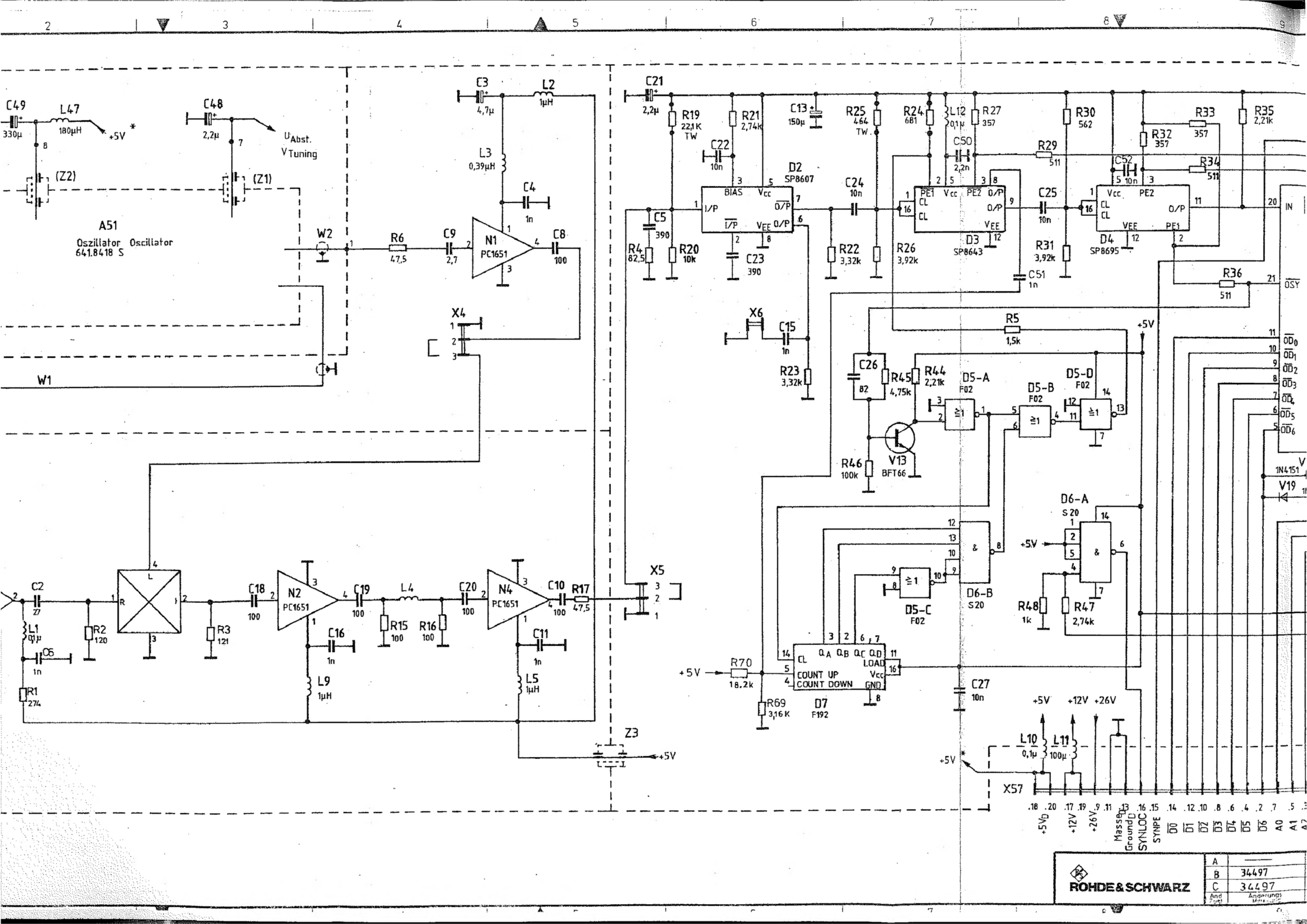
ROHDE&SCHWARZ

Zeichn.-Nr. 641.8147 S

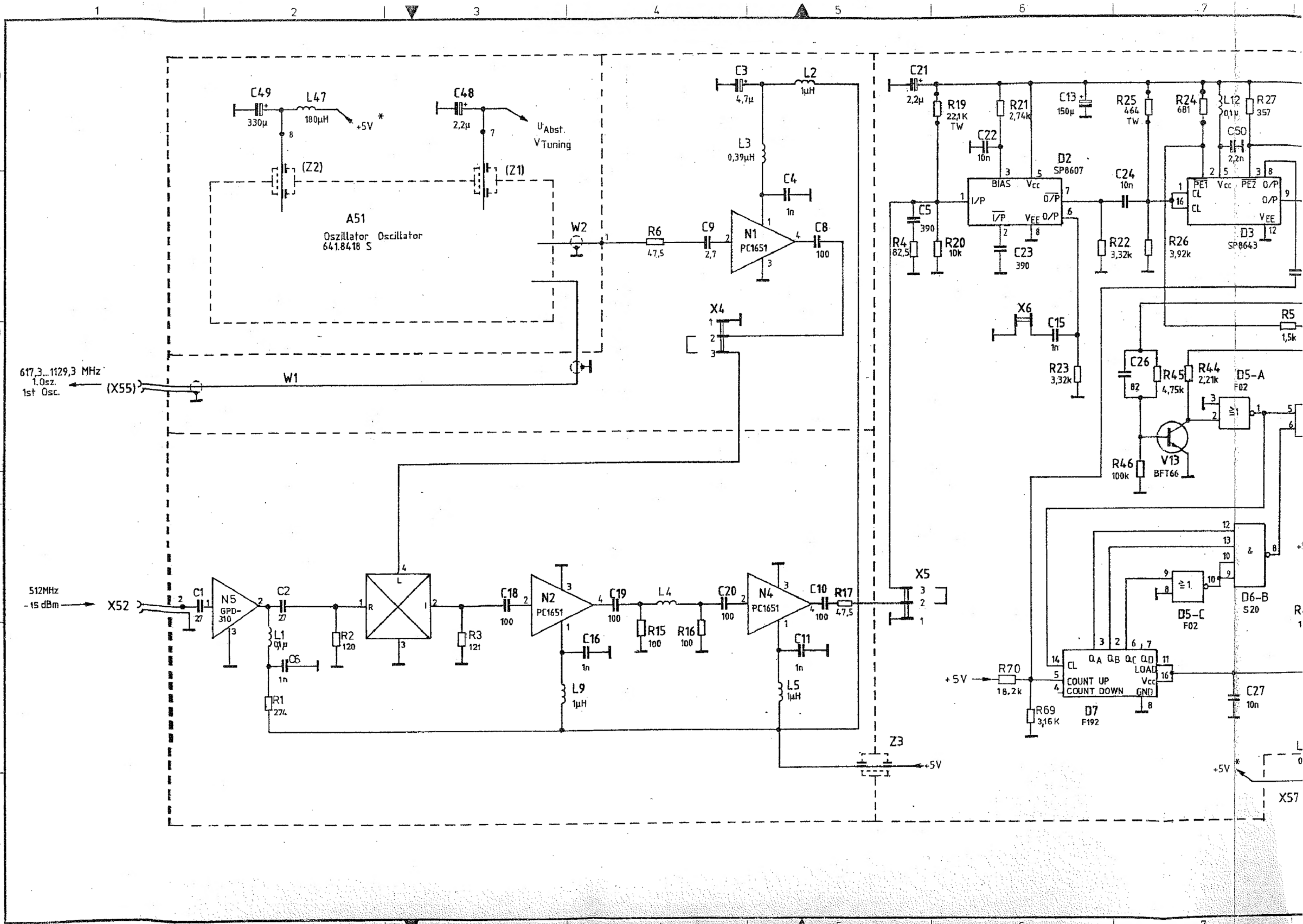
Blatt-Nr. 1 v. 1 Bl.

reg. i. V. 641.8018V

erste Z. 641.8018

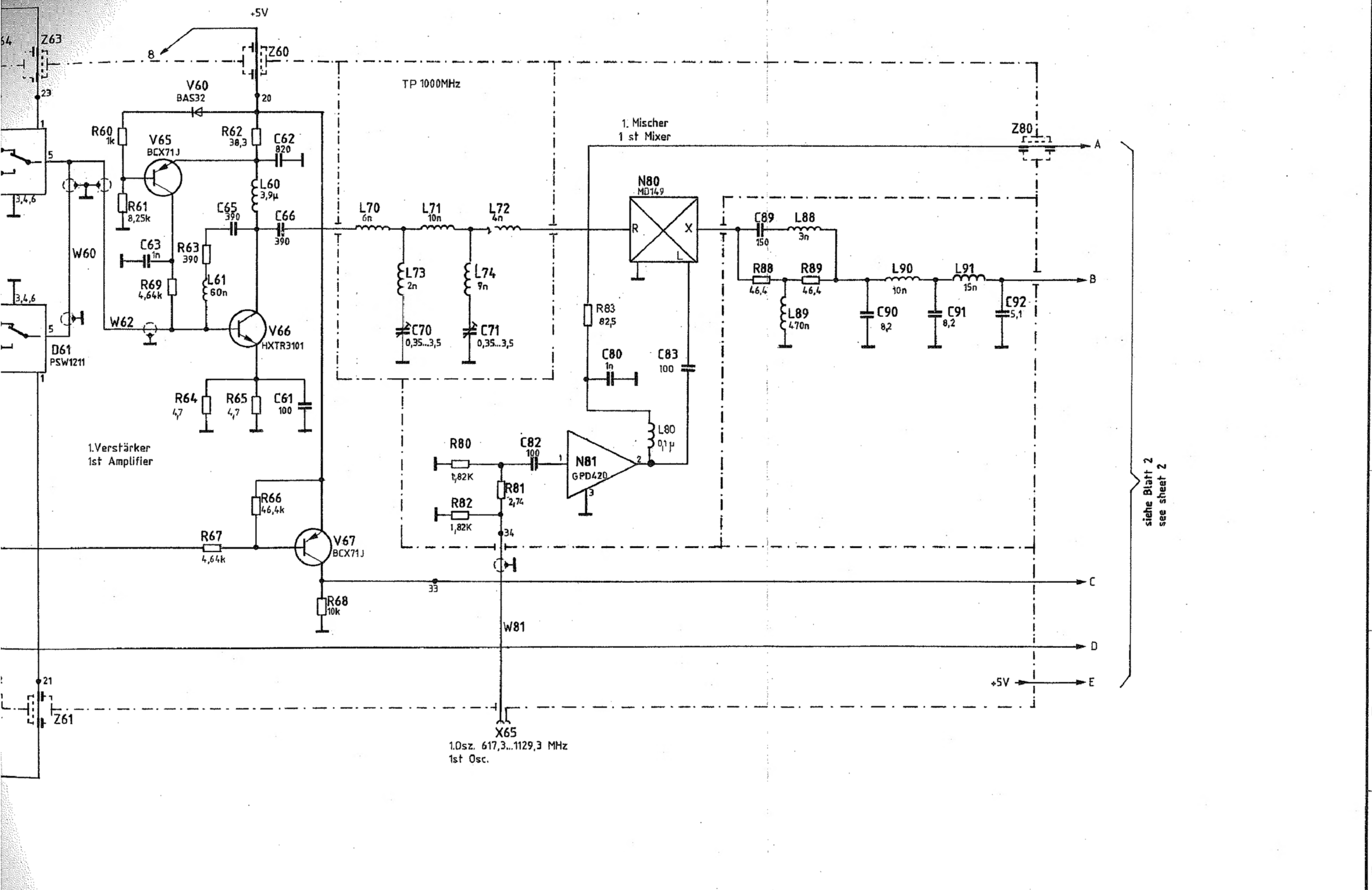


A51
Oszillator Oscillator
641.8418 S
W1
W2
UAbst.
VTuning
C49 330µ
L47 180µH
+5V *
C48 2,2µ
(Z1)
(Z2)
C3 4,7µ
L2 1µH
L3 0,39µH
C4 1n
N1 PC1651
C8 100
C9 2,7
R6 47,5
X4
X5
X6
Z3
C2 27
L1 0,1µ
C6 1n
R1 274
R2 120
R3 121
C18 100
N2 PC1651
C16 1n
L9 1µH
C19 100
L4
R15 100
R16 100
C20 100
N4 PC1651
C11 1n
L5 1µH
C10 100
R17 47,5
C21 2,2µ
R19 221K TW
R21 2,74k
C22 10n
C13 150µ
C5 390
R4 82,5
R20 10k
D2 SP8607
BIAS
Vcc
I/P
O/P
VEE
C23 390
C24 10n
R22 3,32k
C15 1n
R23 3,32k
R25 464 TW
R24 681
L12 0,1µ
R27 357
C50 2,2n
D3 SP8643
PE1
PE2
CL
R26 3,92k
R29 511
R30 562
C25 10n
R31 3,92k
C51 1n
R32 357
R33 357
R34 511
C52 10n
R35 2,21k
D4 SP8695
R36 511
IN
OSY
OD0
OD1
OD2
OD3
OD4
OD5
OD6
1N4151
V19
R5 1,5k
+5V
C26 82
R45 4,75k
R44 2,21k
R46 100k
V13 BFT66
D5-A F02
D5-B F02
D5-C F02
D5-D F02
D6-A S20
D6-B S20
R48 1k
R47 2,74k
D7 F192
QA QB QC QD
LOAD
COUNT UP
COUNT DOWN
GND
R70 18,2k
R69 3,16K
C27 10n
+12V
+26V
L10 0,1µ
L11 100µ
X57
+5VD
Masse Ground
SYNLOC
SYNPE
D0
D1
D2
D3
D4
D5
D6
A0
A1
ROHDE&SCHWARZ
34497
34497
Änd. Zust.
Änderungs Mitteilung

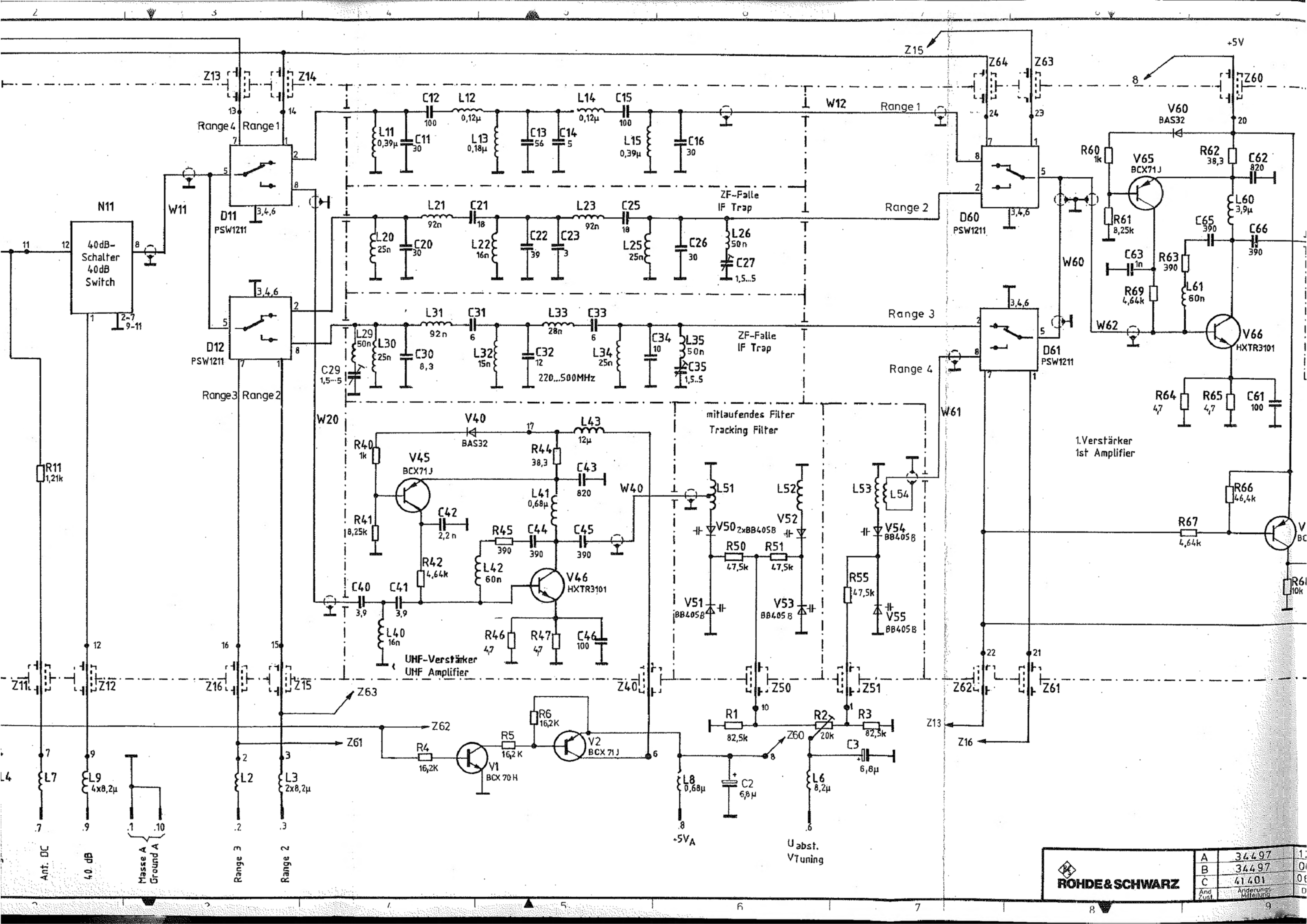


A51
Oszillator Oscillator
641.8418 S
617,3...1129,3 MHz
1.Osz.
1st Osc.
(X55)
W1
W2
512MHz
-15 dBm
X52
N5
GPD-310
N1
PC1651
N2
PC1651
N4
PC1651
D2
SP8607
D3
SP8643
D5-A
F02
D5-C
F02
D6-B
S20
D7
F192
COUNT UP
COUNT DOWN
V13
BFT66
X4
X5
X6
Z3
X57
UAbst.
VTuning
+5V

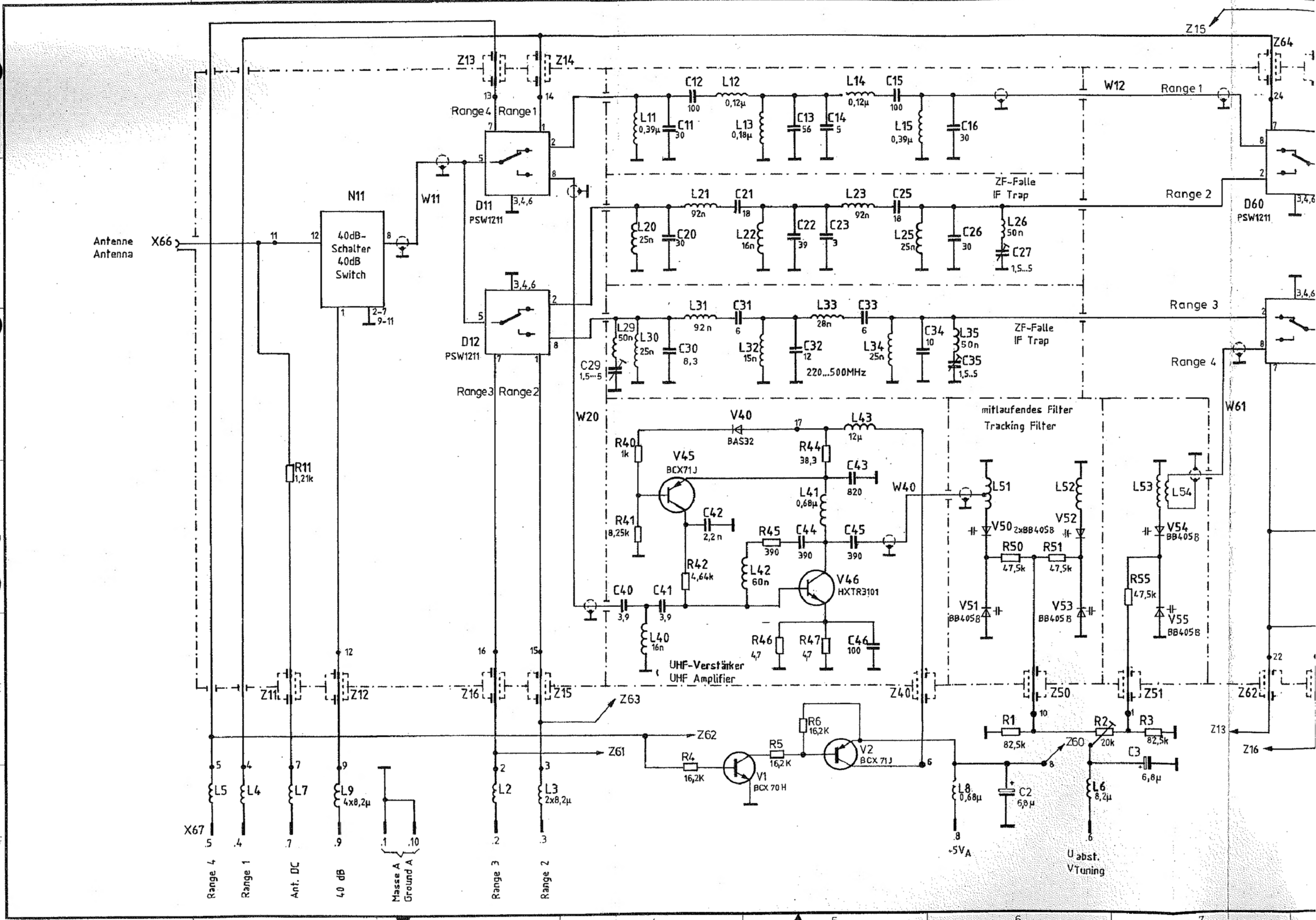
Zeichn.-Nr.

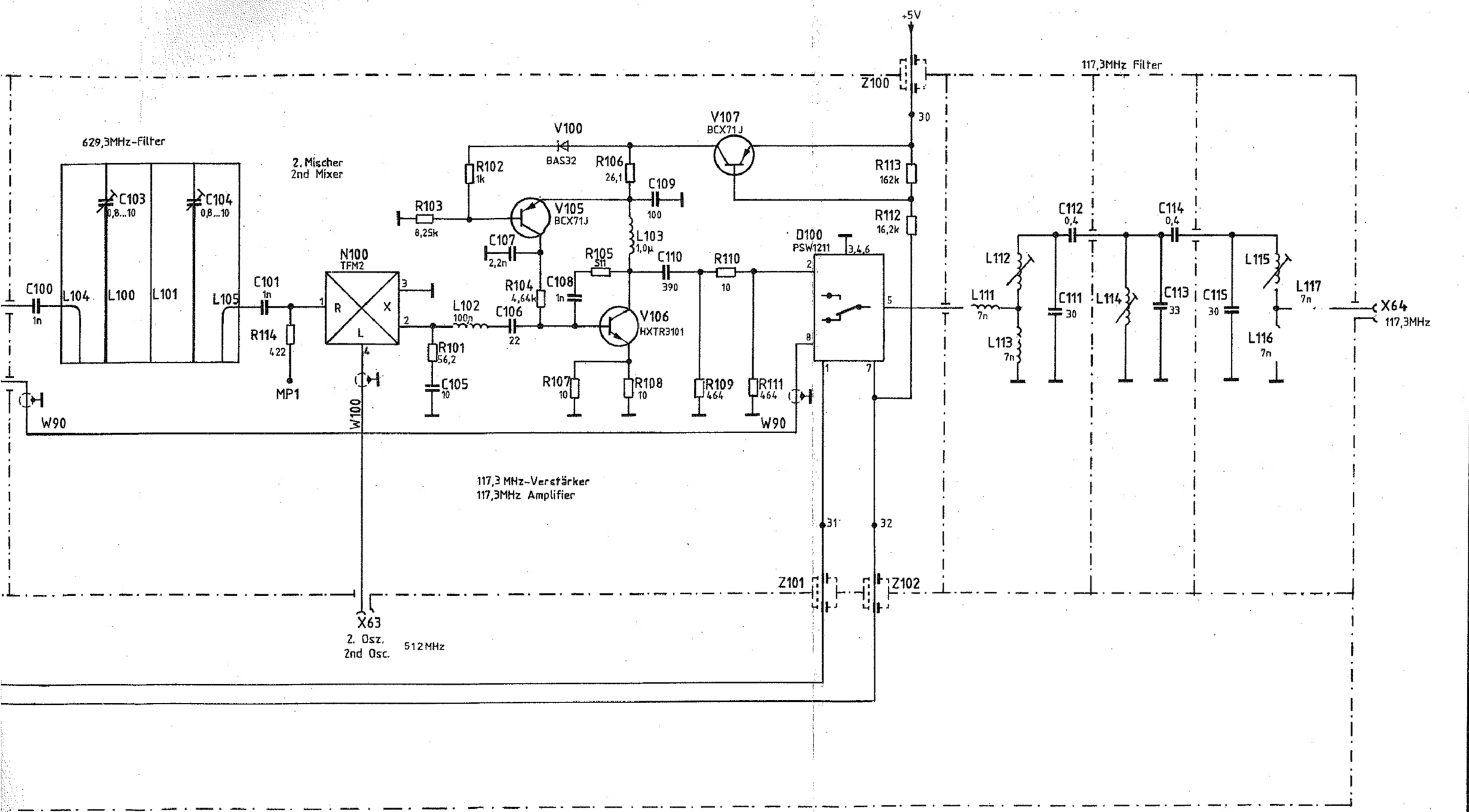


ROHDE&SCHWARZ	A	34497	12.85	SB	4PMM	Tag	Name	Benennung EB100-B4 Tuner 20-1000MHz / EB 100-B4 Tuner 20 to 1000 MHz
	B	34497	06.86	SB	Bearb.	11.85	SB	Zeichn.-Nr. 641.8124.01 S
	C	41401	06,89	SB	Gepr.			Blatt-Nr. 1 v. 2 Bl.
	Änd Zust	Änderungs-Mitteilung	Datum	Name	Norm			zu Gerät / reg. i. V. 641.8018 V / erste Z. 641.8018

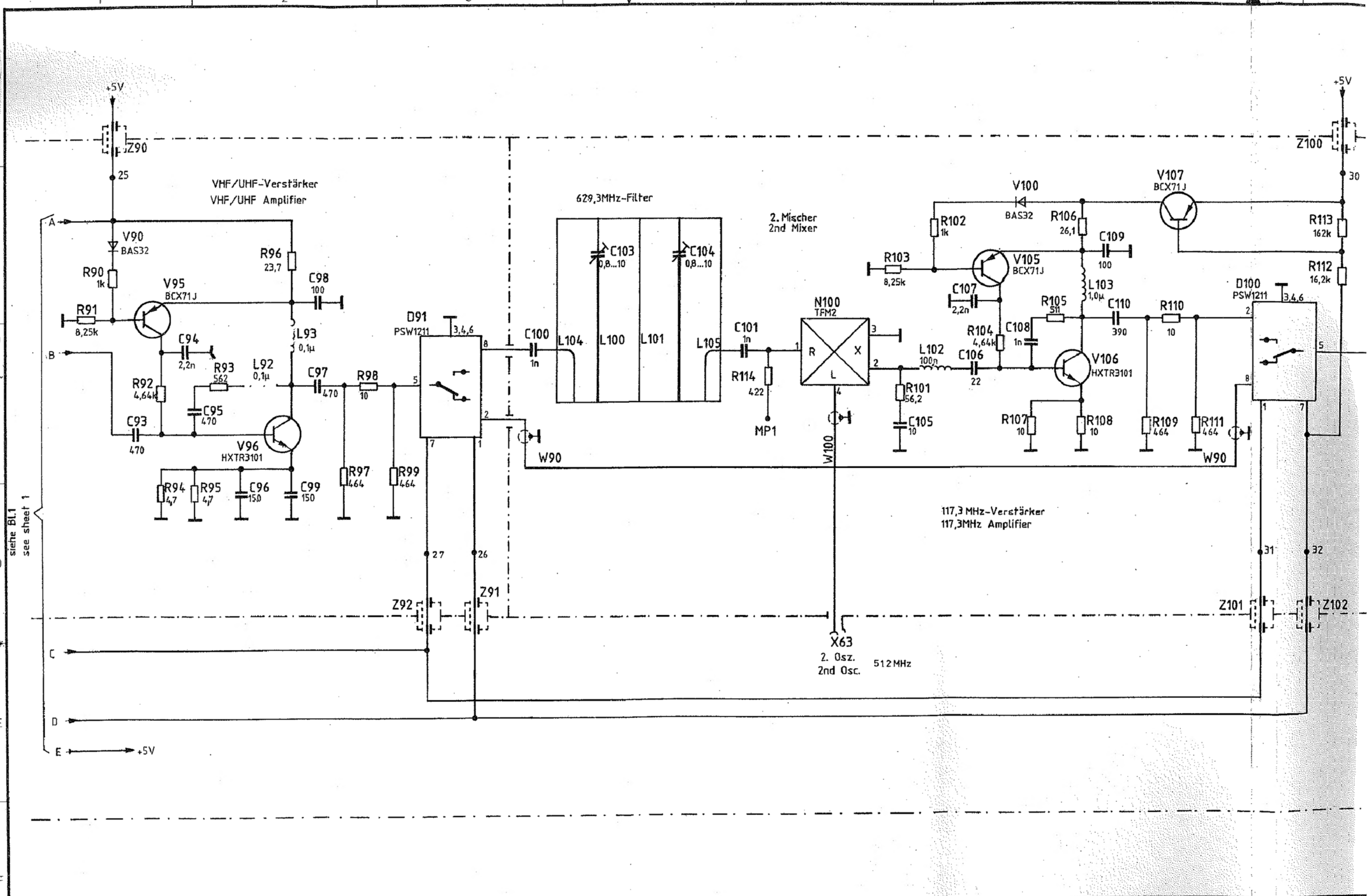


N11
40dB-Schalter
40dB Switch
D11 PSW1211
D12 PSW1211
D60 PSW1211
D61 PSW1211
Range 1
Range 2
Range 3
Range 4
W11
W12
W20
W40
W60
W61
W62
ZF-Falle
IF Trap
220...500MHz
mitlaufendes Filter
Tracking Filter
UHF-Verstärker
UHF Amplifier
1.Verstärker
1st Amplifier
V45 BCX71J
V46 HXTR3101
V65 BCX71J
V66 HXTR3101
V60 BAS32
V40 BAS32
V1 BCX 70 H
V2 BCX 71 J
V50 2xBB405B
V51 BB405B
V53 BB405B
V54 BB405B
V55 BB405B
+5V
+5VA
U abst.
V Tuning
Ant. DC
40 dB
Masse A
Ground A
Range 3
Range 2
ROHDE&SCHWARZ
A 34497
B 34497
C 41401
Änd. Zust.
Änderungs-Mitteilung


Antenne
Antenna
X66
N11
40dB-Schalter
40dB Switch
W11
D11
PSW1211
D12
PSW1211
Range 4
Range 1
Range 3
Range 2
Z13
Z14
Z15
Z64
W12
D60
PSW1211
ZF-Falle
IF Trap
220...500MHz
W20
W40
W61
V40
BAS32
V45
BCX71J
V46
HXTR3101
UHF-Verstärker
UHF Amplifier
mitlaufendes Filter
Tracking Filter
V50 2xBB405B
V51 BB405B
V52
V53 BB405B
V54 BB405B
V55 BB405B
V1 BCX 70 H
V2 BCX 71J
Z11
Z12
Z16
Z40
Z50
Z51
Z60
Z61
Z62
Z63
Z13
Z16
X67
Range 4
Range 1
Ant. DC
40 dB
Masse A
Ground A
Range 3
Range 2
+5V_A
U abst.
V Tuning
Für diese Unterlage behalten wir uns alle Rechte vor.
Zeichn.-Nr.



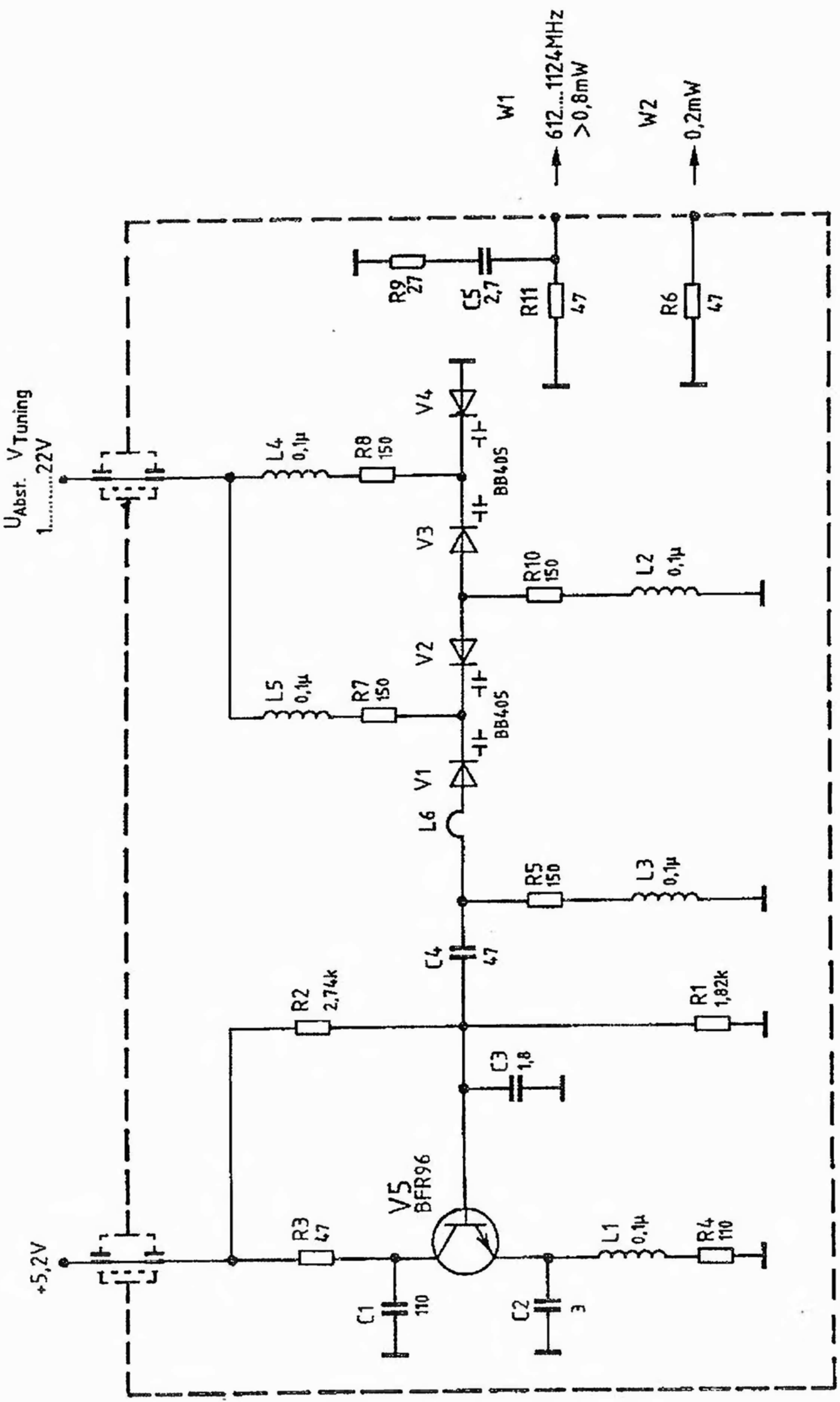
ROHDE&SCHWARZ	Änd Zust	Änderungs-Mitteilung	Datum	Name	Änd Zust	Änderungs-Mitteilung	Datum	Name	4PMM	Tag	Name	Benennung	Zeichn.-Nr	Blatt-Nr
	A	34497	12.85	SB					Bearb	11.85	SB	Tuner 20 bis 1000 MHz (to)	641.8124 S	2
	03	42566	01.91	SI					Gepr					v 2 Bl.
									Norm			zu Gerät	reg i V 641.8018 V / erste Z 641.8018	



ROHDE&SCHWARZ	A	34497	12.85	SB				4PMM	Tag	Name
	03	42566	01.91	SI				Bearb	11.85	SB
								Gepr		
	Änd Zust	Änderungs-Mitteilung	Datum	Name	Änd Zust	Änderungs-Mitteilung	Datum Name	Norm		

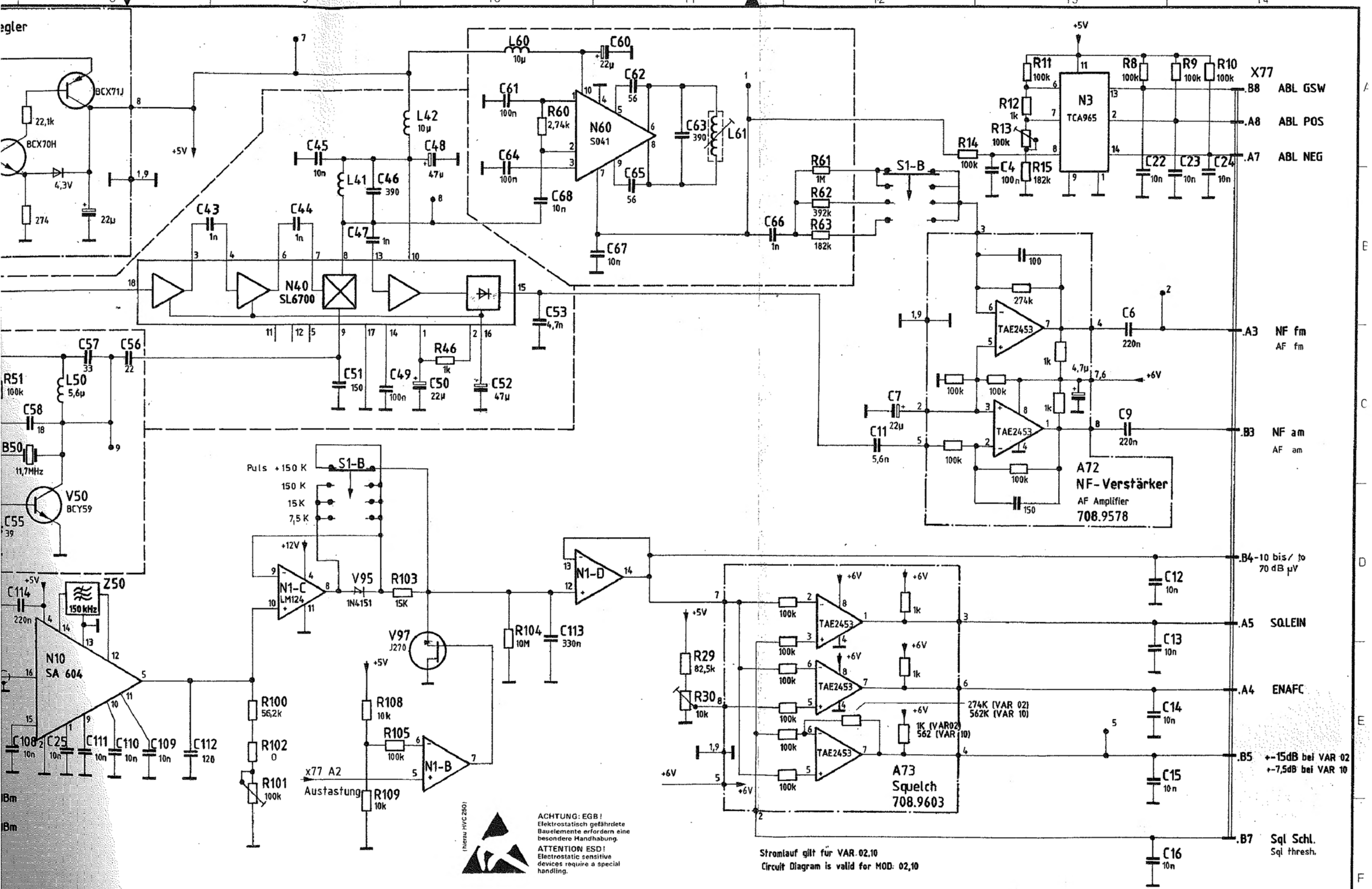
Benennung: Tuner

Zeichn.-Nr.



A	34497	10.85	SB	Maße ohne Toleranzangabe	Maßstab	
					Halbzeug, Werkstoff	
				4PME / Tag / Name	Benennung	
				Bearb. / 16.6.84 / Cu/Se	Oszillator Oscillator	
				Gepr.		
				Norm		
				ROHDE&SCHWARZ	Zeichn.-Nr. 641.8418 S	Blatt-Nr. 1 v. 1 Bl.
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät EB100	reg. i. V.	erste Z.

Projektion Methode E



ROHDE&SCHWARZ

Änd Zust	Änderungs-Mitteilung	Datum	Name	Änd Zust	Änderungs-Mitteilung	Datum	Name	4GMM	Tag	Name
09	46653	01.93	SB	E	42034	12.89	SB	Bearb.	03.88	SB/FR
				F	42308	02.90	SB	Gepr.		
				08	42566	01.91	Si	Norm		

Benennung: EB 100 B6 ZF-Teil-Puls
EB 100 B6 ZF Section Pulse

zu Gerät: EB 100

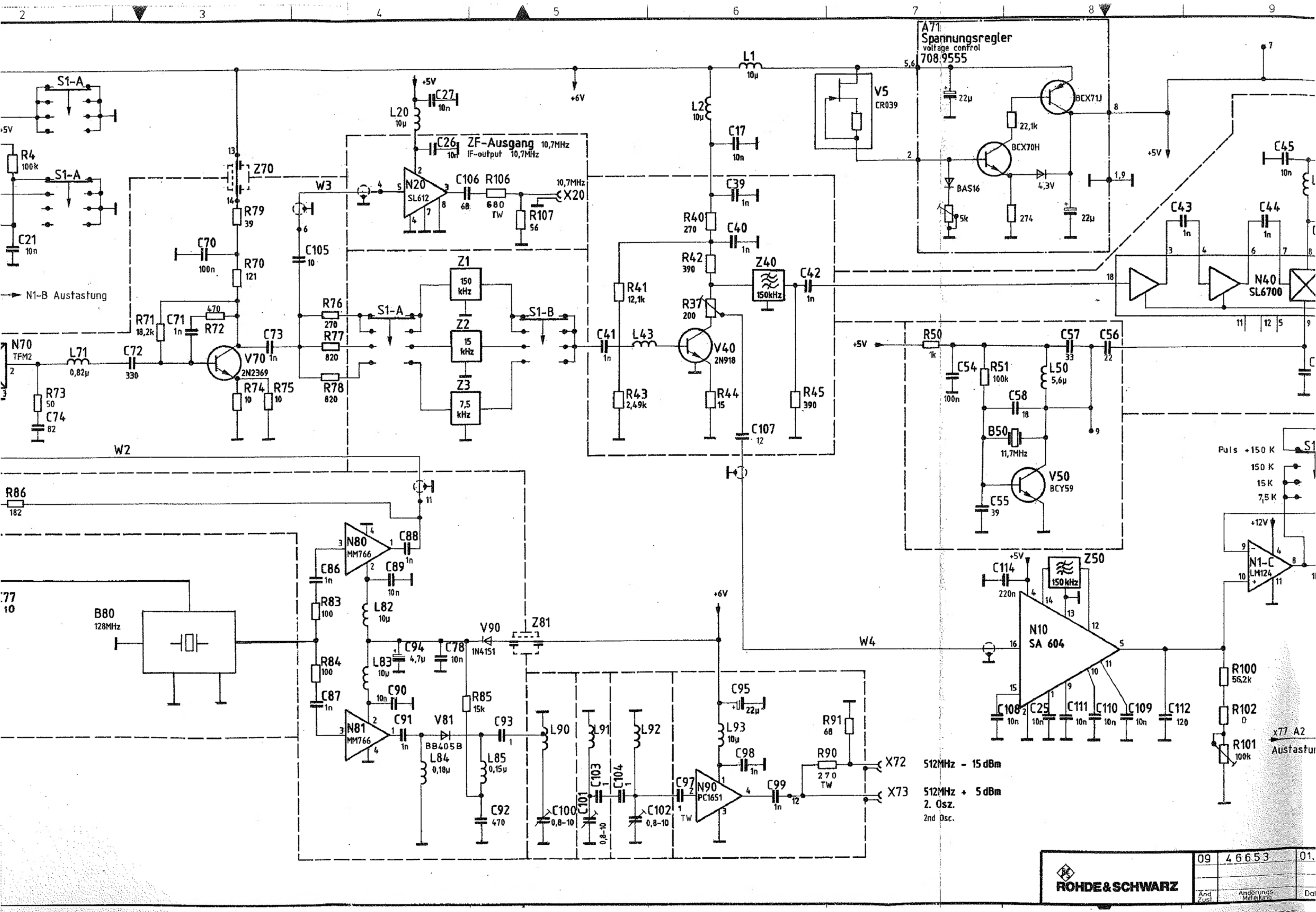
Zeichn.-Nr. 708.9503.01 S

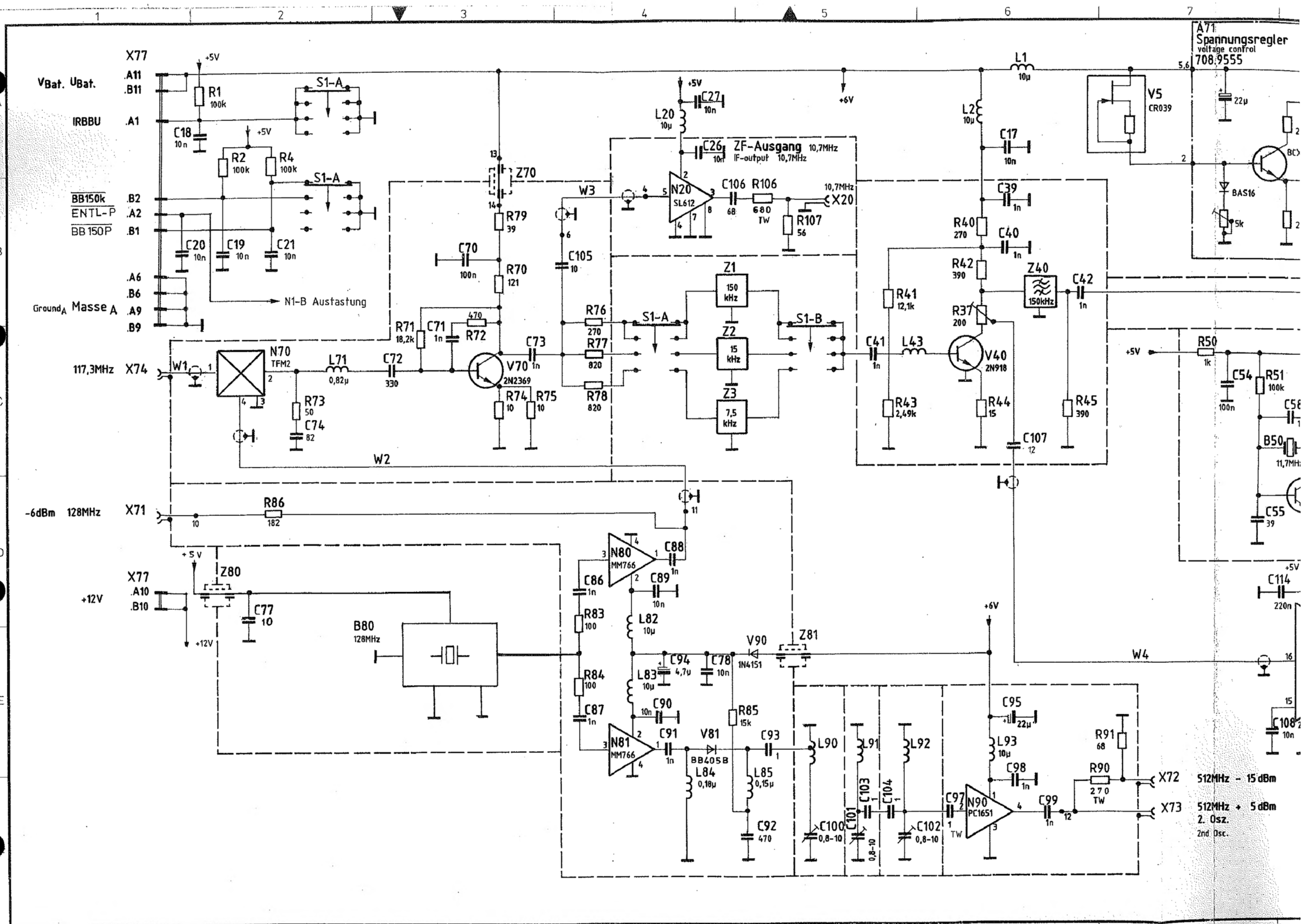
reg. i. V. 708.8507 V

erste Z. 641.8018

Blatt-Nr.

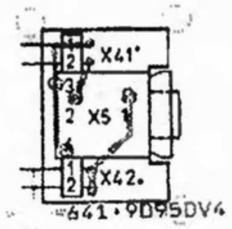
v. Bl.


A71
Spannungsregler
voltage control
708.9555
BCX71J
BCX70H
BAS16
V5
CR039
ZF-Ausgang 10,7MHz
IF-output 10,7MHz
10,7MHz
X20
N20
SL612
N40
SL6700
Z40
150kHz
V40
2N918
V70
2N2369
N70
TFM2
Z1
150 kHz
Z2
15 kHz
Z3
7,5 kHz
S1-A
S1-B
N1-B Austastung
B50
11,7MHz
V50
BCY59
N10
SA 604
Z50
150kHz
N1-C
LM124
Puls +150 K
150 K
15 K
7,5 K
N80
MM766
N81
MM766
V90
1N4151
V81
BB405B
N90
PC1651
B80
128MHz
X72
X73
512MHz - 15 dBm
512MHz + 5 dBm
2. Osz.
2nd Osc.
X77 A2
Austastung
W2
W3
W4
ROHDE&SCHWARZ
09
46653
01.
Änd
Zust
Änderungs-
Mitteilung

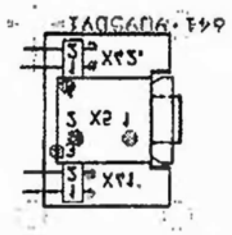


Zeichn.-Nr. 708.9503 S

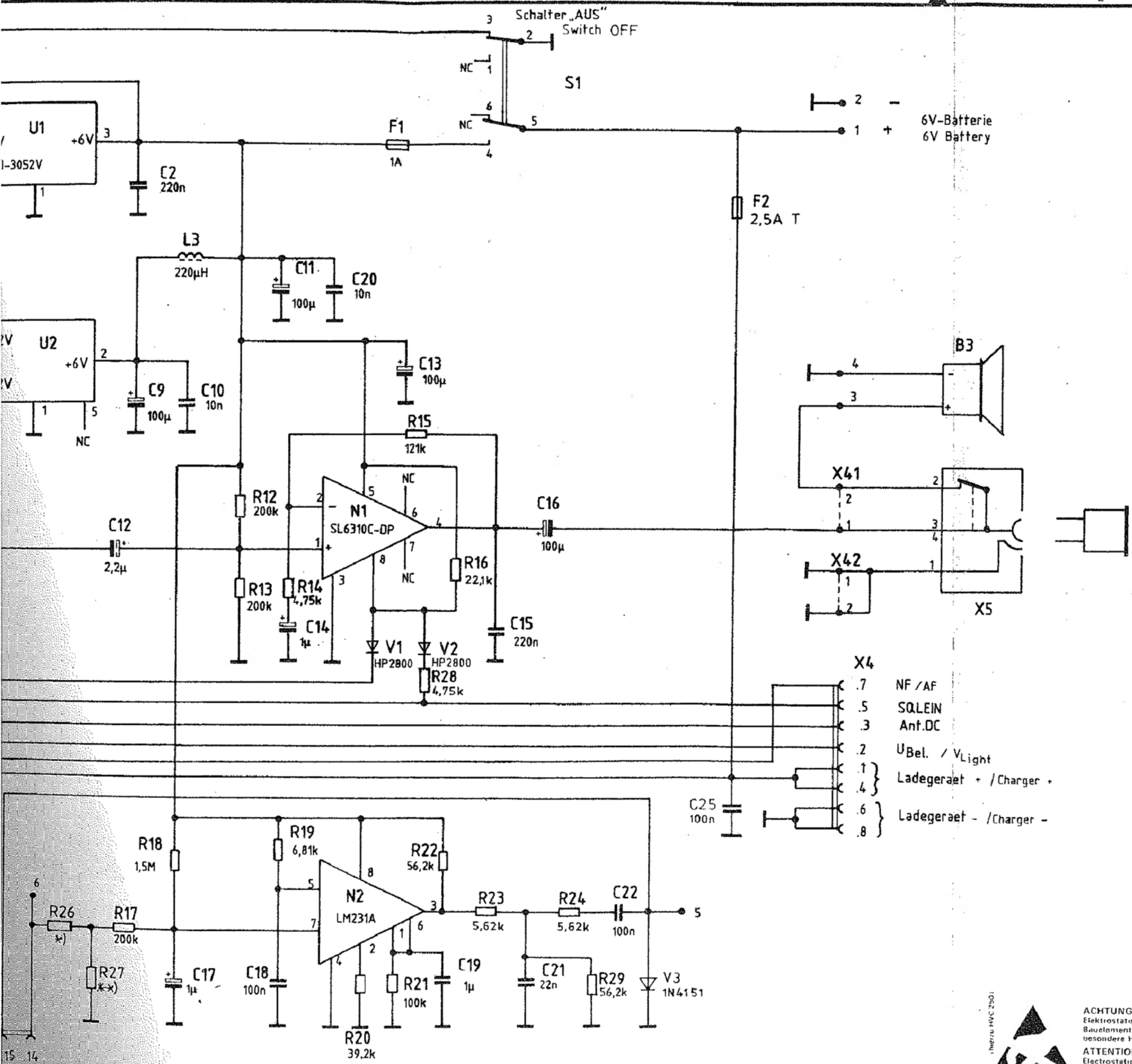
Ansicht und Leitungsführung Bauteilseite
View of tracks on component side



Ansicht und Leitungsführung Lötseite
View of tracks on solder side



C	34497	10.85	SB	Maße ohne Toleranzangabe		Maßstab 1 : 1	
						Halbzeug, Werkstoff	
				4PMM	Tag	Name	Benennung	
				Bearb	10.85	SB	Buchsenplatte	Z
				Gepr				
				Norm				
				ROHDE&SCHWARZ			Zeichn.-Nr 641.9089	Blatt-Nr 2
Änd Zust	Änderungs-Mitteilung	Tag	Name	zu Gerät	EB 100		reg i V 641.8018 V · erste Z 641.8182	



*) 5,62K bei VAR. 02/ for MOD. 02
0 bei VAR. 10/ for MOD. 10

**) 5,62K bei VAR 02/ for MOD. 02
nicht bestückt bei VAR. 10
not fitted for MOD. 10

Stromlauf gilt für VAR. 02,10
Circuit Diagram is valid for MOD. 02,10

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

ROHDE&SCHWARZ

Änd	Änderungs-Mitteilung	Datum	Name
A	41383	04.89	SB
B	42034	12.9?	SF

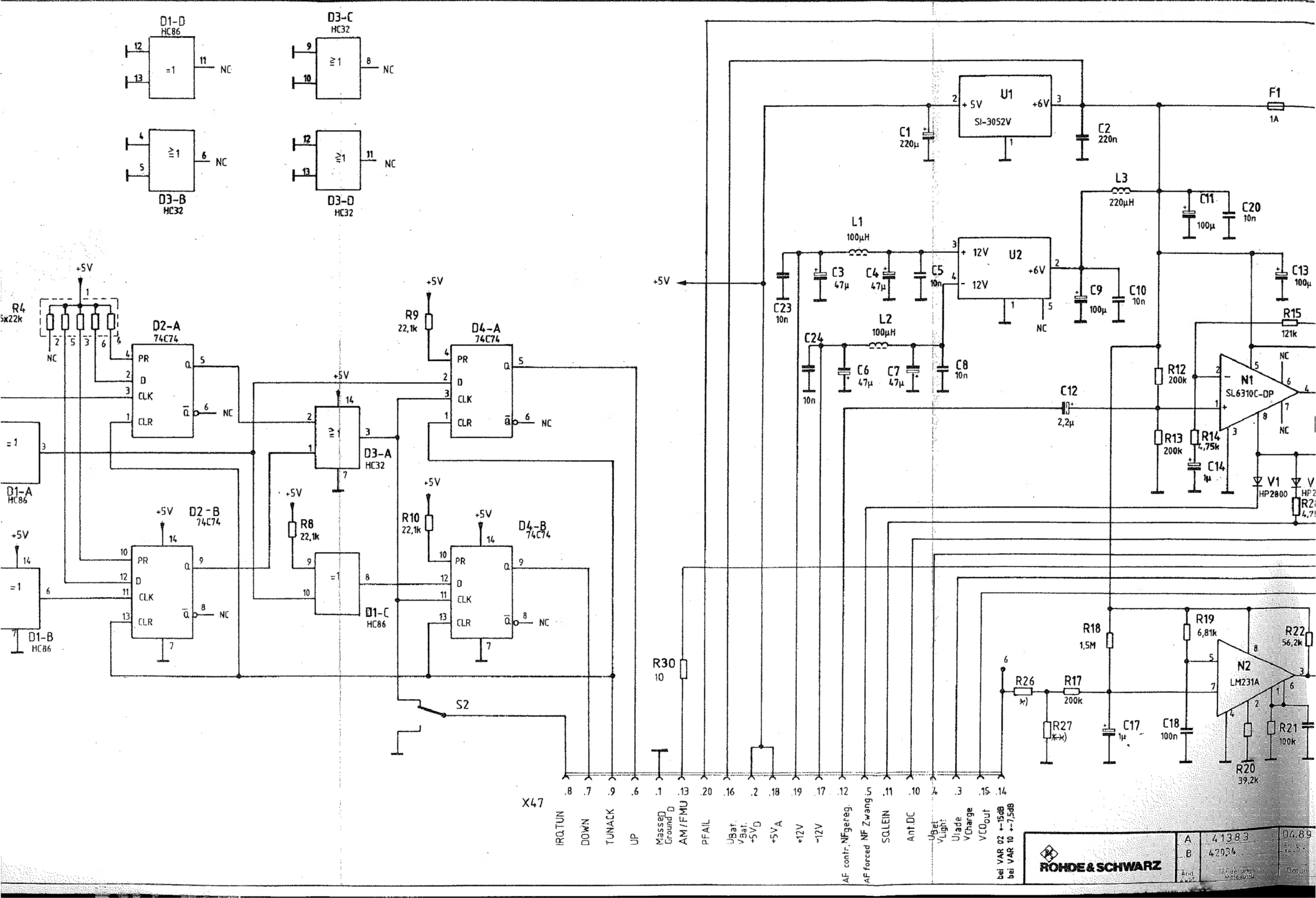
	Tag	Name
4 GMM		
Bearb	03,88	SB
Gepr		
Norm		

Benennung: EB100-B7 Verstimmplatte
EB100-B7 Tuning Unit
zu Gerät: EB100

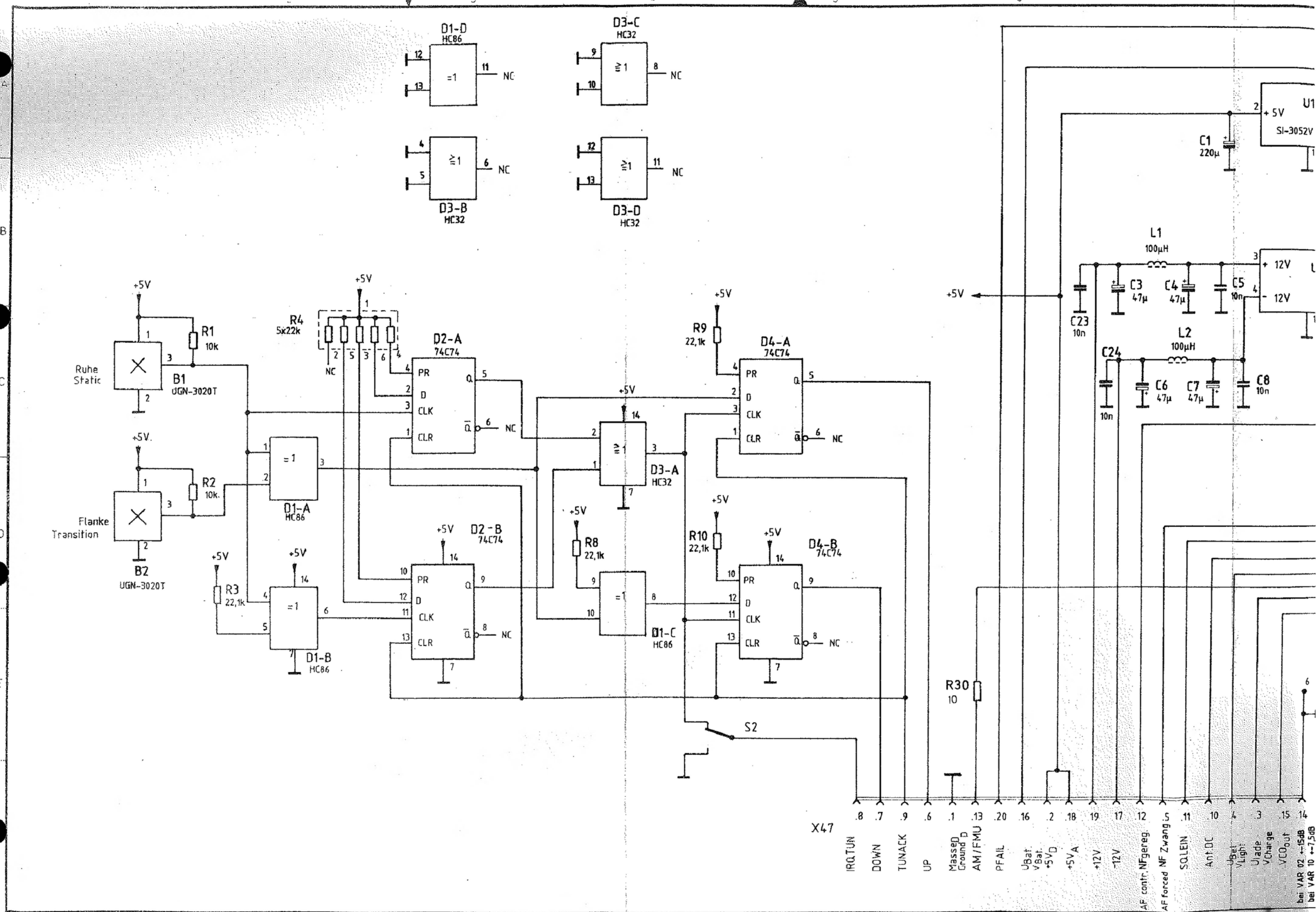
Zeichn.-Nr: 708.9484.01 S

Blatt-Nr: 1 v 1 Bl

708.8507 V / erste Z: 641.8018



D1-D HC86
D3-C HC32
D3-B HC32
D3-D HC32
R4 5x22k
D2-A 74C74
D2-B 74C74
D4-A 74C74
D4-B 74C74
D3-A HC32
D1-A HC86
D1-B HC86
D1-C HC86
R9 22,1k
R8 22,1k
R10 22,1k
S2
R30 10
X47
U1 SI-3052V
U2
F1 1A
C1 220µ
C2 220n
L3 220µH
C11 100µ
C20 10n
L1 100µH
L2 100µH
C3 47µ
C4 47µ
C5 10n
C6 47µ
C7 47µ
C8 10n
C9 100µ
C10 10n
C23 10n
C24 10n
C12 2,2µ
C13 100µ
R15 121k
R12 200k
R13 200k
R14 4,75k
C14 1µ
N1 SL6310C-DP
V1 HP2800
R18 1,5M
R19 6,81k
R22 56,2k
N2 LM231A
R26 *)
R17 200k
R27 (*-*)
C17 1µ
C18 100n
R21 100k
R20 39,2k
IRQTUN
DOWN
TUNACK
UP
Masse D Ground D
AM/FMU
PFAIL
UBat. VBat. +5VD
+5VA
+12V
-12V
AF contr. NFgereg.
AF forced NF Zwang
SQLEIN
Ant.DC
UBel VLight
Ulade VCharge
VCOout
bei VAR 02 +-15dB
bei VAR 10 +-7,5dB
ROHDE&SCHWARZ
41383
42034
04.89


D1-D HC86
D3-C HC32
D3-B HC32
D3-D HC32
NC
U1 SI-3052V
C1 220µ
L1 100µH
L2 100µH
C3 47µ
C4 47µ
C5 10n
C6 47µ
C7 47µ
C8 10n
C23 10n
C24 10n
+ 12V
- 12V
+ 5V
Ruhe
Static
Flanke
Transition
B1 UGN-3020T
B2 UGN-3020T
R1 10k
R2 10k
R3 22,1k
R4 5x22k
R8 22,1k
R9 22,1k
R10 22,1k
R30 10
D1-A HC86
D1-B HC86
D1-C HC86
D2-A 74C74
D2-B 74C74
D3-A HC32
D4-A 74C74
D4-B 74C74
PR
D
CLK
CLR
S2
X47
IRQ.TUN
DOWN
TUNACK
UP
Masse_D Ground D
AM/FMU
PFAIL
U_Bat V_Bat
+5V_D
+5V_A
+12V
-12V
AF contr. NFgereg.
AF forced NF Zwang
SQ.LEIN
Ant.DC
U_Bel V_Light
U_lade V_Charge
VCO_out
bei VAR 02 +-15dB
bei VAR 10 +-7,5dB
+5V