OPTION CMT-B10

The **SSB/AF Analyzer Option CMT-B10** is a narrowband analyzer for signals applied to the RF inputs of the Radiocommunication Tester CMT as well as the AF signal or the signal demodulated by the CMT. The following tests are therefore possible on SSB transceivers:

- Transmitter test: measurement of suppressed carrier, vestigial sideband frequency and intermodulation products
- Receiver test: selective measurement of all AF spectral components at the AF output of transceivers.

For SSB analysis, the CMT fitted with the second AF Synthesizer CMT-B7 can be used for the generation of dual tones essential for the **transmitter test.**

For the **receiver test,** the CMT generates an AM signal modulated with two tones. One of the two modulation sidebands simulates the dual-tone modulated SSB signal for the receiver.

In addition to the SSB application, the CMT-B10 option can also be used as an **AF analyzer** for an applied AF signal or for the signal demodulated in the CMT and, in addition to the capabilities of the basic instrument, thus enables applications such as:

- determination of the spectral components of the harmonic distortion at any AF frequency
- selective modulation measurement, e.g. with multi-tone modulation, subaudio or pilot-tone modulation
- selective AF level measurements, e.g. detection of discrete noise products (pilot-tone residues).

All tests can be selected manually or via an IEC bus (with corresponding CMT configuration) or an autorun control program.

Using the Autorun Control/Printer Interface CM-B5, for example, the measured spectrum can be output on a printer in tabular form, or a graphics-compatible controller analyzes the individual measured values via the IEC-bus interface of the CMT (CM-B4) and then generates a complete display of the spectrum.

From the many CMT options, the following are particularly suitable for **extension:**
OCXO Reference Oscillator CMT-B1 (recommended for SSB analysis)
2nd AF Synthesizer CMT-B7 (required for SSB analysis)
IEC Bus/Control Interface CM-B4
Autorun Control/Printer Interface CM-B5

Specifications

Test signals	AF signal from built-in AF voltmeter, demodulated signal, RF signal following internal conversion to IF
Ranges at full measurement dynamic	
AF	30 mV to 30 V
FM (demod.)	1 to 100 kHz
AM (demod.)	1 to 100 %
φM (demod.)	0.1 to 10 rad
SSB/RF (following conversion to IF)	5 mW to 50 W (test connection with N female) 5 to 500 mV (INPUT 2)
Analyzer characteristics	
Dynamic range	> 60 dB for all signal sources
Filter bandwidth (3 dB/60 dB)	± 15 Hz/± 270 Hz, corresponds to shape factor 1/18
Tuning range (AF, FM, AM, φM)	50 Hz to 15 kHz (dynamic range for f < 300 Hz: 40 dB)
(SSB/RF)	± 6 kHz referred to f_C
Error	< 3 dB
Order designation	▶ SSB/AF Analyzer CMT-B10 837.0018.02

The option is available factory-fitted for the CMT models 52 and 54 in any combination with the options CMT-B1, CM-B4, CM-B5, CMT-B6, CMT-B7, CM-B8, CM-B9, CM-B11.

Recommended extras for the CMT

OCXO Reference Oscillator	CMT-B1	803.8916.02
2nd AF Synthesizer	CMT-B7	803.2618.02
IEC Bus/Control Interface	CM-B4	803.3914.02
Autorun Control/Printer Interface	CM-B5	803.3314.02

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387 (Bv)

Program : SSBSTART.BAT PCA - Software : 1.90

CMT-Adr. : 00

Two-Tone-Modulation

CMT - SSBTX | 1VCA-SE | Date : 05-08-87
(c) R&S Muenchen 1987 | Vers. : 20.03.1987 | Time : 10:44:52
STATUS READY

TEST OF S S B TRANSMITTERS BY C M T

SPECIFICATION OF TRANSCEIVER

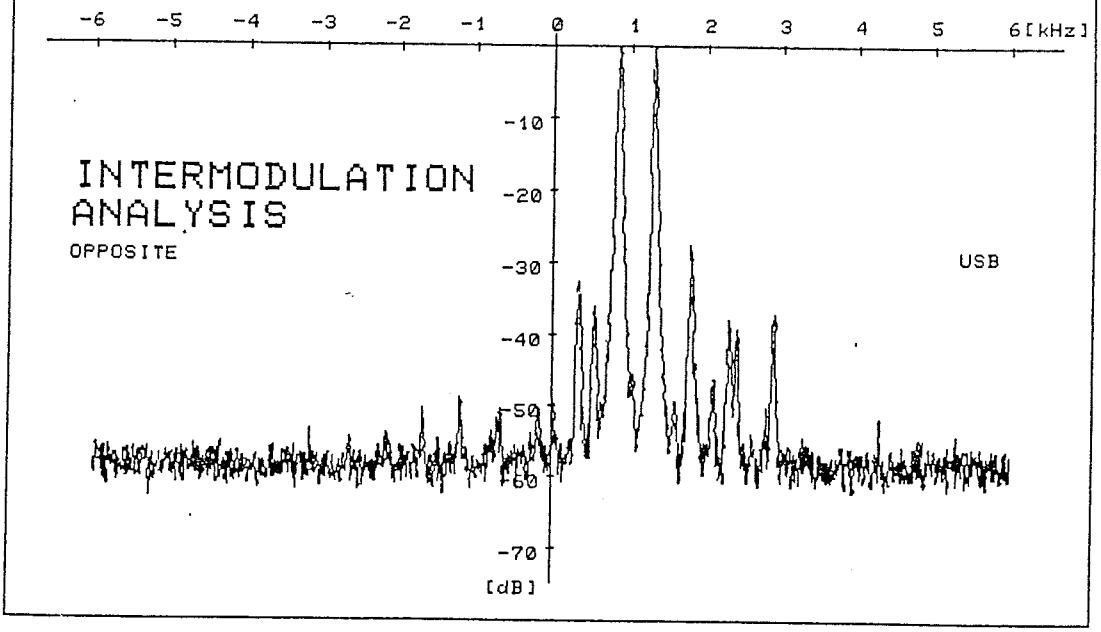
Radio type	(SK1)	KW TS-120V
RF frequency [MHz]:	(SK2)	14
Type of modulation 4= USB 5= LSB	(SK3)	4

TESTING PARAMETERS

Step size [Hz]:	(SK4)	10
AF frequency 1 [kHz]:	(SK5)	0.8
AF frequency 2 [kHz]:	(SK6)	1.3
AF level [mV]:	(SK7)	5

CHANGE PARAMETER WITH SOFTKEY OR START WITH (Y):

CMT - SSBTX | 1VCA-SE | Date : 05-02-87
(c) R&S Muenchen 1987 | Vers. : 20.03.1987 | Time : 10:53:11
STATUS READY



One-Tone-Modulation

CMT - SSBTX	1VCA-SE	Date : 05-08-87
		Time : 10:44:52
(c) R&S Muenchen 1987	Vers. : 20.03.1987	STATUS READY

TEST OF S S B TRANSMITTERS BY C M T

SPECIFICATION OF TRANSCEIVER

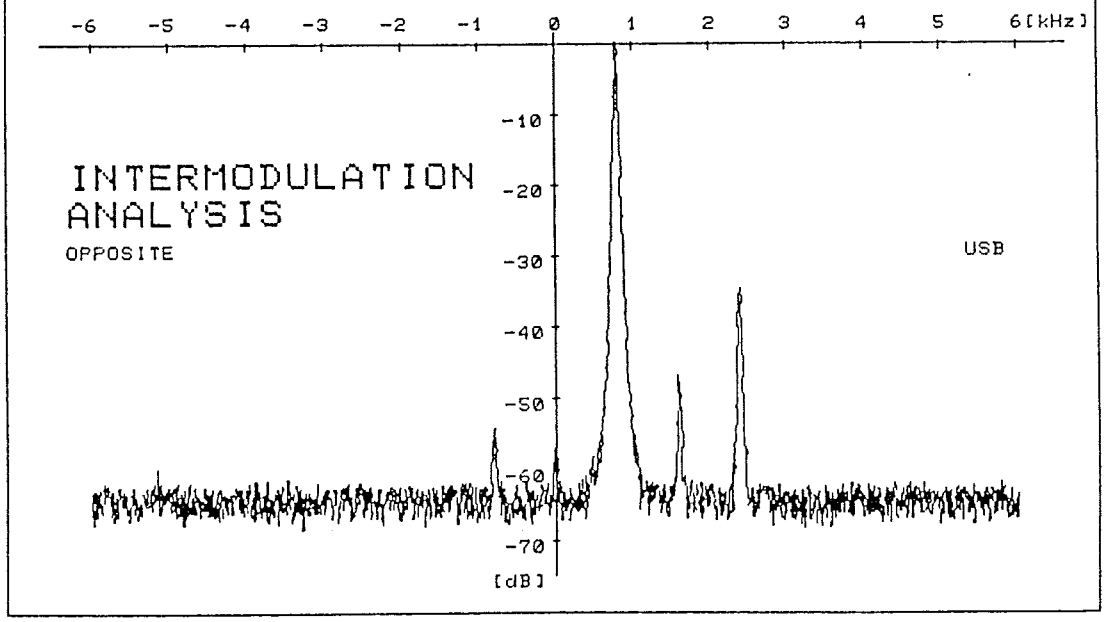
Radio type	(SK1)	KW TS-120V
RF frequency [MHz]:	(SK2)	14
Type of modulation	(SK3)	4
4= USB		
5= LSB		

TESTING PARAMETERS

Step size [Hz]:	(SK4)	10
AF frequency 1 [kHz]:	(SK5)	0.8
AF frequency 2 [kHz]:	(SK6)	0.0
AF level [mV]:	(SK7)	5

CHANGE PARAMETER WITH SOFTKEY OR START WITH (Y):

CMT - SSBTX	1VCA-SE	Date : 05-02-87
		Time : 13:14:17
(c) R&S Muenchen 1987	Vers. : 20.03.1987	STATUS READY



ROHDE&SCHWARZ

Manual

SSB/AF Analysis

CMT-B10

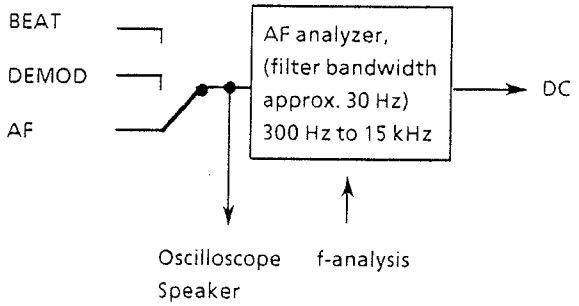
837.0018.02

Contents

2 Operation

2.1 Connection and Applications of the Option

The CMT-B10 is a digitally controlled AF analyzer for the frequency range 300 (30) Hz to 15 kHz which is capable of handling the same CMT signals as the oscilloscope.



BEAT

Using the BEAT signal, an RF analysis can be performed within the operating range of the CMT (SET f TX), the frequency ranges

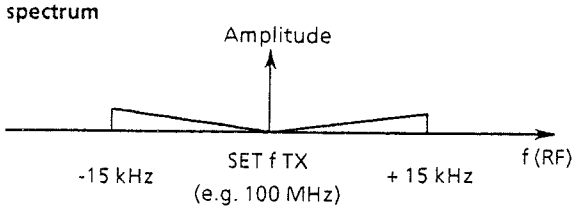
SET f TX ... SET f TX + 15 kHz

and

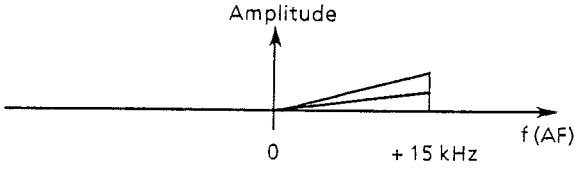
SET f TX - 15 kHz ... SET f TX

being converted to the AF range via a mixer.

RF spectrum



AF spectrum (BEAT)



As a result of RF level control which is intended to prevent overdriving in the mixer, there is no direct relationship between RF level and measured AF level (BEAT signal), ie although the spectral distribution of the RF signal can be measured very exactly, the absolute magnitude of the individual levels (in V, dBm or W) is to be obtained from the RF voltmeters or the RF power display.

DEMOD

Analysis of the DEMOD signal in the CMT permits to investigate the modulation spectrum of the connected signal generator for unwanted distortions and intermodulations.

AF

The signal AF represents any AF signal applied to the female connector AF VOLTM.

2.2 Switching on the Analyzer (SSB)

The option CMT-B10 can be switched on using SPEC function 150.

After max. 2 seconds, a level value and the associated analyzer frequency are output on the alphanumeric display.

In the event that the AF signal to be analyzed at the analyzer input is too small (< 20 mV) or too great (> 5 V), "CHECK INST." is read out on the alphanumeric display instead, prompting the user to check the test setup.

Example:

Enter : 150 SPEC

Readout on alphanumeric display (0.5 to 2 s later):

"1.56 V Un 1.00 kHz" or" CHECK INST."

Besides, the function "Analyzer/SSB on" is also performed automatically by means of

152 SPEC <f> SPEC	Set analyzer frequency
153 SPEC <±f> SPEC	Change analyzer frequency
154 SPEC	Frequency adjustment
155 SPEC	Amplitude reference

Note:

The Adjacent-channel Power Meter (CMT-B6) must be switched off during operation of the CMT-B10, because the two measurements influence the RF synthesizer in different ways.

2.3 Switching between the Operating Modes

When switching on the option following a master reset, SSB mode (upper sideband, useful sideband) is always selected.

The following SPEC functions are used to switch to the desired operating mode:

SSB	Analyzer
USB: 157 SPEC BEAT (TX test) AF (RX test)	DEMOD analysis: 161 SPEC DEMOD (TX test) AF (RX test)
LSB: 158 SPEC BEAT (TX test) AF (RX test)	BEAT analysis: 162 SPEC BEAT (TX test) AF (RX test)

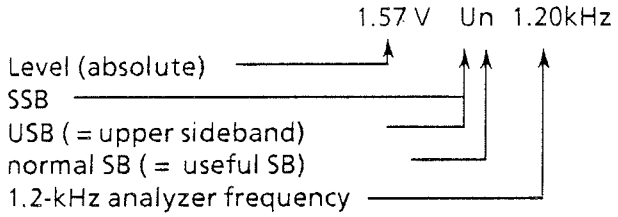
TX test: Transmitter test/ XMITTER-LED (red) lights

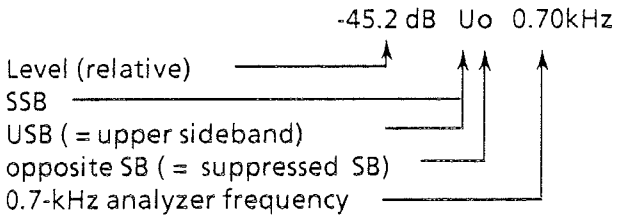
RX test: Receiver test/RECEIVER-LED (green) lights

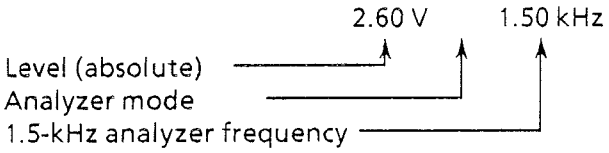
If analyzer operation is selected before switching on the option (150 SPEC), the corresponding analyzer operating mode is automatically set (162 SPEC or 161 SPEC), depending on whether the AF counter counts the BEAT signal or the DEMOD signal.

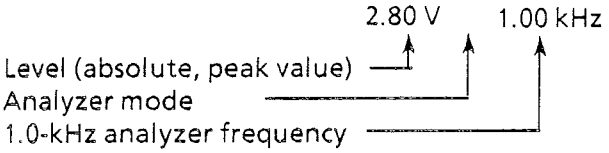
2.4 Output of Measurement Results

The measurement results are output on the alphanumeric display. In addition to the measurement result, ie the level of the measured spectral line, the associated analyzer frequency and, with SSB, the sideband information are also output so that all important measurement parameters and values are continuously available.









2.5 Level Display

The measured level can be displayed as absolute or relative value, the latter being referred to a reference value.
In SSB mode as well as with the BEAT or AF measurement, the level is displayed in µV, mV or Vrms.
With the DEMOD measurement, the measured value is output in % (AM), kHz (FM) or rad (φM) (peak values!), depending on the type of modulation.

By entering 155 SPEC, the current measured value is defined as reference value and the display automatically switches to dB (the display then indicates 0.0 dB). In addition, the preamplification of the AF analyzer is optimized. It is therefore recommended to call this function with each major change in the input voltage (jump in voltage > ± 2 dB).

In the event that the AF signal to be analyzed at the analyzer input is too small (< 20 mV) or too great (> 5 V), "CHECK INST." is read out on the alphanumeric display, prompting the user to check the test setup.

The entry of 156 SPEC allows to switch between relative (dB) and absolute (µV, mV, V or %, kHz, rad) output of the measured value.

2.6 Setting the Analyzer Frequency

The analyzer frequency is set by means of the SPEC functions 152 and 153. By entering

152 SPEC 1.23 SPEC (= 1.23 kHz)

the desired frequency can be set directly in kHz (unit is specified).

Using 153 SPEC -0.3 SPEC (= -0.3 kHz), the set frequency can be increased or reduced by the entered value (in kHz).

After calling one of these functions, the VAR symbol is displayed, indicating that the spin wheel is assigned to the analyzer frequency. The spin wheel can then be used to increase or reduce the frequency in steps of 10 Hz within the range limits.

2.7 Switching Off the Analyzer (SSB)

The function 151 SPEC switches the analyzer off again.
Since measurement results are output on the alphanumeric display, each measurement call and each setting using the same display also switch the analyzer off.

This applies to

DECODE
DEMOD/BEAT
Δf
CODE
AF EXT
α-DISPL SELECT Terminating key

Since analyzer mode frequently requires the modulation generator frequencies AF INT 1 and AF INT 2 to be set, the corresponding value is only briefly displayed (approx. 400 ms) when pressing one of these keys and the analyzer remains switched on.

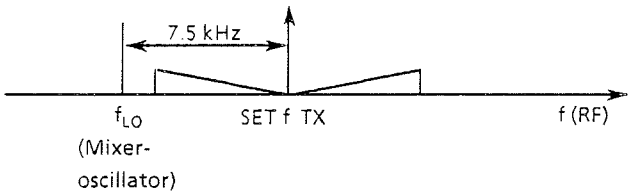
2.8 SSB Mode

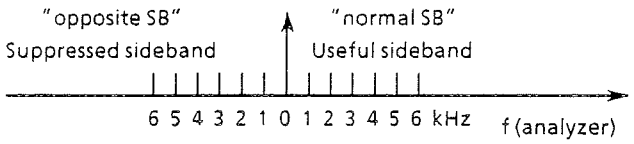
2.8.1 Frequencies

In SSB mode, the CMT functions are optimally matched to transceiver measurements. This includes shifing of the RF frequency from the frequency indicated on the frequency display by an IF of 7.5 kHz.
In addition to the analysis in the useful sideband, it is then also possible to measure the suppressed carrier and spectral components in the suppressed sideband in the transmitter test. Since the RF frequency offset is taken into account in the setting of the (AF) analyzer frequency, clear determination of the wanted spectral line is easily possible.

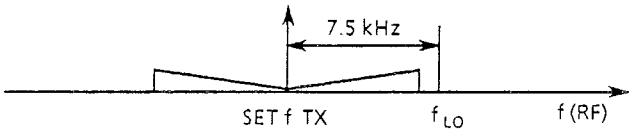
SET f TX refers to the frequency of the suppressed carrier!

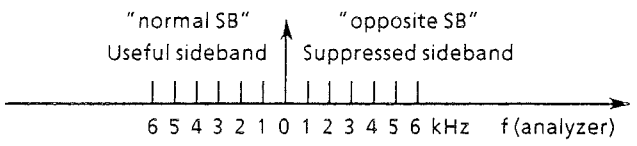
USB (Upper Sideband)





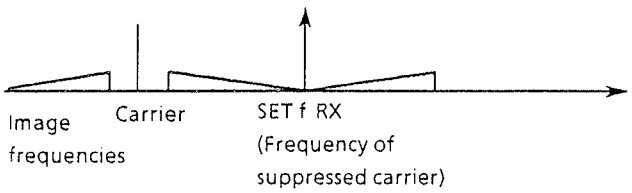
LSB (Lower Sideband)

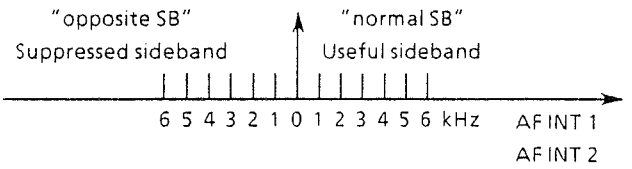




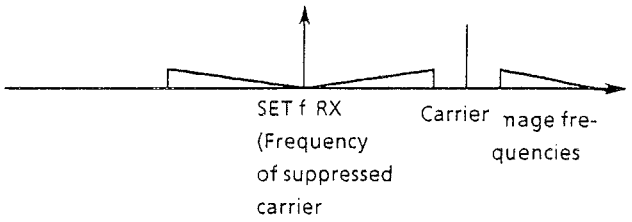
In the receiver test, shifting of the RF frequency by 7.5 kHz causes the carrier and the unwanted sideband of the signal generator (type of modulation: AM) to be removed from the reception range of the SSB receiver and a quasi-SSB signal to be generated.
The RF frequency offset is taken into account in the frequency of the internal modulation generators. As this is not possible when using external modulation sources (e.g. microphone), SSB operating mode should be switched off in such a case.

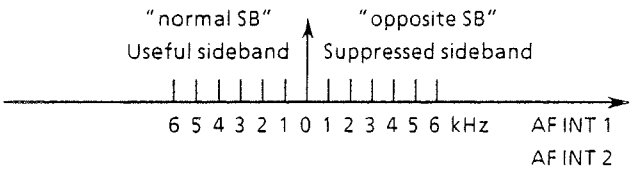
USB (Upper Sideband)





LSB (Lower Sideband)





Note:

Due to the correction of AF INT 1 and AF INT 2, the frequency of the signal at socket MOD GEN is increased by approx. 7.5 kHz as against normal operation. The maximum permissible frequency range of AF INT 1 and AF INT 2 is reduced to 20 Hz to 6 kHz.

2.8.2 Frequency Adjustment

As can be seen from the distribution of frequencies (section 2.8.1), even the slightest shift (>30 kHz) in the nominal frequency of the suppressed carrier (set on the CMT by means of SET f TX or SET f RX) as against the actual frequency causes an error in measurement.

This problem can be solved by performing a frequency calibration by means of 154 SPEC.

When this function is called in the transmitter test, the BEAT frequency is measured by means of the AF counter and compared with the expected value (determined by AF INT 1). Deviations (up to ± 1.5 kHz) are taken into account in the setting of the analyzer frequency so that the ideal conditions according to section 2.8.1 are obtained.
When the function is called in the receiver test, the signal applied to input AF VOLTM is measured using the AF counter. By comparison with the nominal value (setting AF INT 1), a correction factor is again calculated which corrects the frequency setting of the internal modulation generators (AF INT 1 and AF INT 2). After successful completion of the frequency calibration, the message "DONE" is output on the alphanumeric display, otherwise the warning "CHECK INST." appears.

The correction values for transmitter and receiver test are independent of each other and are therefore not influenced by changing the operating mode.

When SSB mode is left (by switching off the CMT, switching off the option or switching over to analyzer mode, 161 SPEC / 162 SPEC), the correction factors are set to zero again.

2.8.3 RF Level in Receiver Test

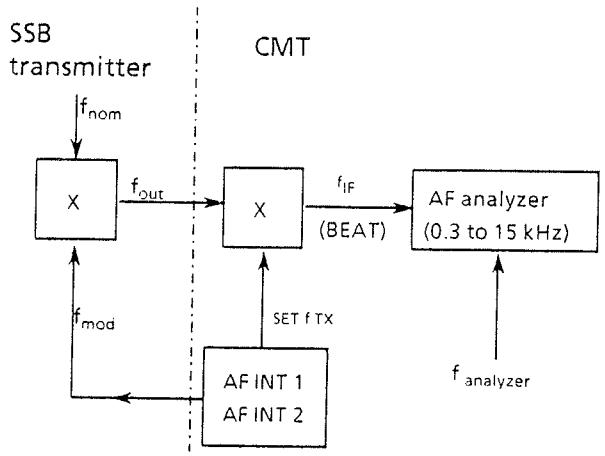
Since the SSB test signal is generated by removing the carrier and the unwanted sideband from the reception range of the receiver, the RF level can be influenced not only by the RF level setting (Vo SYNTH.) but also by the modulation depth setting (INT 1/ INT 2).

Set level: V_0 SYNTH. (in RF level display)

Modulation depth	Actual level
50 %	V_0 SYNTH. - 12 dB (1/4)
33 %	V_0 SYNTH. - 15.6 dB (1/6)
20 %	V_0 SYNTH. - 20 dB (1/10)
10 %	V_0 SYNTH. - 26 dB (1/20)

2.8.4 Examples of Application

Transmitter test



Settings:

Operating mode AM Transmitter test/LOCK!	% MAX PK
Switch on SSB mode	150 SPEC
f_{nom} = 14.000 MHz	14.000 MHz SET f TX
f_{mod} = 1 kHz	1 kHz AF INT 1
USB	157 SPEC
Measurement of signal in useful sideband	159 SPEC
Measurement of useful signal (f_{mod} = 1 kHz) ($f_{analyzer}$ = 1 kHz)	152 SPEC 1 SPEC

Display field FREQUENCY

14.00000 MHz
1.50 V Un 1.00 kHz
VAR

When an extremely small voltage value is output, the wanted spectral line may have a frequency offset although the frequencies have been correctly entered. In this case, it is advisable to perform a frequency adjustment.

Settings:

Frequency adjustment	154 SPEC
Frequency of 2nd tone generator	1.7 kHz AF INT 2
Switchover to two-tone	122 SPEC
The spectral line AF INT 1 is to be the reference level.	155 SPEC

Display field FREQUENCY

```
14.00000 MHz
-0.0dB  Un  1.00 kHz
```

Measurement of second spectral line

Enter: 152 SPEC 1.7 SPEC

Display field FREQUENCY

```
14.00000 MHz
-1.5dB  Un  1.70 kHz
VAR
```

Measurement of first sideline

Enter: 152 SPEC 0.703 SPEC
(or rotary knob)

Display field FREQUENCY

```
14.00000 MHz
-21.2dB  Un  0.30 kHz
VAR
```

Measurement of suppressed carrier

Enter: 152 SPEC 0 SPEC
(or rotary knob)

Display field FREQUENCY

```
14.00000 MHz
-48.0dB  Un  0.00 kHz
VAR
```

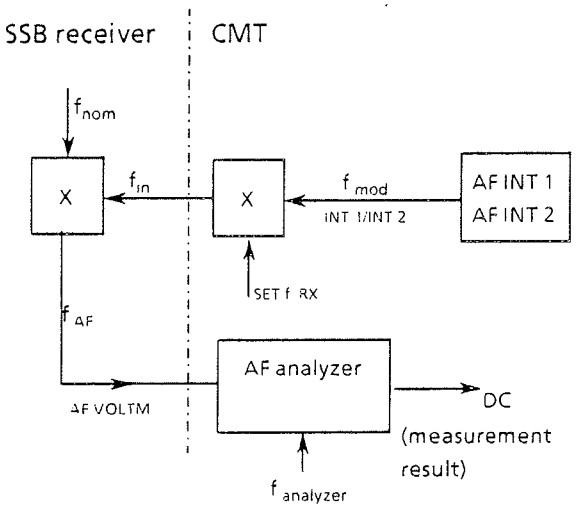
Measurement in suppressed sideband

Enter: 160 SPEC
152 SPEC 0.4 SPEC
(or rotary knob)

Display field FREQUENCY

```
14.00000 MHz
-37.0dB  Un  0.40 kHz
VAR
```

Receiver test



Settings:

Operating mode AM, Receiver test	% INT 1
Switch on SSB mode	150 SPEC
f_{nom} = 14.000 MHz	14.0 MHz SET f RX
f_{mod} = 1.0 kHz	1 kHz AF INT 1
Set test level	5 uV Vo SYNTH
	20 % INT 1
	0 INT 2
	0 EXT

Level of spectral line in useful sideband: 0.5 µV

Settings:

USB	157 SPEC
RF signal in useful sideband	159 SPEC
Measurement of useful signal	152 SPEC 1 SPEC

(f_{mod} = 1 kHz)
($f_{analyzer}$ = 1 kHz)

Display field FREQUENCY

```
14.00000 MHz
1.50 V  Un  1.00 kHz
            VAR
```

When an extremely small voltage value is output, the wanted spectral line may have a frequency offset although the frequencies have been correctly entered. In this case, it is advisable to perform a frequency adjustment.

Settings:

Frequency adjustment	154 SPEC
Frequency of 2nd tone	1.7 kHz AF INT 2
Switchover to two-tone	20 % INT 2
This level is to be the reference level	155 SPEC

Display field FREQUENCY

```
14.00000 MHz
0.0dB  Un  1.00 kHz
```

Measurement of second spectral line

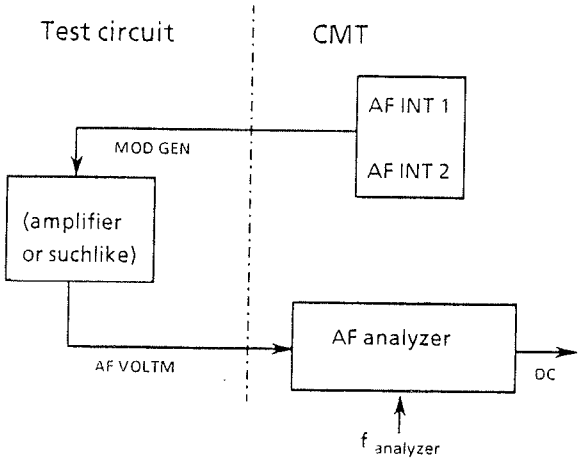
Enter: 152 SPEC 1.7 SPEC

Display field FREQUENCY

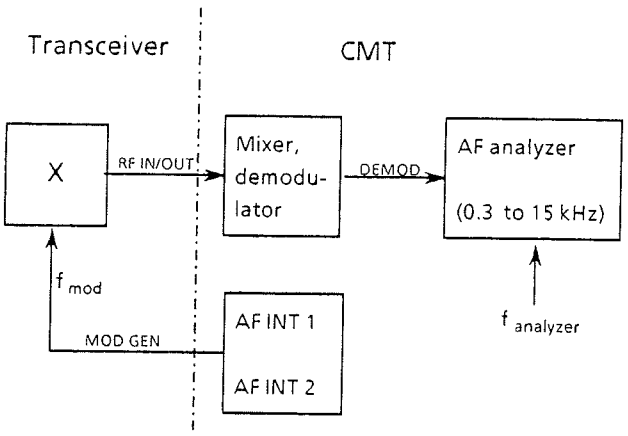
```
14.00000 MHz
-2.0dB  Un  1.70 kHz
            VAR
```

2.9 Application Examples of Analyzer Mode

Measurement of distortion factor of an AF circuit:
(161 SPEC or 162 SPEC, receiver test)



Measurement of transmitter distortion (AM/FM/ΦM transmitter):
(161 SPEC, transmitter test)



2.10 Operation via IEC Bus and Autorun Control

IEC-bus control of the option basically corresponds to the use of SPEC functions in the CMT. Only the two SPEC functions `152 SPEC / 153 SPEC` provide a result:

Manual mode:

`152 SPEC 1 SPEC`
(substitute analyzer frequency in kHz)

IEC-bus mode:

```
IECOUT,"SPECIALFUNCTION:DATA 152,1?"
IECINO,A$
PRINT A$
```

The preceding command sequence provides the following result:

"-29.5 dB	1.00 KHZ"
↑	↑
level of spectral line	current analyzer frequency

Manual mode:

`153 SPEC -.7 SPEC`
(reduce analyzer frequency in kHz)

IEC-bus mode:

```
IECOUT,"SPECIALFUNCTION:DATA 153,-.7?"
IECINO,A$
PRINT A$
```

The preceding command sequence provides the following result:

"-49.5 dB	0.30 KHZ"
↑	↑
level of spectral line	current analyzer frequency

These are the two only SPEC functions of the option CMT-B10 which are capable of providing a result (and therefore permit a question mark in IEC-bus mode).
The second result starts at the 20th position of the result string.

In test reports, the current analyzer frequency is indicated in the parameter field and the measured level in the result field.

Line	Command	Parameter	Result	Tol
10	SPEC 152	1.00 kHz	-29.5 dB	
11	SPEC 153	0.30 kHz	-49.5 dB	

2.11 List of Commands

Enter	Function
150 SPEC	Analyzer / SSB on
151 SPEC	Analyzer / SSB off
152 SPEC <f> SPEC	Set the AF analyzer frequency of the CMT (f in kHz) + Analyzer / SSB on
153 SPEC <±Δf> SPEC	Increase or reduce the AF analyzer frequency of the CMT (Δf in kHz) + Analyzer / SSB on
154 SPEC (only with SSB mode)	Perform frequency adjustment. (Necessary to compensate for differences in frequency between CMT and transceiver) + Analyzer/SSB on
155 SPEC	Reference function, ie the currently displayed measured value is used as reference value (0 dB) + Analyzer / SSB on
156 SPEC	Switchover from relative (dB) to absolute (µV, mV, V or kHz, rad, %) display and vice versa.
157 SPEC	Switch on USB (→ "U" displayed); (default)
158 SPEC	Switch on LSB (→ "L" displayed)
159 SPEC (only with SSB mode)	Analysis of selected sideband (→ "n" displayed); (default)
160 SPEC (only with SSB mode)	Analysis of opposite sideband (→ "o" displayed)
161 SPEC	Analyzer mode: DEMOD in transmitter test/AF in receiver test
162 SPEC	Analyzer mode: BEAT in transmitter test/AF in receiver test

The following functions switch off one another:

USB	(157 SPEC)	SSB
LSB	(158 SPEC)	SSB
DEMOD/AF	(161 SPEC)	analyzer
BEAT/AF	(162 SPEC)	analyzer

2.12 Fitting the Option

The module SSB/AF Analysis CMT-B10 can be plugged in and operated both in slot S4 and S5. In the following, the wiring as a function of the available options will be described:

2.12.1 Wiring 100-MHz Reference

Without CMT-B6, without CM-B9

Connect:
RF oscillator (X304) → CMT-B10 (X941)

Without CMT-B6, with CM-B9

Connect:
CM-B9 (X932) → CMT-B10 (X941)

With CMT-B6, without CM-B9

Disconnect:
RF oscillator (X304) → CMT-B6 (X911)

Connect:
RF oscillator (X304) → CMT-B10 (X941)
CMT-B10 (X942) → CMT-B6 (X911)

With CMT-B6 and with CM-B9

Disconnect:
CM-B9 (X932) → CMT-B6 (X911)

Connect:
CM-B9 (X932) → CMT-B10 (X941)
CMT-B10 (X942) → CMT-B6 (X911)

2.12.2 Wiring AF

Disconnect:
Analog section (X605) → oscilloscope (X215)

Connect:
Analog section (X605) → CMT-B10 (X945)
CMT-B10 (X944) → oscilloscope (X215)

2.12.3 Modification in the Analog Section

Perform this modification only for instruments with the following serial numbers:

873 963
873 964
873 965
873 966
873 967
873 968
873 969
883 149
883 150
883 151

Modification:

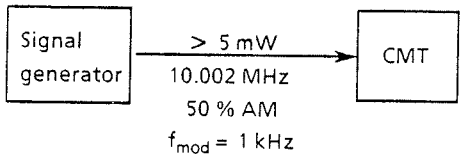
Capacitors C170, C158 (10 nF) → 390 pF
Operational amplifier N170 (LF 353) → LF 157

3 Maintenance

Setting (transmitter test):

Transmitter test AM	% MAX PK
Receive frequency	10 MHz SET f

Test setup:



Since the measurement result is considerably influenced by the RF frequency, it is advisable to synchronize either the signal generator with the CMT (23 SPEC) or the CMT with the signal generator (22 SPEC).

10MHz → CMT

Test:

When 152 SPEC 2 SPEC 155 SPEC is entered, 0 dB is read out on the display, i.e. the carrier level is defined as reference value and all subsequent measurements then refer to this value.
When 152 SPEC 3 SPEC is entered, the relative level of the upper sideband is indicated on the display, referred to the carrier. This value must be -12 dB.
When 152 SPEC 1 SPEC is entered, the relative level of the lower sideband is displayed; it must also be -12 dB.

4 Service Instructions

(see circuit diagram 837.0024 S
and block diagram)

4.1 Function Description

4.1.1 Input Amplifier and Band-limiting Filter

The input amplifier, a two-stage level-matching circuit, can be switched in steps of 4 dB in the range from -20 dB to +28 dB. Its purpose is to match the wide dynamic range at the input to the smaller dynamic range of the following circuit.

The amplifier is followed by a 17-kHz lowpass filter which limits the input signal in the frequency range, since spectral components above 17 kHz would lead to errors in measurement.

4.1.2 Mixer and IF Conditioning

A DC level of 2.5 V is superimposed on the signal coming from the limiting filter in order to match it to the modulation range of the following analog switches. It is then applied to the mixer which converts it to an IF of 34.724 kHz according to the LO frequency.
A series-connected filter suppresses all signal components produced by the harmonics of the LO signal. The following amplifier raises the signal level, thus compensating for level losses due to mixing.

4.1.3 LO Frequency Conditioning

The LO frequency for the mixer is produced by dividing down an externally applied 100-MHz signal in a programmable divider. The 100-MHz clock signal is first buffered and, after the first buffer stage, again taken outside for further use in the instrument (X942).

At the same time, it is taken to a divider which, depending on the subsequent divider stages, divides by 10 or 11, thus enabling to set any integral division ratios from 10 to 2565.

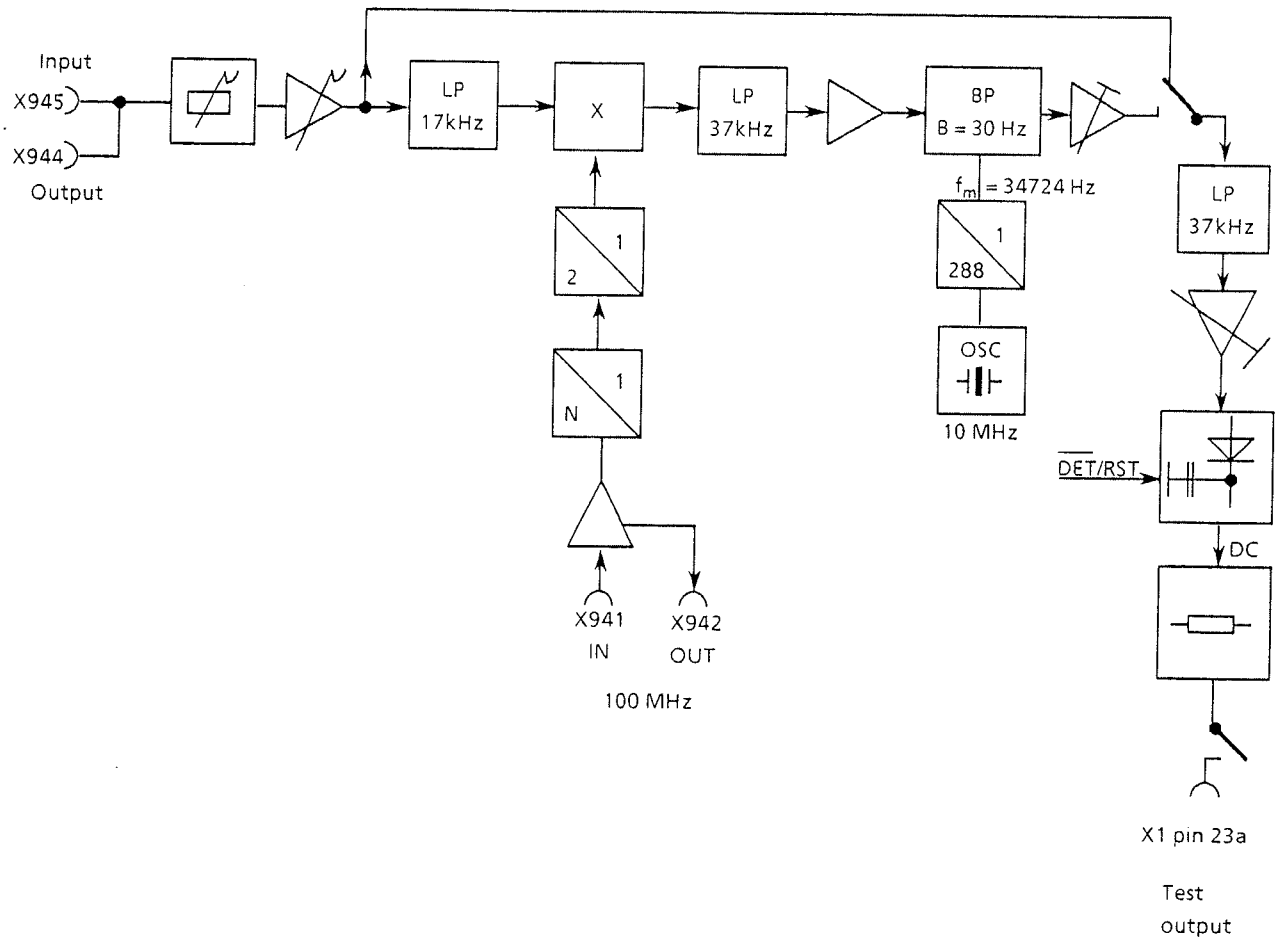
The 100-MHz signal is divided by 11 until the units counter has counted down to zero.
When the tens counter has counted down to zero, the divisor is again loaded into the divider ICs and the division cycle is repeated. A further division by 2 produces a duty factor of 0.5.

4.1.4 Resolution Filter and Clock Generation

The resolution filter is designed as four-stage switch-capacitor filter (commutative filter).
The 3-dB bandwidth of the filter is 30 Hz with a shape factor of 18. To ensure a high constancy of the centre frequency (34724 Hz ± 3 Hz), the filter clock is obtained by dividing down the 10-MHz clock signal of a crystal oscillator.

4.1.5 Measurement Section

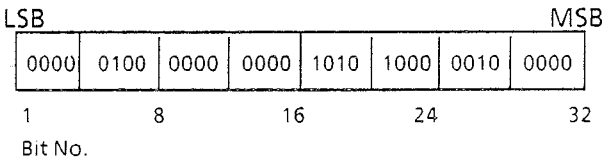
To set the input amplifiers, broadband measurement of the input signal is required. For this purpose, an analog switch switches between the output of the resolution filter and the signal directly coming from the input amplifier and applies this signal to the peak-value meter.
A 37-kHz lowpass filter is connected ahead of the peak-value meter in order to filter out the interfering spectral components produced by the resolution filter.



Block diagram: option CMT-B10

4.2 Testing and Adjustment

Basic setting of the module (to be performed prior to each adjustment):



The MSB is the first bit to be shifted in.

AF input signal (X945) f = 5 kHz,
V = 500 mV

RF input signal (X941) f = 100 MHz,
V = 220 mV

4.2.1 Adjustment of Broadband Measurement

- Set all trimmers to center position.
- Use R161 to adjust voltage at X1 pin 23a to 1 V DC.

4.2.2 Adjustment of Narrow-band Measurement

- Bit No. 8 = H (narrow-band measurement
- Use R130 to adjust voltage at X1 pin 23a to 3 V DC.
- Reduce level of AF input signal to 0.5 mV.
- Use R190 to adjust voltage at X1 pin 23a to 3 mV.

4.3 Troubleshooting

4.3.1 Data Channel of the Option

Component	Function
D80/4	Option pole
/5	none
/6	none
/7	none
/14	none
/13	Switch of measuring DC at output ON/$\overline{\text{OFF}}$
/12	Reset peak-value meter $\overline{\text{DET}}$/RST
/11	Switching between broadband and narrow band narrow/$\overline{\text{broad}}$
D81/4	Set input gain from 0 to -20 dB
/5	same
/6	same
/7	Set input gain from 0 to + 28 dB
/14	same
/13	same
/12	none
/11	none

Component	Function
D230 / 4	LO frequency conditioning tens register
/ 5	same
/ 6	same
/ 7	same
/14	same
/13	same
/12	same
/11	same
D231 / 4	LO frequency conditioning units register
/ 5	same
/ 6	same
/ 7	same
/14	none
/13	none
/12	none
/11	none

4.3.2 Coaxial Connector

Connector	Function
X941	Input for 100-MHz clock signal Impedance: 680 Ω Level: 300 mV ± 3 dB
X942	Output of 100-MHz clock signal Impedance: 680 Ω Level: 200 mV ± 3 dB (measured into 50 Ω)
X945	Input of AF signal Impedance: < 100 kΩ, depending on resistance at X944 Level: max. 5 Vs
X944	Output of AF signal Impedance: < 100 kΩ, depending on resistance at X945 Level max. 5 Vs

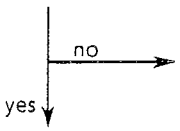
4.3.3 64-contact Multipoint Connector

Pin	Function
1b	Supply voltage + 5 V (dig.) I = 240 mA ± 20 mA
13a, b	Supply voltage + 5 V I = 35 mA ± 5 mA
17a, b	Supply voltage + 15 V I = 63 mA ± 5 mA
19a, b	Supply voltage -15 V I = 63 mA ± 5 mA
2a, b / 7a, b / 9a, b / 11a, b / 14a, b / 16a, b / 18a, b / 20a, b / 30a, b / 32a, b	Ground
23a	Test voltage output (test DC)
10a, b	Clock input for data channel
5a	Strobe input for data channel
8a	Data input for data channel

4.3.4 Troubleshooting Diagram

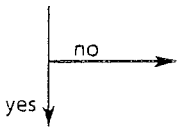
The module must be in a basic setting status (see section 4.2).

P1:
V = 500 mV ± 15 mV?



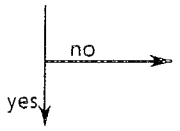
Fault:
Input amplifier
data transfer

P2:
V = 500 mV ± 20 mV?



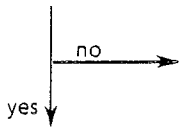
Fault:
Band-limiting lowpass
f_s = 17 kHz.

D225 pin 5:
f = 29726 Hz ± 1 Hz?



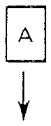
Fault:
Divider circuit, 100-MHz signal,
buffer, data transfer.

P7:
34 724 Hz ± 3 Hz?
(CMOS level)

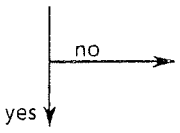


Fault:
Crystal oscillator,
divider circuit

A

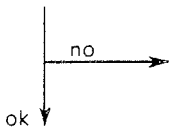


P8:
10 Vs ± 100 mV?



Fault:
Mixer, 37-KHz LP,
Resolution filter.

X1 pin 23a:
3 V DC ± 40 mV?



Fault:
Peak-value meter
level converter.

Further possible faults:

Fault: Output voltage offset cannot be adjusted to zero using R190.

Cause: Offset adjustment circuit, excessive crosstalk of clock frequency of resolution filter.

Fault: If 4961 Hz are fed in and the option is set to 14882 Hz, the output voltage exceeds 4 mV.

Cause: Distortion factor of input amplifier or of mixer D225 does not provide a duty factor of 0.5, voltage suppression at D50 pin 4 is defective.

ROHDE & SCHWARZ
MÜNCHEN

Schaltteillisten
Stromläufe
Bestückungspläne

Parts lists
Circuit diagrams
Components plans

R 29500 Bl. 2

R&S-Schlüsselliste

Die R&S-Schaltteillisten nennen in der Spalte "Benennung/Beschreibung" die technischen Daten der Bauelemente in Kurzform. Die Art des Bauelements (z. B. Schicht-, Draht-Widerstand usw.) beschreiben die 2 Kennbuchstaben vor der "Benennung" (evtl. auch vor der "Sachnummer"), die nachfolgend erklärt werden. In Ersatzteil-Bestellungen an R&S ist stets die Angabe der vollständigen Sachnummer erforderlich

R&S key list

The R&S Parts Lists give the technical data of the components in short form in the column "Benennung/Beschreibung" (designation). The type of component (e.g. depos.-carbon resistor, wire-wound resistor etc.) is indicated by 2 identification letters before the designation, possibly also before the "Sachnummer" (order number), which are explained below. When ordering spare parts from R&S, the complete order number must always be specified.

Liste des symboles de référence R&S

La colonne «Désignation/description» des listes de pièces de R&S indique les caractéristiques des éléments sous forme abrégée. Le type d'élément (p. ex. résistance à couche, résistance bobinée etc. . .) est décrit par les deux lettres précédant la désignation (et éventuellement le numéro de référence), dont voici l'explication. Prière d'indiquer le numéro de référence («Sachnummer») complet dans toute commande de pièces de rechange.

Kenn-buchst.	Art des Bauelementes	Identif.-letter	Type of component	Sym-bole	Type d'élément
A	**Aktive Bauelemente, Halbleiter**	**A**	**Active components, semiconductors**	**A**	**Composants actifs, semiconducteurs**
AD	Universaldiode, z.B. Gleichrichter, Sperrdiode	AD	General-purpose diode, e.g. rectifier, high-resistance diode	AD	Diode d'usage général, p.ex. redresseur, diode à haute resistance
AE	Spezialdiode, z.B. Tunnel-, Kapazitäts-, Zener-Diode	AE	Diode (special), e.g. tunnel diode, varactor, Zener diode	AE	Diode spéciale, p.ex. diode tunnel, varactor, diode Zener
AF	Fotoelement, z.B. Foto-Diode, -Transistor, -Widerstand, Leucht-diode	AF	Ligth-sensitive component, e.g. resistor, diode, transistor; LED	AF	Composant photoélectrique, p.ex. diode, transistor, resistance photoél., D.E.L.
AG	Leistungs-Gleichrichter, z.B. Thyristor, Triac, Selengleichrichter	AG	Power rectifier, e.g. thyristor, triac, selenium rectifier	AG	Redresseur de puissance, p.ex. thyristor, triac, redresseur au sélénium
AK	Kleinsignal-Transistor	AK	Low-power transistor	AK	Transistor faible puissance
AL	Leistungs-Transistor	AL	High-power transistor	AL	Transistor grande puissance
AM	Spezial-Transistor, z.B. FET, MOSFET	AM	Transistor (special), e.g. FET, MOS-FET	AM	Transistor spécial, p.ex. TEC, MOSTEC
AP	Peltier-, Hall-Element	AP	Peltier element, Hall element	AP	Element Peltier, élement Hall
AR	Röhre für Empfänger, Verstärker, Gleichrichter	AR	Valve for receiver, amplifier, rectifier	AR	Tube pour récepteur, amplificateur, redresseur
AS	Spezialröhre, z.B. Senderöhre, EW-Widerstand, Stabilisator	AS	Valve (special), e.g. for transmitter; baretter, ballast valve	AS	Tube (spécial), p.ex. pour émetteur, résistance fer-hydrogène, ballast
AT	Katodenstrahlröhre, z.B. Bildröhre, Ziffern-Anzeigeröhre	AT	Cathode ray tube, e.g. picture tube, digital indicator tube	AT	Tube à rayon cathodique, p.ex. tube à image, tube à affichage numérique
AW	Spannungs- oder temperaturabhängiger Widerstand	AW	Voltage- or temperature-dependent resistor	AW	Varistance ou thermistance
B	**Bausteine**	**B**	**PC boards, chips**	**B**	**Cartes imprimées, puces**
BC	Integr. Schaltkreis (Microcomp.)	BC	Integrated circuit (interface, A/D)	BC	Circuit intégré (microprocesseur)
BD	R&S-Dünnschichtschaltung	BD	R&S thinfiim circuit	BD	Circuit à couche mince R&S
BG	Gerätebaugruppe	BG	Subassembly	BG	Sous-ensemble
BJ	Integr. Schaltkreis (Interface, A/D-Wandler)	BJ	Integrated circuit (interface, A/D converter)	BJ	Circuit intégré (interface, convertisseur A/N)
BK	Kernspeicher, Magnetspeicher	BK	Core memory, magnetic memory	BK	Mémoire à tores, mémoire magnétique
BL	Log. Schaltkreis z.B. DTL, TTL, HTL, ECL, C-MOS	BL	Logic circuit, e.g. DTL, TTL, HTL, ECL, C-MOS	BL	Circuit logique, p.ex. DTL, TTL, HTL, ECL, C-MOS
BM	Hybridbaustein, z.B. Mischer, Tuner, Modulator	BM	Hybrid chip, e.g. mixer, tuner, modulator	BM	Puce hybride, p.ex. mélangeur, tuner, modulateur
BO	Analogschaltkreis, z.B. Operations-verstärker	BO	Analog circuit, e.g. operational amplifier	BO	Circuit analogique, p.ex. amplificateur opérationnel
BP	Optobaustein, z.B. Anzeigeeinheit, Koppler	BP	Optoelement, e.g. display, coupler	BP	Elément optique, p.ex. afficheur, coupleur
BS	Schalt- und Steuerbaustein, elektronischer Sensor	BS	Switching and control modul, electronic sensor	BS	Modul de commutation et de commande, sonde électronique
BV	Stromversorgung, Übersp.-Schutz	BV	Power pack, protective circuit	BV	Alimentation, protection surcharge

Kenn-buchst.	Art des Bauelementes	Identif.-letter	Type of component	Sym-bole	Type d'élément
C	**Kondensatoren**	**C**	**Capacitors**	**C**	**Condensateurs**
CB	Bypass-, Durchf.-Kondensator	CB	Bypass capacitor, feed-through capacitor	CB	Condensateur bypass, condensateur de traversée
CC	Keramischer Kondensator	CC	Ceramic capacitor	CC	Condensateur céramique
CD	Drehkondensator	CD	Variable capacitor	CD	Condensateur variable
CE	Elektrolytkondensator	CE	Electrolytic capacitor	CE	Condensateur électrolytique
CG	Glimmerkondensator	CG	Mica capacitor	CG	Condensateur au mica
CH	Sperrschichtkondensator	CH	Semiconductor capacitor	CH	Condensateur semiconducteur
CK	Kunstfolienkondensator	CK	Synthetic-foil capacitor	CK	Condensateur à feuille synthétique
CL	Ker. Hochsp.-Kondensator	CL	HV capacitor (ceramic)	CL	Condensateur HT céramique
CM	Metallpapier-Kondensator	CM	MP capacitor	CM	Condensateur à papier métallisé
CN	Kondensatornetzwerk	CN	Capacitor network	CN	Réseau capacitif
CP	Papierkondensator	CP	Paper capacitor	CP	Condensateur au papier
CS	Störschutzkondensator	CS	Interference-suppression capacitor	CS	Condensateur anti-parasite
CT	Trimmkondensator	CT	Trimmer capacitor	CT	Condensateur ajustable
CV	Vakuum-Kondensator	CV	Vacuum capacitor	CV	Condensateur à vide
D	**Drähte, Leitungen**	**D**	**Wires, lines**	**D**	**Fils, lignes**
DD	Schalt- und Wickeldraht	DD	Hook-up or winding wire	DD	Fil de câblage, fil de bobinage
DF	Flachleitung, Litze	DF	Flat multiple line, stranded wire	DF	Ligne plate, ligne torsadée
DG	Abgeschirmte Leitung	DG	Shielded line	DG	Ligne blindé
DH	Koaxialkabel	DH	Coaxial line	DH	Ligne coaxiale
DN	Antenne	DN	Antenna	DN	Antenne
DS	Anschlußkabel (mehradrig)	DS	Connecting cable, multicore	DS	Câble de connexion (multiconducteur)
E	**Elektrische Teile**	**E**	**Electric parts**	**E**	**Organes électriques**
EB	Blei-, NC-Akku, Batterie	EB	Lead or alkaline accumulator, battery	EB	Accumulateur Pb/NC, batterie
EF	Glühlampe, Leuchte	EF	Incandescent lamp, pilot lamp	EF	Lampe à incandescence, voyant
EG	Glimmlampe, Entladungslampe	EG	Glow lamp, discharge lamp	EG	Lampe à luminescence, lampe à décharge
EK	Kontakt-Streifen, -Feder	FK	Contact clip, contact spring	EK	Lame de contact, ressort de contact
EL	Lautspr., Kopfhörer, Mikrofon	EL	Loudspeaker, headphones, microphone	EL	Haut-parleur casque, microphone
EM	Motor, Hubmagnet, Drehfeldsystem	EM	Motor, lifting magnet, synchro system	EM	Moteur, électro- aimant de levage, système synchro
EO	Oszillator, z.B. Quarzoszillator	EO	Oscillator, e.g. crystal oscillator	EO	Oscillateur, p.ex. oscillateur à quartz
EP	Tief-, Band-, Hochpaß, Bandsperre, Diskriminator	EP	Lowpass, bandpass, highpass filter, band-stop filter, discriminator	EP	Filtre passe-bas, passe-bande, passe-haut, suppression de bande, discriminateur
EQ	Schwing-, Filter-Quarz	EQ	Oscillator or filter crystal	EQ	Quartz oscillateur, quartz de filtre
ER	Resonator, piezoelektr./ magnetostriktiv	ER	Resonator, piezoelectric/ magnetostrictive	ER	Résonateur piézo-électrique/ magneto-strictif
ES	Passive SHF-Bauteile	ES	Passive SHF-components	ES	Composant SHF passif
ET	Thermostat	ET	Thermostat	ET	Thermostat
EV	Lüfter, Gebläse	EV	Ventilator, blower	EV	Ventilateur, soufflerie
F	**Fassungen, Steckverbindungen**	**F**	**Sockets, connectors**	**F**	**Douilles, connecteurs**
FA	Dezifix/Prezifix A	FA	R&S coaxial connector Dezifix/Precifix A	FA	Dezifix, Prezifix A
FB	Dezifix B	FB	R&S coaxial connector Dezifix B	FB	Dezifix B
FC	Dezifix C	FC	R&S coaxial connector Dezifix C	FC	Dezifix C
FD	Dezifix D	FD	R&S coaxial connector Dezifix D	FD	Dezifix D
FE	Dezifix E/J	FE	R&S coaxial connector Dezifix E/J	FE	Dezifix E/J
FF	Dezifix F	FF	R&S coaxial connector Dezifix F	FF	Dezifix F

Kenn-buchst.	Art des Bauelementes	Identif.-letter	Type of component	Sym-bole	Type d'élément
FG	Koax-Umrüstsatz	FG	Coaxial screw-in assembly	FG	Ensemble vissable coaxial
FH	Koax-Übergang auf Fremdsystem	FH	Coaxial adapter	FH	Adaptateur coaxial
FJ	BNC-Systemteil	FJ	BNC srew-in assembly	FJ	Ensemble vissable BNC
FK	Koaxial-UHF-Systemteil	FK	Coaxial UHF screw-in assembly	FK	Ensemble vissable coaxial UHF
FM	Mehrfachstecker, Buchsenleiste	FM	Multipoint connector	FM	Connecteur multiple
FN	Netz-Steckverbindung	FN	AC-supply connector	FN	Connecteur secteur
FO	Runde Mehrfach-Steckverbindung	FO	Round multipoint connector	FO	Connecteur multipoles rond
FP	Druckschalt.-Steckverbindung	FP	Multipoint connector for PC boards	FP	Connecteur multipoles pour cartes imprimées
FR	Fassung für Lampe, Sicherung, usw.	FR	Socket for lamp, fuse, etc.	FR	Douille pour lampe, fusible etc. . .
FT	Schwachstrom-Steckverbindung	FT	LV plug and socket	FT	Connecteur pour faible courant
FU	Hochsp.-Steckverbindung	FU	HV plug and socket	FU	Connecteur pour haute tension
FV	Verbinder (z.B. AMP)	FV	Push-on connector	FV	Connecteur à enfichage
J	**Meßinstrumente**	**J**	**Indicators**	**J**	**Indicateurs**
JD	Drehspul-Anzeigeinstrument	JD	Moving-coil meter	JD	Galvanomètre à cadre mobile
JE	Dreheisen-Anzeigeinstrument	JE	Moving-iron meter	JE	Galvanomètre à fer mobile
JF	Frequenzmesser	JF	Frequency meter	JF	Fréquencemètre
JG	Drehspulinstrument mit Gleichrichter	JG	Moving-coil meter with rectifier	JG	Galvanomètre à cadre mobile avec redresseur
JH	Betriebstundenzähler	JH	Operating-hours counter	JH	Compteur d'heures de fonctionnement
JJ	Impulszähler	JJ	Pulse counter	JJ	Compteur d'impulsions
JK	Kleinst-Instrument, z.B. Abstimmanzeiger	JK	Mini-instrument, e.g. tuning indicator	JK	Petit indicateur, p.ex. indicateur d'accord
JM	Mechanisches Zählwerk	JM	Mechanical counter	JM	Compteur mécanique
JP	Projektions-Instrument (Leuchtziffer)	JP	Digital display	JP	Afficheur numérique
JQ	Quotientenmesser (Kreuzspul-instrument)	JQ	Ratiometer (cross coil)	JQ	Quotientmètre (à cadres croisés)
JS	Spiegelgalvanometer	JS	Reflecting galvanometer	JS	Galvanomètre à mirroir
JU	Uhrwerk	JU	Clockwork	JU	Mouvement d'horlogerie
JW	Elektrodyn. Anzeigeinstrument	JW	Electrodynamic meter	JW	Instrument électrodynamique
L	**Induktivitäten, Magnetik**	**L**	**Inductors, magnetic components**	**L**	**Composants inductifs et magnétiques**
LC	Keramische Spule	LC	Ceramic coil	LC	Bobine céramique
LD	Netz-, HF-Drossel, Df-Filter	LD	Choke, lead-through filter	LD	Self de choc, filtre de traversée
LE	Einzelkreis, Bandfilter	LE	Single tuned circuit, bandpass filter	LE	Circuit accordé, filtre passe-bande
LP	Permanentmagnet	LP	Permanent magnet	LP	Aimant permanent
LT	Netztransformator	LT	Power transformer	LT	Transformateur secteur
LU	NF-Übertrager	LU	AF transformer	LU	Transformateur BF
LV	Variometer	LV	Variometer	LV	Variomètre
R	**Widerstände**	**R**	**Resistors**	**R**	**Résistances**
RD	Drahtwiderstand	RD	Wire-wound resistor	RD	Résistance bobinée
RF	Kohleschicht-Widerstand	RF	Carbon-film resistor	RF	Résistance à couche de carbone
RG	Metallglasur-Widerstand	RG	Metal-coated resistor	RG	Résistance à couche métallique
RJ	Metalloxyd-Widerstand	RJ	Metal-oxide resistor	RJ	Résistance à oxyde métallique
RL	Metallfilm-Widerstand	RL	Metal-film resistor	RL	Résistance à film métallique
RM	Widerstandsdraht	RM	Resistance wire	RM	Fil de résistance
RN	Widerstandsnetzwerk	RN	Resistor network	RN	Réseau de résistance
RR	Draht-Potentiometer	RR	Wire-wound potentiometer	RR	Potentiomètre bobiné
RS	Schicht-Potentiometer	RS	Carbon-film potentiometer	RS	Potentiomètre à couche

Kenn-buchst.	Art des Bauelementes	Identif.-letter	Type of component	Sym-bole	Type d'élément
RT	Dämpfungsglied, Abschluß-widerstand	RT	Attenuator, termination	RT	Atténuateur, charge
RV	Drahtwiderstand mit Abgriff	RV	Wire-wound resistor, tapped	RV	Résistance bobinée à prise
RW	Wendelpotentiometer	RW	Helical potentiometer	RW	Potentiomètre hélicoidal
S	**Schalter, Relais, Sicherungen**	**S**	**Switches, relays, fuses**	**S**	**Commutateurs, relais, fusibles**
SB	Drucktastenschalter	SB	Pushbutton switch	SB	Commutateur à touche
SD	Drehschalter	SD	Rotary switch	SD	Commutateur rotatif
SF	Kontaktfedersatz	SF	Spring contact assembly	SF	Jeu de ressorts de contact
SH	HF-Koaxialschalter, -Relais, -Teiler	SH	Coaxial RF switch, RF relay, RF attenuator	SH	Commutateur RF coaxial, relais RF, atténuateur RF
SK	Kipp-, Wipp- und Schiebeschalter	SK	Toggle switch, slide switch	SK	Commutateur à bascule, à glissière
SL	Leistungsschalter Netz/HF	SL	AC supply switch, high-power RF switch	SL	Commutateur secteur, de puissance RF
SM	Mikroschalter	SM	Microswitch	SM	Microrupteur
SN	Elektromagnet, Relais	SN	Electromagnetic relay	SN	Relais électromagnétique
SP	Leistungsrelais, Luftschütz	SP	Power relay, air-type contactor	SP	Relais de puissance, contacteur à air
SR	Reedrelais	SR	Reed relay	SR	Relais reed
SS	Sicherung, Schutzschalter	SS	Fuse, automatic cut-out	SS	Fusible, coupe-circuit automatique
ST	Thermoschalter	ST	Thermal circuit breaker	ST	Disjoncteur thermique
SU	Überspannungs-Ableiter	SU	Arrester	SU	Eclateur
SW	Wechselrichter, Näherungsschalter	SW	Inverter (DC-AC), proximity switch	SW	Inverseur (DC-AC), commutateur de proximité
SZ	Zeitschalter	SZ	Time switch	SZ	Interrupteur horaire
V	**Verbindungselemente**	**V**	**Connecting elements**	**V**	**Eléments de raccordement**
VK	Klemme, Klemmleiste	VK	Clamp, terminal strip	VK	Pince, réglette à bornes
VL	Lötöse, Stützpunkt	VL	Soldering lug	VL	Cosse à souder
VS	Schraube, Mutter, Scheibe	VS	Screw, nut, washer	VS	Vis, écrou, disque

Farbcode für Widerstände und Kondensatoren / Colour code for resistors and capacitors / Code couleur pour résistances et condensateurs

Anmerkung:
Die Wertangabe der weitgehend miniaturisierten Bauelemente erfolgt überwiegend durch Farbkennzeichnungen, deren Bedeutung der nachfolgenden Tabelle entnommen werden kann.

Note:
The electrical values of the largely miniaturized components are mainly identified by a colour code, the meaning of which can be taken from the table below.

Remarque:
Les valeurs électriques des composants fort miniaturisés sont indiquées dans la plupart des cas par un code couleur dont voici l'explication.

HINWEIS:
Im Zuge des technischen Fortschrittes setzt R&S zunehmend Metallschichtwiderstände mit 1% Toleranz anstelle von Kohleschichtwiderständen mit 5% Toleranz ein. Metallschicht-widerstände können sich dabei an Stellen befinden, an denen gemäß Schaltteilliste Kohleschichtwiderstände vorgesehen sind. Etwaige geringfügige Differenzen der Nennwerte zwischen Stromlaufplan, Schaltteilliste und Gerät liegen im zulässigen Toleranzbereich.

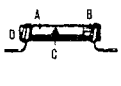
N. B.:
Following the state of the art R&S makes increasing use of metal-film resistors (1% tolerance) instead of carbon-film resistors (5% tolerance). Metal-film resistors may have been employed where carbon-film resistors are specified in the parts list. Any slight differences of nominal values between circuit diagram, parts list and equipment are within tolerance.

N. B.:
Suivant le progrès technique R&S utilise de plus en plus des résistances à film métallique (tolérance 1%) au lieu des résistances à couche de carbone (tolérance 5%). Des résistances à film métallique peuvent se trouver en des points où des types à couche de carbone figurent dans la liste des composants. Les différences minimes des valeurs nominales existant éventuellement entre le schéma de circuit, la liste des composants et l'appareil sont dans la marge de tolérance.

Farbe/Colour/Couleur	A	B	C	D
Schwarz/Black/Noir	-	0		
Braun/Brown/Marron	1	1	0	± 1%
Rot/Red/Rouge	2	2	00	± 2%
Orange/Orangé	3	3	000	
Gelb/Yellow/Jaune	4	4	0000	
Grün/Green/Vert	5	5	00000	± 0,5%
Blau/Blue/Bleu	6	6	000000	
Violett/Violet	7	7	-	± 0,1%
Grau/Gray/Gris	8	8	-	
Weiß/White/Blanc	9	9	-	
Gold/Doré	-	-	-	± 5%
Silber/Silver/Argenté	-	-	-	± 10%
Ohne Farbe/No colour/ Pas de couleur	-	-	-	± 20%

Anordnungsbeispiele für Examples for Exemple pour

Widerstände (R) / Resistors (R) / Résistance (R)



Kondensat. (C) / Capacitors (C) / Condensateur (C)

1) Toleranzring, hier nicht spezifiziert.
1) Tolerance ring, here not specified.
1) Anneau de tolérance, ne pas spécifié ici.

Definition* / Définition*

Kennzeichen A / Marking A / Repérage A: (Bauteilfarbe/1. Farbring) = 1. Zahl; (body colour or first coloured ring) = 1st digit; (couleur du corps ou 1er anneau) = 1er chiffre;

Kennzeichen B / Marking B / Repérage B: (Bauteilende/2. Farbring) = 2. Zahl; (body end or second coloured ring) = 2nd digit; (bout du corps ou 2e anneau) = 2e chiffre;

Kennzeichen C / Marking C / Reperage C: (Punkt/3. Farbring) = 3. Zahl = Zahl der Nullen; (dot or third coloured ring) = number of zeroes; (point ou 3e anneau) = nombre de zéros;

Kennzeichen D / Marking D / Reperage D: (Punkt/4. Farbring) = Toleranz des Nennwerts in %. (Fehlendes Kennzeichen für D bedeutet ±20%) (with no D marking: tolerance ± 20%) (point ou 4e anneau) = tolérance en % de la valeur nominale. (L'absence du repérage D signifie ± 20%)

Das Fehlen eines Kennzeichens bedeutet, daß die Farbe des Bauteilkörpers die Wertangabe darstellt.
The absence of a marking signifies that the body colour gives the corresponding information.
L'absence de tout repérage signifie que la couleur du corps du composant représente la valeur correspondante.

*Siehe auch DIN 41 429 und DIN 40 825
see also IEC publication 62-1952 and 62-1968
Voir aussi DIN 41 429 et DIN 40 825.

ROHDE&SCHWARZ	Äl	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock No.	Blatt Page
	01	0986	CMT-B10 SSB-/NF-ANALYSE CMT-B10 SSB/AF ANALYSIS	837.0018.01 SA	1

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
A94	ED SSB-/NF-ANALYSE SSB/AF ANALYSIS	837.0024.02	
W21	DX HF-KABEL W21 RF CABLE W21	837.0118	837.0060
W56A	DX HF-KABEL W56A RF CABLE W56A	837.0124	837.0060
			- ENDE -

095.0026-0586

ROHDE&SCHWARZ	Äl	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock No.	Blatt Page
	04	1186	ED SSB-/NF-ANALYSE SSB/AF ANALYSIS	837.0024.01 SA	1

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
B180	EQ 10,000MHZ CL30PF HC43U KRISTALLVE N. R&S SACHNUMMER	EQ 091.0250	
C1	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C2	CC 22PF+-2%4X5NP0 CAPACITOR VALVO 2222 678 10229	CC 087.6464	
C10	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C12	CC 22PF+-2%4X5NP0 CAPACITOR VALVO 2222 678 10229	CC 087.6464	
C20	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C21	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C22	CK 1UF+-10%50V5RM MKT CAPACITOR WIMA MKS2/50/1UF/10%	CK 099.2998	
C26	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C27	CK 1,5NF+-1,25%63V7,5QUAD CAPACITOR SIEMENS B33531-A5152-F	CK 213.4360	
C28	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C29	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C31	CK 200PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5201-F	CK 341.8515	
C32	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C36	CK 100PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5101-F	CK 337.4654	
C37	CK 2,2NF+-1%63V 6,3QUAD. CAPACITOR SIEMENS B33531-A5222-F	CK 099.1304	
C38	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C39	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C41	CK 100PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5101-F	CK 337.4654	
C42	CK 22NF+-1%63V8X8X11 KP CAPACITOR SIEMENS B33531-A5223-F	CK 213.4553	
C45	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C46	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C49	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C50	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C52	CC 22PF+-2%4X5NP0 CAPACITOR VALVO 2222 678 10229	CC 087.6464	
C54	CK 1UF+-10%50V5RM MKT CAPACITOR WIMA MKS2/50/1UF/10%	CK 099.2998	
C55	CE 100UF-10+50% 25V 13X13 ELECTROLYTIC CAPACITOR ROEDERST ELKCEK100/25	CE 208.4007	
C61	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C62	CK 1,5NF+-1,25%63V7,5QUAD CAPACITOR SIEMENS B33531-A5152-F	CK 213.4360	
C63	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C64	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C66	CK 3,3NF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5332-F	CK 340.9030	
C67	CK 510PF+-1%63V 6,3X11 KP SIEMENS B33531-A5511-F	CK 099.3642	
C71	CK 100PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5101-F	CK 337.4654	
C72	CK 7,5NF+-1,25%63V7,5QUAD CAPACITOR SIEMENS B33531-A5752-F	CK 213.4376	
C76	CC 68PF+-2%6X7NP0 CAPACITOR VALVO 2222 678 10689	CC 087.6529	
C77	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C78	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C80	CE 22UF-10+50% 63V 9X13 ELECTROLYTIC CAPACITOR ROEDERST EK 00 CB 222 J	CE 006.7120	
BIS/TO C84			
C85	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102	CC 022.0784	
C86	CC 100NF+-10%50V5K1200VIE CAPACITOR UNION CARB CK05BX104K	CC 084.5350	
C100	CK 680NF+-10%50VRM MKT CAPACITOR WIMA MKS2/50/0,68UF/10%	CK 099.2981	
BIS/TO C107			
C108	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C110	CK 680NF+-10%50VRM MKT CAPACITOR WIMA MKS2/50/0,68UF/10%	CK 099.2981	
BIS/TO C117			
C118	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C130	CC 560PF+-10%3X4R2000 CAPACITOR VALVO 2222 63051 561	CC 087.7002	
C132	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C133	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C135	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C136	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C142	CK 1,5NF+-1,25%63V7,5QUAD CAPACITOR SIEMENS B33531-A5152-F	CK 213.4360	
C143	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C145	CK 1NF+-1,25%63V7,5QUAD. CAPACITOR SIEMENS B33531-A5102-F	CK 213.4353	
C146	CK 200PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5201-F	CK 341.8515	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C150	CK 100PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5101-F	CK 337.4654	
C151	CK 2,2NF+-1%63V 6,3QUAD. CAPACITOR SIEMENS B33531-A5222-F	CK 099.1304	
C153	CK 100PF+-1%63V6,3QUX11KP CAPACITOR SIEMENS B33531-A5101-F	CK 337.4654	
C154	CK 22NF+-1%63V8X8X11 KP CAPACITOR SIEMENS B33531-A5223-F	CK 213.4553	
C160	CK 100NF+-5%63V5RM MKT CAPACITOR WIMA MKS/2/63/0,1UF/5%	CK 099.2930	
C161	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C162	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C170	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C171	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C172	CK 2,2NF+-2,5%63V RM5 KP POLYPROPYLENE CAPACITOR WIMA FKP2 2200/2,5%/63V	CK 099.6141	
C180	CC 39PF+-2%4X5NP0 CAPACITOR VALVO 2222 678 10399	CC 087.6493	
C181	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C182	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C183	CC 10PF+-0,25PF3X4NP0 CAPACITOR VALVO 2222 678 09109	CC 087.6429	
C184	CC 39PF+-2%4X5NP0 CAPACITOR VALVO 2222 678 10399	CC 087.6493	
C194	CK 1UF+-10%50V5RM MKT CAPACITOR WIMA MKS2/50/1UF/10%	CK 099.2998	
C195	CK 1UF+-10%50V5RM MKT CAPACITOR WIMA MKS2/50/1UF/10%	CK 099.2998	
C200	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C201	CC 1NF+-10%63V K2000 CERAMIC CAPACITOR VALVO 2222 63051 102	CC 022.0784	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
C202	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C205	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C210	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C211	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C220	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C221	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C222	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
C225	CC 10NF-20+50%7X8R4000 CAPACITOR VALVO 2222 63051 64051103	CC 087.7525	
D1	BL CD4051BE 8CH. MUX MULTIPLEXER RCA CD4051BE	BL 339.4174	
D10	BL CD4051BE 8CH. MUX MULTIPLEXER RCA CD4051BE	BL 339.4174	
D50	BL MM74HC4066N 4XA.SWITCH QUAD ANALOG SWITCH NSC MM74HC4066N	BL 099.9692	
D80	BL PC74HC4094P 8ST.SH.REG 8ST.SHIFT A.STORE REGIST. VALVO PC74HC4094P	BL 099.9711	
D81	BL PC74HC4094P 8ST.SH.REG 8ST.SHIFT A.STORE REGIST. VALVO PC74HC4094P	BL 099.9711	
D85	BL CD4050BE 6XCONVERTER HEXCONVERTER RCA CD4050BE	BL 086.7250	
D100	BL MM74HC4052N 2X4CH. MUX DUAL 4CHANNEL MUX/DEMUX NSC MM74HC4052N	BL 099.9686	
D110	BL MM74HC4052N 2X4CH. MUX DUAL 4CHANNEL MUX/DEMUX NSC MM74HC4052N	BL 099.9686	
D180	BL PC74HC4520P 2X4B COUNT BINARY COUNTER VALVO PC74HC4520P	BL 352.7721	
D181	BL MM74HC00N 4X2IN.NAND QUAD 2-INPUT NAND GATE MOTOROLA MC74HC00N	BL 571.3194	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
D182	BL MM74HC191N U/D BI.CTR UP/DOWN BINARY COUNTER NSC MM74HC191N	BL 099.9586	
D200	BL MC10H116L 3X L.RECEIV LINE RECEIVER MOTOROLA MC10H116L	803.0538	
D210	BL SP8647BDG10:1DIVID UHF DIVIDER PLESSEY SP8647BDG	BL 300.6747	
D215	BL 74F00PC 4X2IN.NANDG QUAD-NAND-GATE FAIRCHILD 74F00PC	BL 344.6659	
D220	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC	BL 344.6871	
D221	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC	BL 344.6871	
D222	BL 74F191PC U/D-BIN.CNT UP/DOWN BIN.-COUNTER FAIRCHILD 74F191PC	BL 344.6871	
D225	BL MM74HC74N 2XD-FLIPFL DUAL D FLIP-FLOP NSC MM74HC74N	BL 571.3171	
D230	BL PC74HC4094P 8ST.SH.REG 8ST.SHIFT A.STORE REGIST. VALVO PC74HC4094P	BL 099.9711	
D231	BL PC74HC4094P 8ST.SH.REG 8ST.SHIFT A.STORE REGIST. VALVO PC74HC4094P	BL 099.9711	
L49	LD 1000UH10%72,00HMC,028A CHOKE DELEVAN DROSSEL1025-92	LD 037.8005	
L54	LD 1000UH10%72,00HM0,028A CHOKE DELEVAN DROSSEL1025-92	LD 037.8005	
L180	LD 100 UH10%8,000HM0,084A CHOKE DELEVAN DROSSEL1025-68	LD 067.3101	
L205	LD 100 UH10%8,000HM0,084A CHOKE DELEVAN DROSSEL1025-68	LD 067.3101	
L210	LD 100 UH10%8,000HM0,084A CHOKE DELEVAN DROSSEL1025-68	LD 067.3101	
N20	BO NE5532AFE 2XL.N.OPAMP OPERATIONAL AMPLIFIER VALVO NE5532AFE	BO 356.0450	
N30	BO NE5532AFE 2XL.N.OPAMP OPERATIONAL AMPLIFIER VALVO NE5532AFE	BO 356.0450	
N40	BO NE5532AFE 2XL.N.OPAMP OPERATIONAL AMPLIFIER VALVO NE5532AFE	BO 356.0450	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
N45	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N60	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N70	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N85	BO UA7905UC - 5V1AC VREGL VOLTAGE REGULATOR FAIRCHILD UA7905UC	BO 282.5449	
N120	BO TL074IN 4XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL074IN	568.7528	
N130	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N135	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199	
N140	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N150	BO TL072ACP 2XFET OPAMP OPERATIONAL AMPLIFIER TEXAS TL072ACP	340.6054	
N160	BO LF412CN 2XFET OPAMP OPERATIONAL AMPLIFIER NSC LF412CN	356.0521	
N171	BJ PKD01FP PEAK DETECT PEAK DETECTOR PMI PKD-01	358.6256	
N176	BJ TL604CP 2X ANALOGSCH ANALOG SWITCH TEXAS INST TL604CP	BJ 300.6199	
P1	VL WIRE-WRAP PIN WIRE-WRAP PIN BERG NR. 75 403-003	VL 088.4542	
BIS/TO P8			
R1	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R2	RL 0,35W 63,4KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/63,4K-F-C	RL 082.2148	
R3	RL 0,35W 40,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/40,2K-F-C	RL 083.1751	
R4	RL 0,35W24,9 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/24,9K-F-C	RL 082.1758	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R5	RL 0,35W 15,8KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15,8K-F-D	RL 083.1422	
R6	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R10	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R11	RL 0,35W 15,8KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15,8K-F-D	RL 083.1422	
R12	RL 0,35w24,9 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/24,9K-F-C	RL 082.1758	
R13	RL 0,35W 40,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/40,2K-F-C	RL 083.1751	
R14	RL 0,35W 63,4KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/63,4K-F-C	RL 082.2148	
R15	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R16	RL 0,35W 158 KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/158K-F-C	RL 083.2141	
R17	RL 0,35W 249 KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/249K-F-C	RL 083.2329	
R20	RL 0,35W 100KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/100K-F-C	RL 082.1764	
R21	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R25	RL 0,35W12,7KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/12,7K-F-C	RL 082.2448	
R26	RL 0,35W 26,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/26,1K-F-C	RL 082.2431	
R30	RL 0,35W 23,7KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/23,7K-F-C	RL 083.1568	
R31	RL 0,35W 41,2KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/41,2K-F-C	RL 082.2319	
R35	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400	
R36	RL 0,35W 31,6KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/31,6K-F-C	RL 083.1651	
R40	RL 0,35W4,64KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,64K-F-C	RL 082.1687	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R41	RL 0,35W 7,68KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/7,68K-F-D	RL 083.1200	
R45	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R46	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R47	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R48	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C	RL 083.1639	
R50	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C	RL 083.1639	
R51	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C	RL 083.1639	
R52	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C	RL 083.1639	
R53	RL 0,35W 60,4KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/60,4K-F-C	RL 083.1851	
R54	RL 0,35W 60,4KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/60,4K-F-C	RL 083.1851	
R55	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R56	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R57	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R60	RL 0,35W 4,42KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,42K-F-D	RL 083.1074	
R61	RL 0,35W 8,45KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/8,45K-F-D	RL 083.1245	
R65	RL 0,35W 2,80KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,80K-F-D	RL 083.0932	
R66	RL 0,35W 5,23KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,23K-F-D	RL 083.1122	
R70	RL 0,35W 3,40KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,40K-F-D	RL 083.1000	
R71	RL 0,35W 6,04KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/6,040HM-F-C	RL 082.6089	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R75	RL 0,35W 19,1KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/19,1K-F-C	RL 083.1500	
R76	RL 0,35W 49,9KOHM+-1%TK50 RESISTOR DRALORIC SMA 0207/49,9K-F-C	RL 082.6114	
R120	RL 0,35W 1,54KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,54K-F-D	RL 083.0749	
BIS/TO R123			
R130	RS 0,5W10KOHM+-10%10X10X5 CERMET POTENTIOMETER T BOURNS 3386X1-103	RS 247.7526	
R131	RL 0,35W 4,99KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/4,99K-F-D	RL 083.1116	
R132	RL 0,35W 30,1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/30,1K-F-C	RL 083.1639	
R140	RL 0,35W5,76KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/5,76K-F-C	RL 083.6824	
R141	RL 0,35W 11,8KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/11,8K-F-D	RL 083.1345	
R145	RL 0,35W 11,8KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/11,8K-F-D	RL 083.1345	
R146	RL 0,35W 18,7KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/18,7K-F-C	RL 083.1497	
R150	RL 0,35W 6,98KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/6,98K-F-C	RL 082.2454	
R151	RL 0,35W 14,7KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/14,7K-F-D	RL 083.1397	
R152	RL 0,35W 2,15KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,15K-F-D	RL 083.0855	
R153	RL 0,35W 3,57KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/3,57K-F-D	RL 083.1022	
R160	RL 0,35W 2,00KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/2,00K-F-D	RL 083.0826	
R161	RS 0,5W1KOHM+-10%10X10X5 CERMET POTENTIOMETER BOURNS 3386X-1-102	RS 247.5917	
R162	RL 0,35W 562 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/562OHM-F-D	RL 083.0461	
R163	RL 0,35W 40,2KOHM+-1%TK50 RESISTOR DRALORIC SMA/207/40,2K-F-C	RL 083.1751	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R170	RL 0,35W 15,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/15K-F-D	RL 083.1400	
R171	RL 0,35W 10,0KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/10K-F-D	RL 083.1297	
R180	RL 0,35W4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250	
R190	RS 0,5W500KOHM+-10%10X10X CERMET POTENTIOMETER T BOURNS 3386X-1-504	RS 087.7702	
R191	RL 0,35W4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250	
R192	RL 0,35W4,75MOHM+-1%TK50 METALFILMRESISTOR RESISTA MK2 4,75MOHM 1% TK50	RL 099.8250	
R193	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R194	RL 0,35W 1KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1K-F-C	RL 082.2160	
R200	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R201	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R203	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R204	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R206	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R211	RL 0,35W 475 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/4750HM-F-D	RL 083.0390	
R212	RL 0,35W 681 OHM+-1%TK50 RESISTOR DRALORIC SMA0207/6810HM-F-D	RL 083.0490	
R213	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	
V85	AD 1N4448 75V 0,15A UDI DIODE TEXAS INST 1N4448 GEGURTET	AD 012.0700	
V177	AE BZX79/C5V1 0,5W Z-DI ZENER DIODE VALVO BZX79/C5V1	AE 012.2449	

Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
V194	AE BZX79/C10 0,5W Z-DI ZENER DIODE VALVO BZX79/C10	AE 012.2510	
V195	AE BZX79/C10 0,5W Z-DI ZENER DIODE VALVO BZX79/C10	AE 012.2510	
X1	FP STECKERL.INDIR.64POLIG 64-PIN INSERT PANDUIT 100-064-033/999	FP 084.6470	
X2	FJ EINBAUSTECKER SYST.SMB ANGLE CONNECTOR ROSENBERG R&S-ZCHNG.602.8804	FJ 602.8804	
BIS/TO X5			
Z1	LD 10GHZ 50DB100V10A4RDX9 LEAD THROUGH FILTER ERIE R&S-ZCHNG.451.4636	LD 451.4636	
BIS/TO Z10			
			- ENDE -

Zeichn.-Nr 83. 324 S

D1
4051
C1 10n
+5V
-5V
ATT1
ATT2
ATT3
R1 100k
R2 63,4k
R3 40,2k
R4 24,9k
R5 15,8k
R6 10k
C2 22
X945 IN
X944 SCOPE
C22 1µ
R20 100k
N20-A
NE5532
R21 10k

D10
4051
C10 10n
VER1
VER2
VER3
R10 10k
R11 15,8k
R12 24,9k
R13 40,2k
R14 69,4k
R15 100k
R16 158k
R17 249k
C12 22
A zu/to N135.6 (Bl.2/Sh.2)
N20-B
NE5532
C20 10n
C21 10n
P1
R25 12,7k
R26 26,1k
C26 1n
C27 1,5n
C28 10n
C29 10n
+15V -15V
N30-A
NE5532
R30 23,7k
R31 41,2k
C32 1n

D80
HC4094
D81
HC4094
Opt.Pol.
D
STR
CP
{Bl.3/Sh.3} zu/to D230.3
zu/to D230.1 (Bl.3/Sh.3)
zu/to D230.2 (Bl.3/Sh.3)
N.C.
AUm zu/to N176.2 (Bl.2/Sh.2)
DET/RST zu/to N171.1 (Bl.2/Sh.2)
B/S zu/to N135.2 (Bl.2/Sh.2)

D85
4050
X1
10a,b
8a
5b
Z1 Z2 Z3 Z4 Z5 Z6
C80
C81
C82
C83
4 x 22µ
$+5V_D$ $+5V_A$
X1 1b 17a,b 19a,b 13a,b

D10
4051

-5V

$\overline{E}$

Y_0 R10 10k
Y_1 R11 15,8k
Y_2 R12 24,9k
Y_3 R13 40,2k
Y_4 R14 69,4k
Y_5 R15 100k
Y_6 R16 158k
Y_7 R17 249k

C12 22

A → zu/to N135.6 (Bl 2/Sh 2)

P1

C21 10n

+5V -5V

N30-A
NE5532

R25 12,7k
R26 26,1k
C27 1,5n
C26 1n
C28 10n
C29 10n

+15V -15V

N30-B
NE5532

C32 1n
R31 41,2k
C31 200
R30 23,7k

N40-A
NE5532

R35 15k
R36 31,6k
C37 2,2n
C36 100
C38 10n
C39 10n

+15V -15V

N40-B
NE5532

R40 4,64k
C42 22n
R41 7,68k
C41 100

P2

R45 10k

N45-A
TL072

R46 10k
R57 1k
R56 10k
C54 1µ
C55 100µ
R55 10k
L54 1mH

+5V

R48 30,1k
L49 1mH
R47 10k
C49 10µ

zu/to D225.5 (Bl.3/Sh 3) ← D
zu/to D225.6 (Bl 3/Sh 3) ← C

D50
74HC4066

C50 10n

+5V

Opt.Pol

D
STR
CP

Z1 Z2 Z3 Z4 Z5 Z6 Z7 Z8 Z9 Z10

D85
4050

+5V

X1
10a,b CP
8a D
5b STR
N.C.
N.C.
N.C.

C80
C81
C82
C83
4 x 22µ

C84 22µ
C85 1µ
N85 7905
C86 100n

V85 1N4448

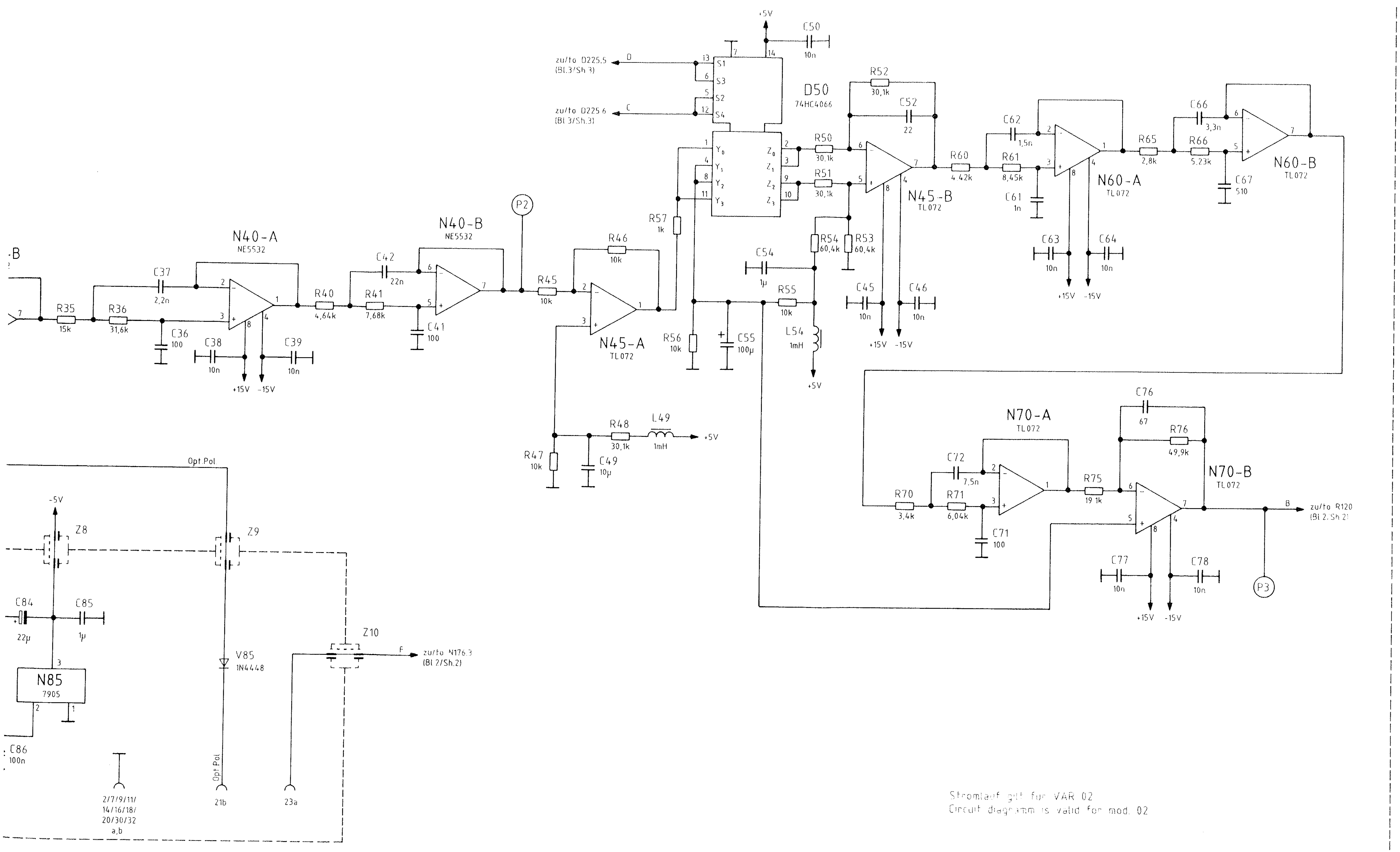
F → zu/to N176.3 (Bl 2/Sh.2)

X1 1b
17a,b
19a,b
13a,b
2/7/9/11/14/16/18/20/30/32 a,b
21b
23a

								1KSA	Tag	Name	Benenn
								Bearb	10.86	Co	
								Gepr			
Änd. Ers.	Änderung Meldung	Datum	Name	Änd. Ers.	Änderung Meldung	Datum	Name	Norm			

ROHDE&SCHWARZ

5 6 7 8 9 10 11



ROHDE&SCHWARZ

1KSA | Tag | Name
Bearb | 10.86 | Co
Gepr
Norm

Benennung
SSB-/NF-ANALYSE
SSB/AF ANALYSIS

zu Gerät CMT-B10

Z

Zeichn.-Nr.
837.0024 S

Blatt-Nr. 1 v. 3 Bl.

reg. i. V. 837.0018 V
erste Z

Zeichn.-Nr 837 24 S

D100
74HC4052
8 x 680n
C100 C101 C102 C103 C104 C105 C106 C107
C108 10n
+5V
6,7,8

D110
74HC4052
8 x 680n
C110 C111 C112 C113 C114 C115 C116 C117
C118 10n
+5V
6,7,8

P7

D180-A
HC4520

D180-B
HC4520

+5V
N.C

D182
74HC191
CTEN
D/Ū
MAX/MIN
CLK
RCO
LOAD

D181-A
74HC00
C183 10
D181-B
74HC00
R180 4,7M
B180 10MHz
C180 39
C184 39

C181 10n
L180 100µ
C182 10n
D181
74HC00

D181-C/D
74HC00

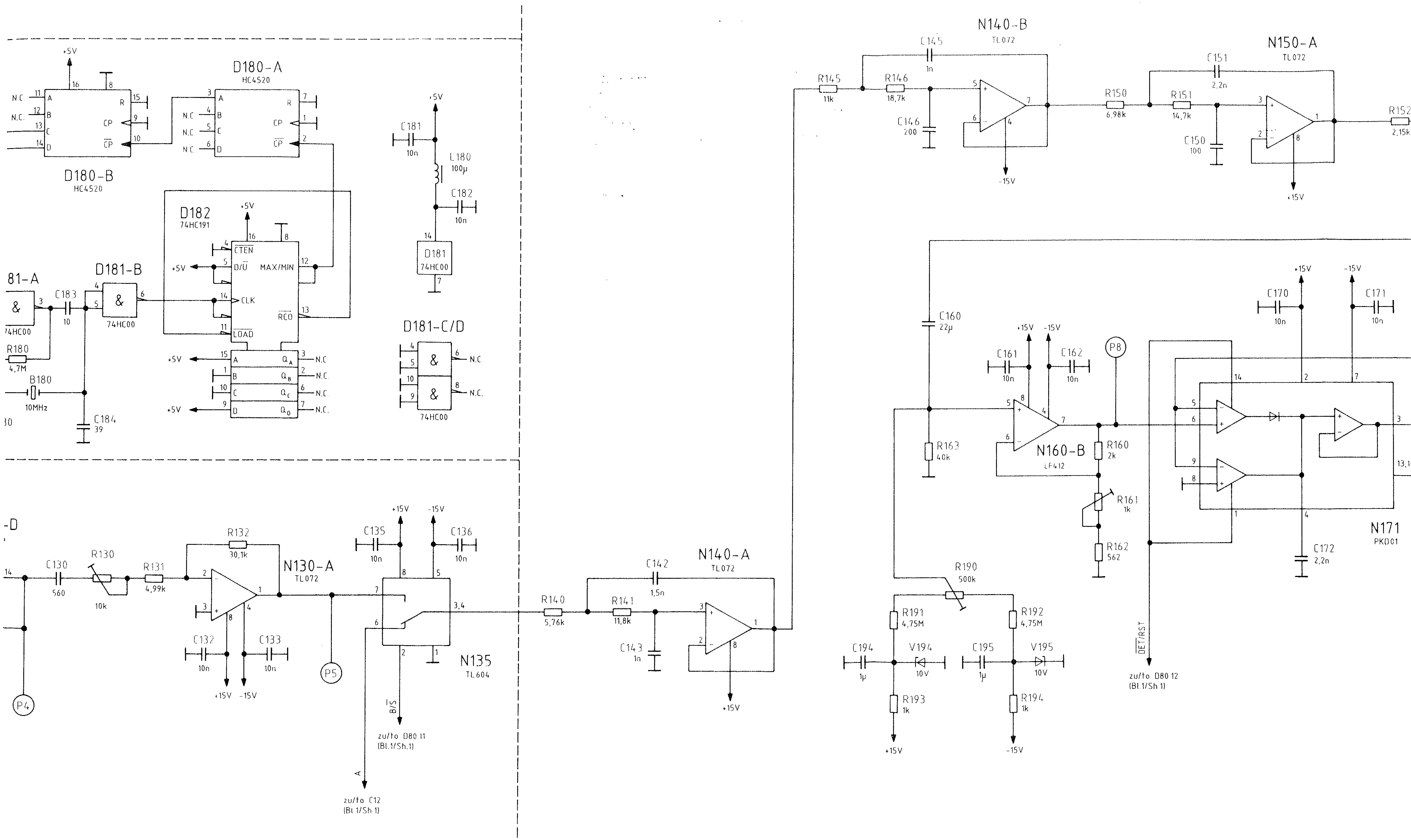
N120-C
TL074
R120 1,54k
zu/to N70 7
(Bl1/Sh.1)
B
R121 1,54k

N120-B
TL074
R122 1,54k

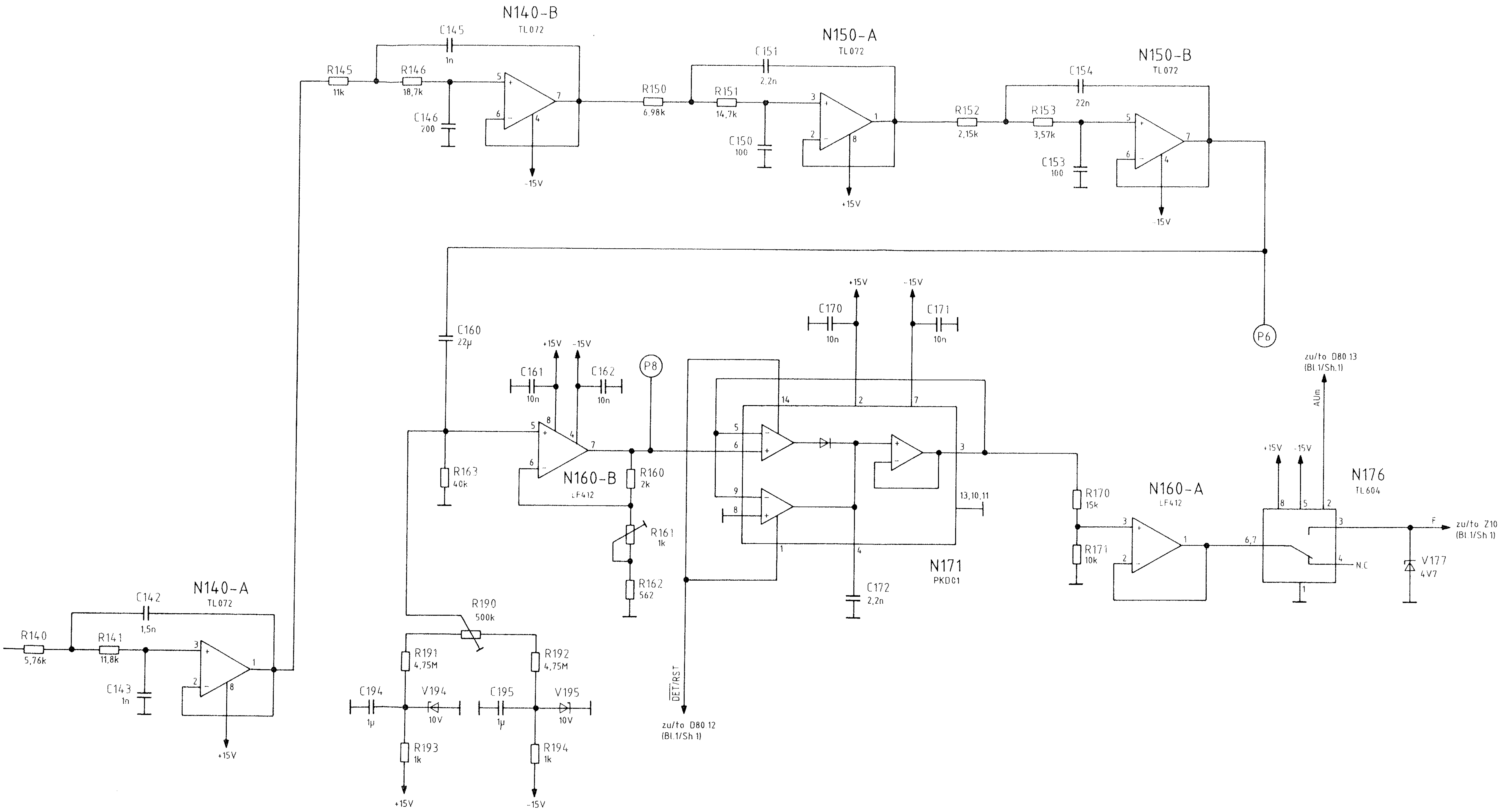
N120-A
TL074
R123 1,54k

N120-D
TL074
C130 560
R130 10k
R131 4,99k
P4

R132 30,1k
N130-A
TL072
C132 10n
C133 10n
C135 10n
C136 10n
P5
B/S
zu/to D80.11
(Bl.1/Sh.1)
A
zu/to C12
(Bl 1/Sh.1)



ROHDE & SCHWARZ	1KSA	Tag	Name	Benennung
	Bearb	10.86	Co	SSB-/N
	Gepr			SSB/AF
	Norm			



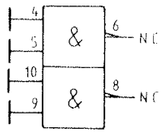
Stromlauf gilt fur VAR 02
Circuit diagramm is valid for mod 02

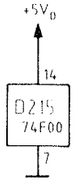
ROHDE & SCHWARZ	1KSA	Tag	Name	Benennung	SSB-/NF-ANALYSE SSB/AF ANALYSIS	Z	Zeichn.-Nr. 837.0024 S	Blatt-Nr. 2 v. 3 Bl.
	Bearb	10.86	Co					
	Gepr							
	Norm				zu Gerat CMT-B10		reg. i. V. 837.0018 V	erste Z

X942
100MHz
OUT
C200
10n
X941
100MHz
IN
C201
1n
R200
680
R203
680
R204
680
R201
680
C220
10n
D200-A
MC10H116
D200-B
MC10H116
D200-C
MC10H116
+5V$_D$
L205
100µ
C205
10n
R206
680
+5V$_D$
L210
100µ
C210
10n
D210
SP8647
2,12,16
R212
680
+5V$_D$
R213
1,5k
+5V$_D$
C211
10n
R211
470
D215-A
74F00
D215-B/C
74F00
N.C
N.C
+5V$_D$
D215
74F00
D220
74F191
CTEN
D/U
MAX/MIN
CLK
RCO
LOAD
A
B
C
D
Q$_A$
Q$_B$
Q$_C$
Q$_D$
N.C.
+5V$_D$
C220
10n
+5V$_D$

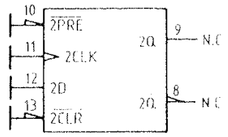
Zeichn.-Nr. 837 4 S

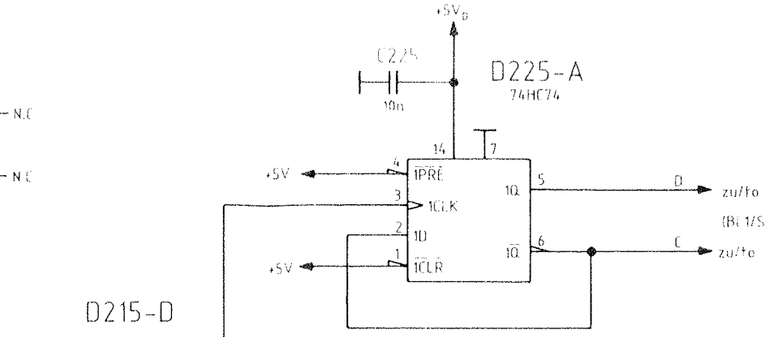
D215-B/C
74F00

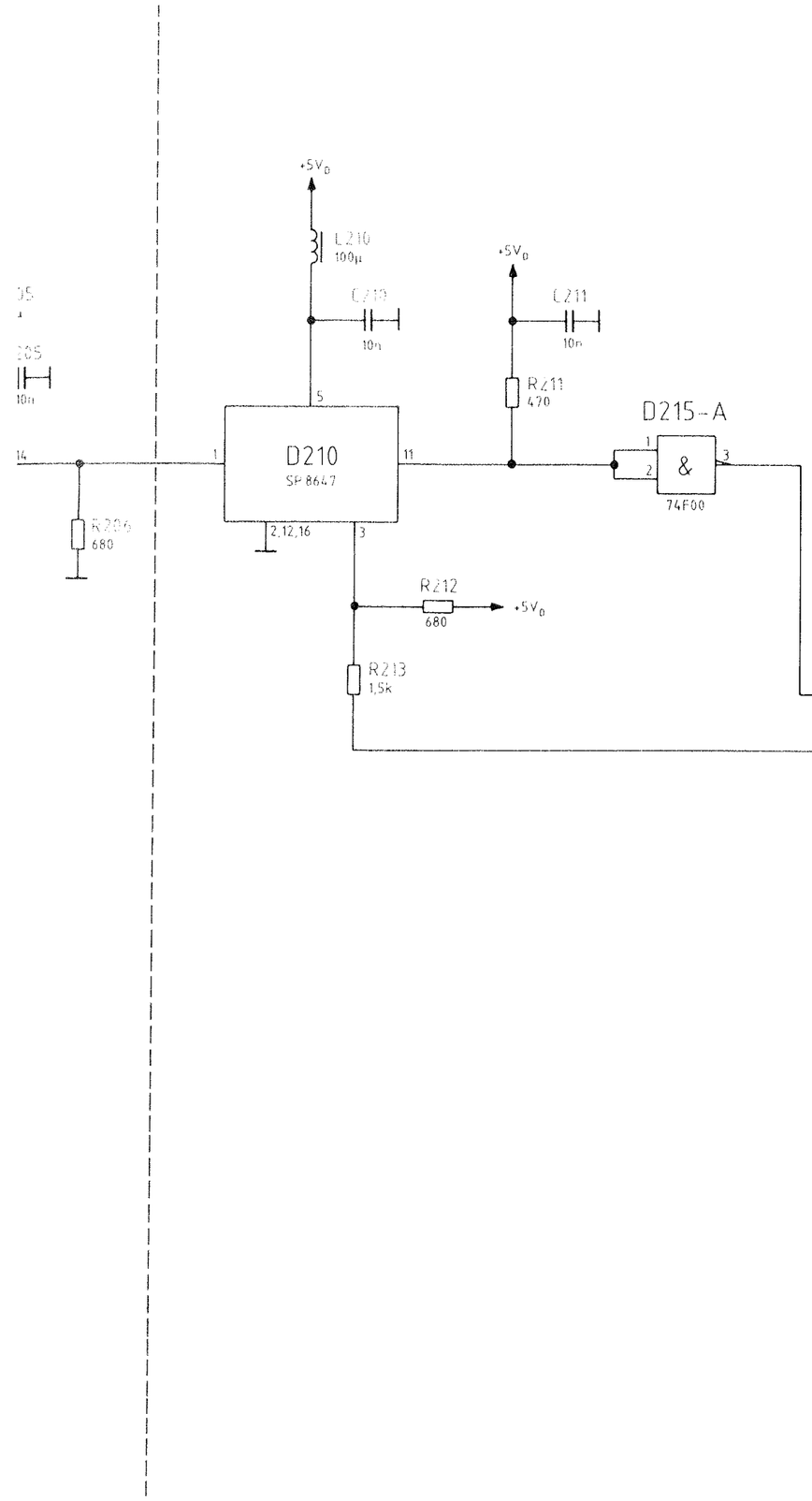


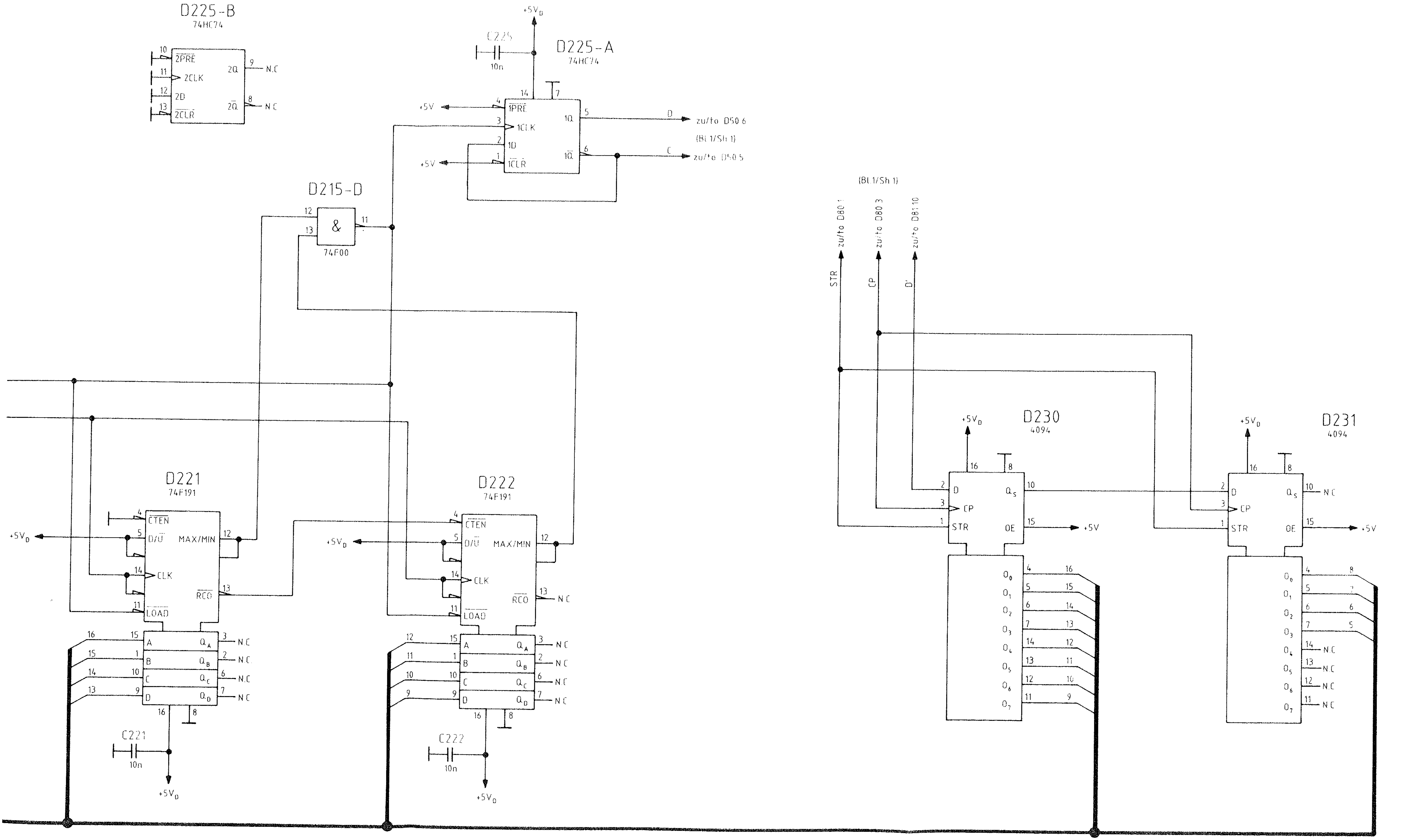


D225-B
74HC74





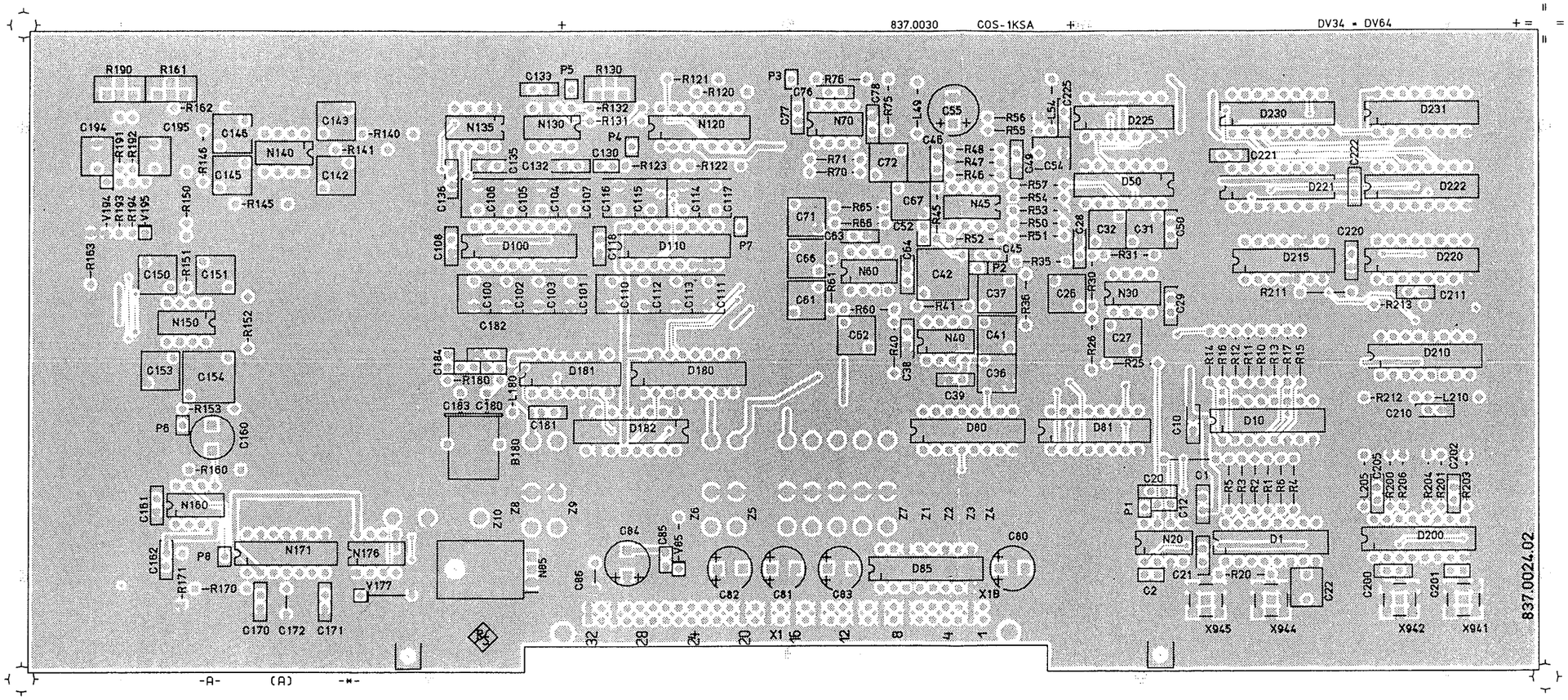




Stromlauf gilt für VAR 02
Circuit diagramm is valid for mod 02

ROHDE & SCHWARZ	1KSA / Bearb. / Gepr. / Norm.	Tag: 10.86	Name: Co
Benennung	SSB-/NF-ANALYSE SSB/AF ANALYSIS	Z	Zeichn.-Nr. 837.0024 S
zu Gerät	CMT-B10	reg. i. V.	837.0018 V

Ansicht und Leitungsführung Bauteilseite
View of tracks on component side

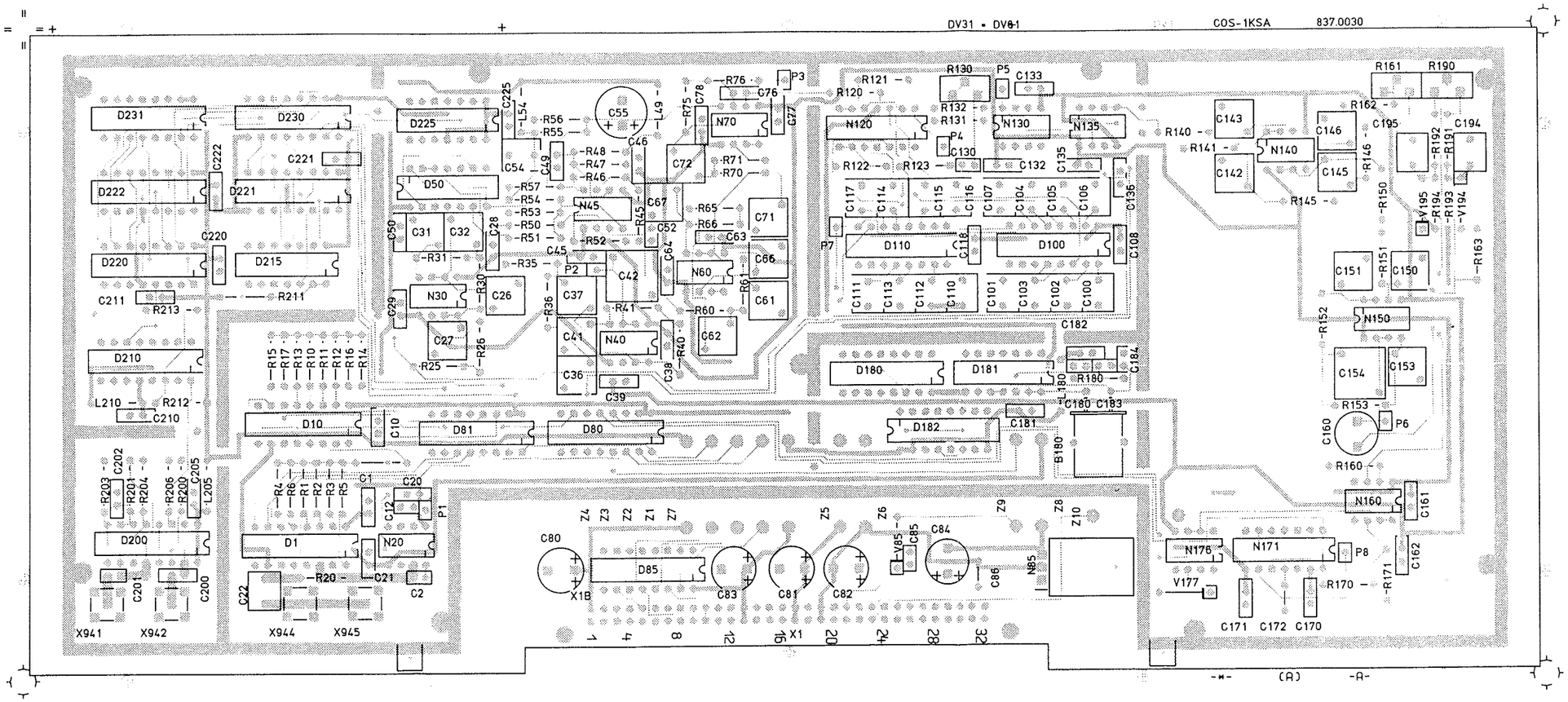


VARIANTENERKLÄRUNG / VERSION
VAR 02 – GRUNDAUSFÜHRUNG / BASIC MODEL

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

A 10.86 COS		1 : 1	
	1KSA 10.86 COS	SSB / NF - ANALYSE SSB / AF ANALYSIS	Z
	ROHDE & SCHWARZ CMT - B10	837.0024.01 EE 837.0018.V	2

Ansicht und Leitungsführung Lotseite
View of tracks on solder side



VARIANTENERKLÄRUNG/VERSION
VAR02 – GRUNDAUSFÜHRUNG/BASIC MODEL

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

A	10.86 COS	Maßstab	1 : 1
1KSA	10.86 COS	SSB/NF-ANALYSE SSB/AF ANALYSIS	Z
ROHDE & SCHWARZ	CMT-B10	837.0024.01 EE	3
		837 0018 V	