

Technical Handbook

SE 550-08-25-1

Part 1

Description

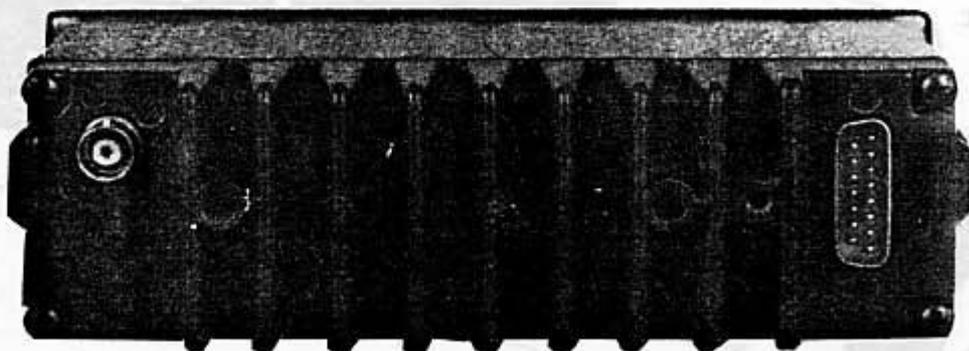
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1 DESCRIPTION

1.1 Purpose

The mobile transceiver SE 550-08-25-1 is used for the transmission of speech, signalization tones and data, in the frequency range 68...88 MHz. The SE 550 provides semiduplex operation and is suitable for mobile or fixed use.



1.2 Construction

1.2.1 General

The transceiver SE 550 is a compact device with removable control unit. The transceiver has 3 main parts:

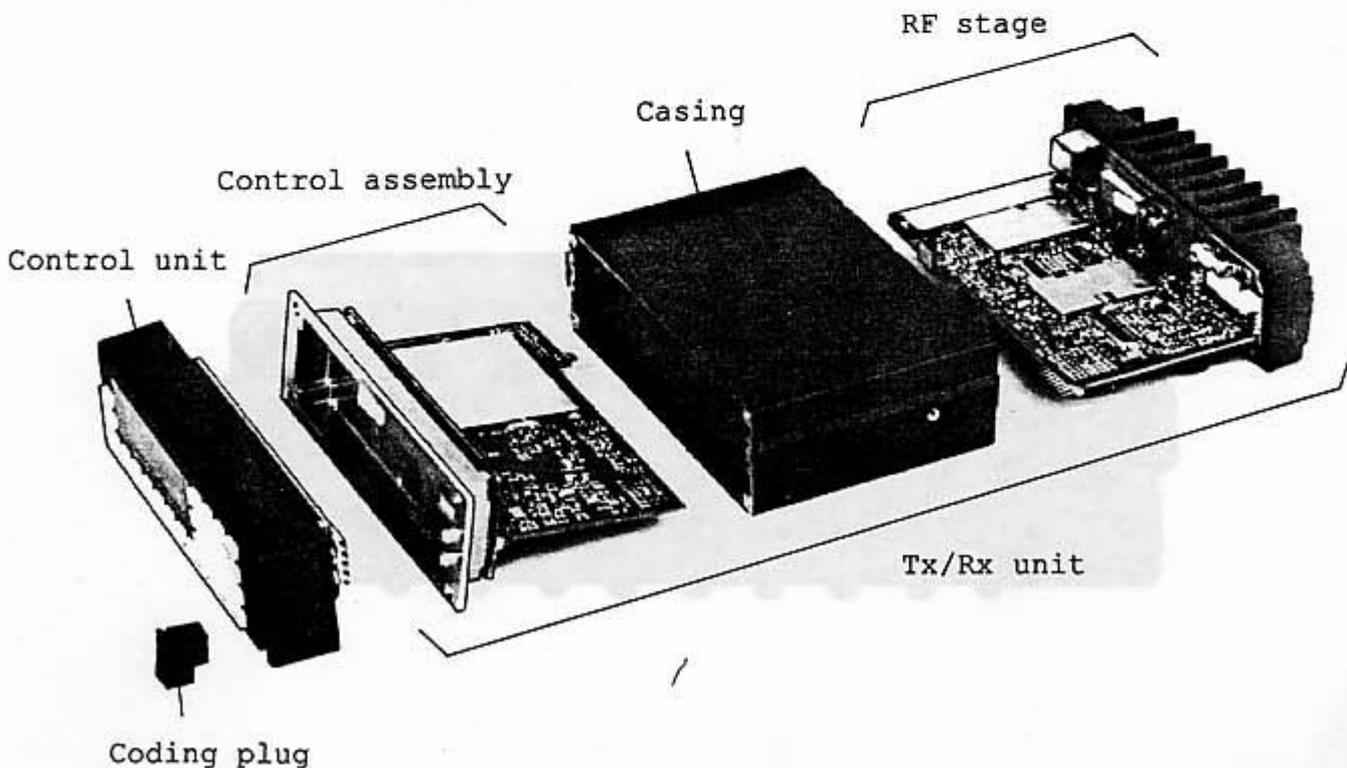
- o the RF stage, mounted on a radiator, constitutes the rear part of the transceiver
- o the control board, mounted on the front frame
- o the removable control unit

The rear part and the front frame are screwed with 4 screws to the casing. All connections between the different parts are plugged.

The transceiver is cased in a sturdy aluminium die-cast frame and protected against dust, splash-water, electrical interferences and mechanical loads.

The casing is equipped with guiding rifts for the 2 main PCB's of the transceiver. The radiator carries the main interconnection plug and the cloning plug of the transceiver.

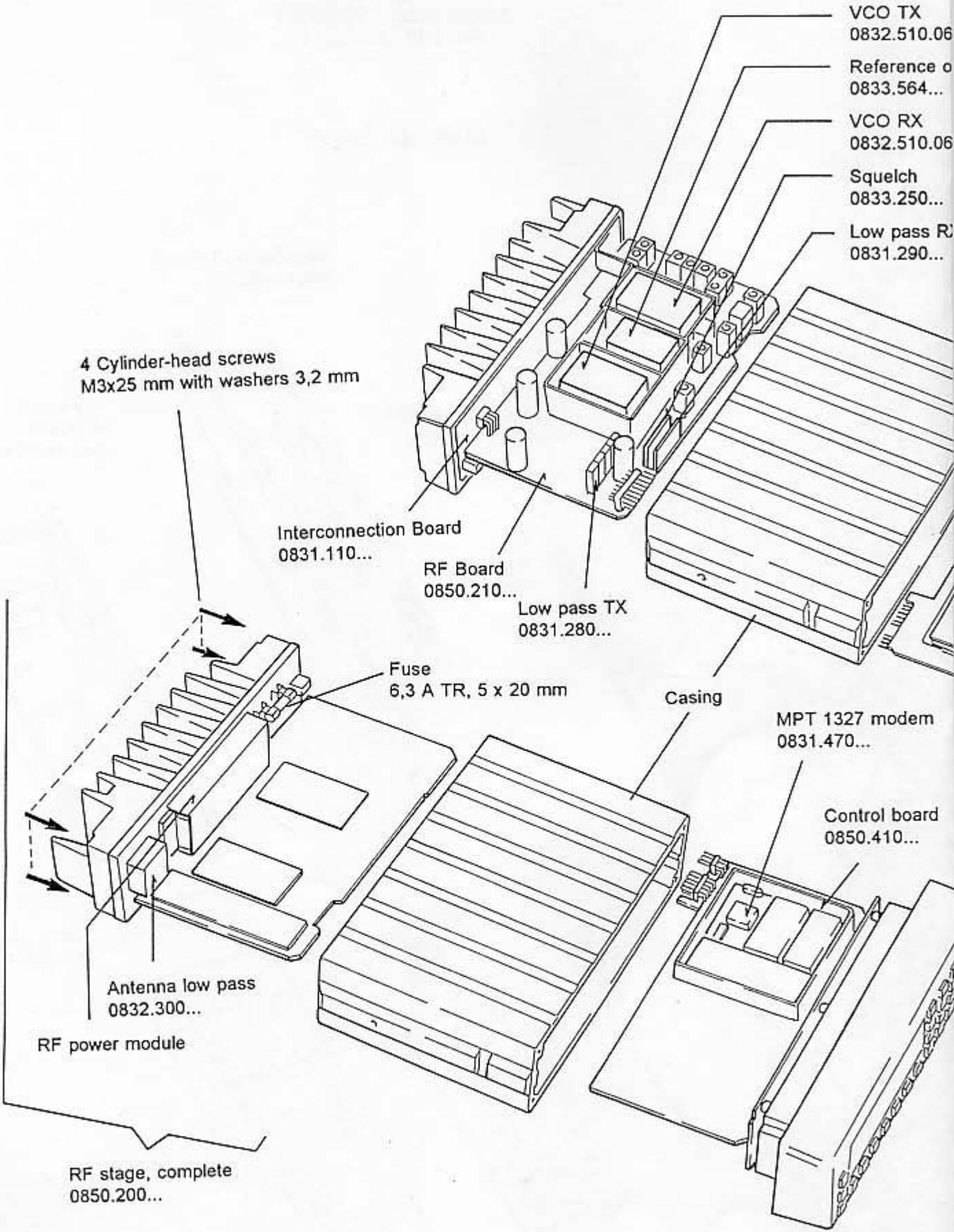
A monophone or handset can be plugged on the front part of the transceiver.



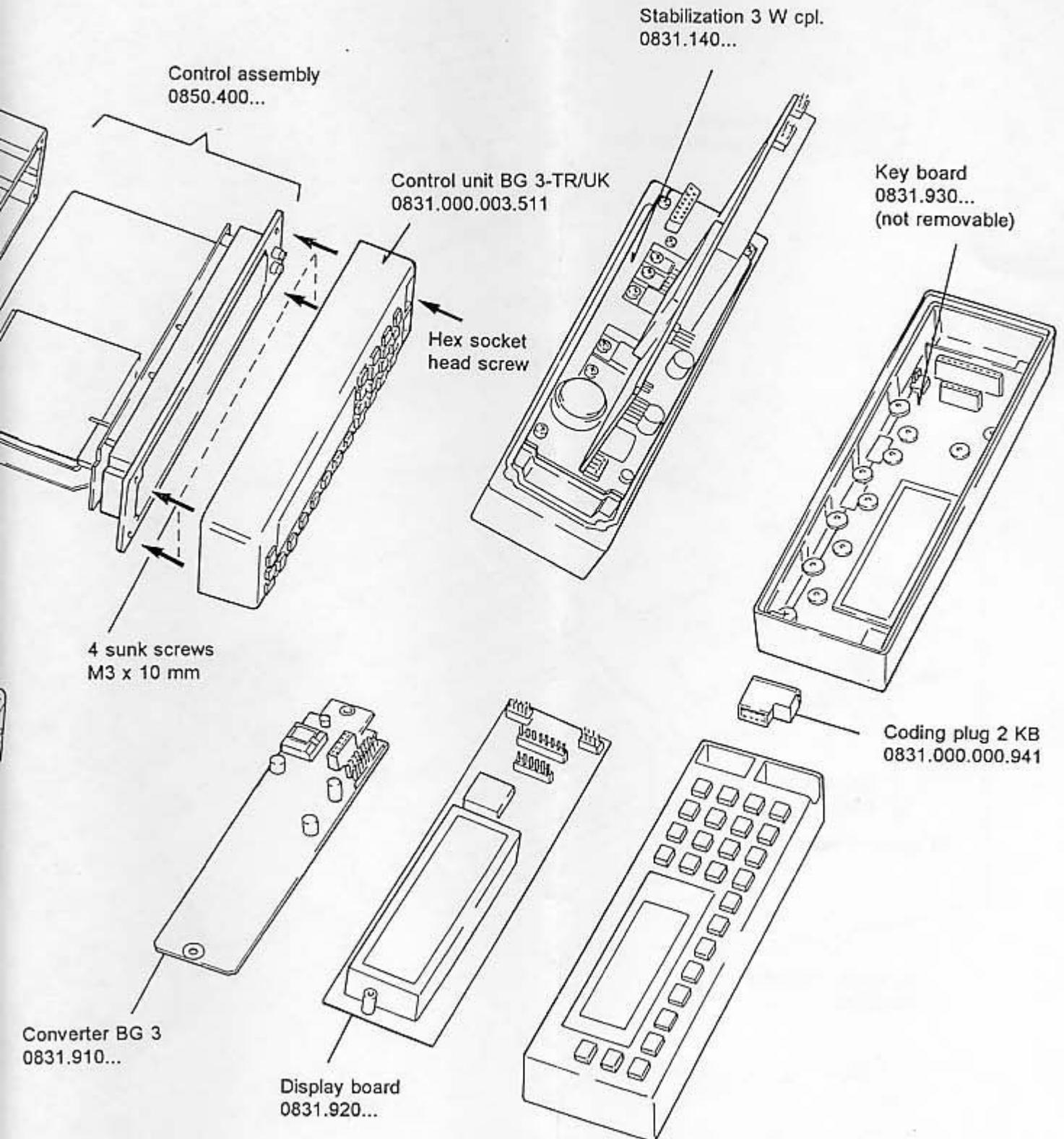
1.2.2 Assembly Review

The SE 550-08-25 mainly consists of the parts given in the table and shown in the following figures.

Pos.	Designation	Article number
1	Mobile transceiver set SE 550-08-25-1	0850.G08.N61.0C1
1.1	Transceiver SE 550-08-25-1	0850.G08.N61.100
1.1.1	Control assembly complete	0850.400.060.003
1.1.1.1	Control board	0850.410.050.003
1.1.1.2	Stabilization 3 W complete	0831.140.060.002
1.1.1.3	MPT 1327 modem	0831.470.050.001
1.1.2	RF stage complete	0850.200.060.201
1.1.2.1	RF board	0850.210.050.201
1.1.2.2	Squelch	0831.250.050.101
1.1.2.3	Low pass Tx	0831.280.050.601
1.1.2.4	Low pass Rx	0831.290.050.601
1.1.2.5	VCO Rx	0832.510.060.002
1.1.2.6	VCO Tx	0832.510.060.502
1.1.2.7	Reference oscillator TCXO 8 PPM	0833.564.060.001
1.1.2.8	Antenna low pass	0832.300.060.002
1.1.2.9	Interconnection board 25 W, SE 550	0831.110.050.101
1.2	Control unit BG 3-TR/UK, complete	0831.000.003.511
1.2.1	Coding plug 2 KB	0831.000.000.941
1.2.1.1	Coding board 2 KB	0831.940.050.001
1.2.2	Converter BG 3	0831.910.050.203
1.2.3	Display board BG 3	0831.920.050.005
1.2.4	Key board	0831.930.050.001
1.3	Mounting set complete	0831.000.060.304
1.3.1	Bag for universal mounting set	0831.080.060.002
1.3.2	Interconnector complete	0831.170.060.001
1.4	Loudspeaker 4 Ω /5 W	008.10.00.800



Assembly Review

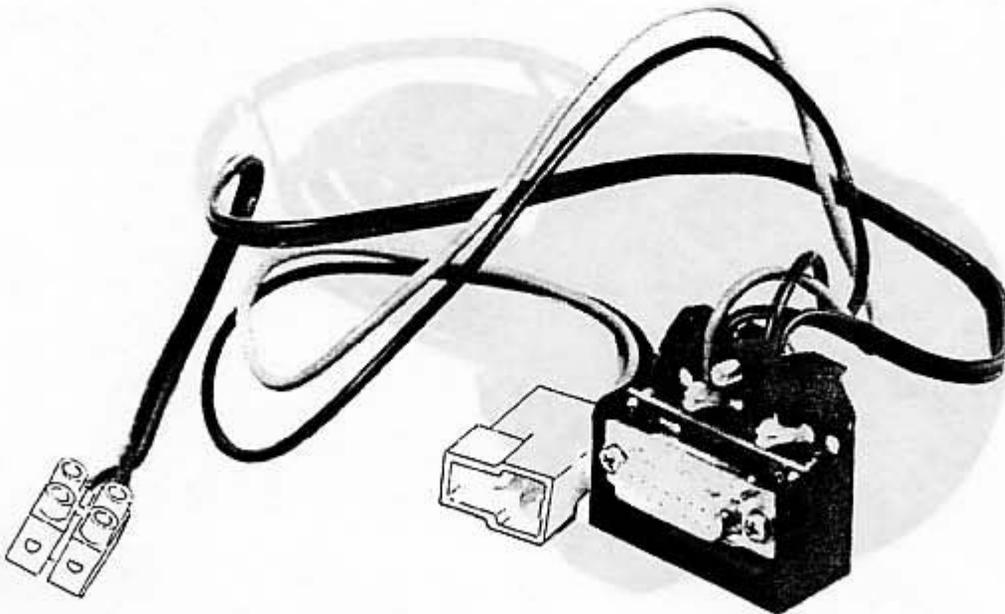


Mounting set

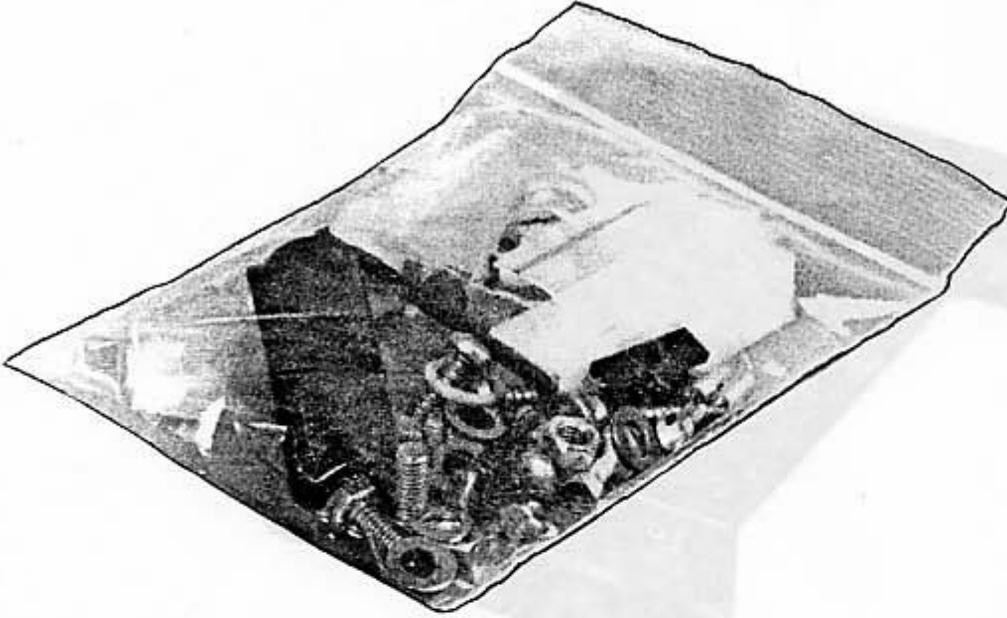
Simple holder, article number 852.01.48.172



Interconnector, article number 0831.170.060.001



Bag for universal mounting set, article number 0831.080.060.002



Accessories

Loudspeaker, article number 008.10.00.800



1.3 Technical Data

1.3.1 General

Type: SE 550-08-25-1
Frequency range: TX -> 68...88 MHz
RX -> 68...88 MHz
Channel spacing: 12.5 kHz
Operating mode: Semiduplex
Number of channels: 800
Modulation: Voice -> PM
Data -> FM
RF-switching band width: 20 MHz
Antenna plug: BNC, 50 Ω

1.3.2 Transmitter

Tx power output: 25 W, regulated
reduced power 12.5 W or 2.5 W
programmable
Frequency deviation max: 2.5 kHz
Frequency response: 300...2550 Hz, -3 dB
S/N ratio CCITT: > 40 dB
Distortion factor: < 5 %
Mikrophone input: 1 mV
Adjacent channel rejection: > 60 dB
Spurious and harmonic power: < 0.25 μ W (0.03...1 GHz)
< 1 μ W (1...12.7 GHz)

1.3.3 Receiver

Principle: Double superhet (IF1 = 21.4 MHz;
IF2 = 455 kHz)
Sensitivity at 20 dB S/N (CCITT): typ. 0.5 μ V
Protection against spurious
responses: > 80 dB
Adjacent channel selectivity: > 70 dB
Intermodulation rejection: > 70 dB μ V (EMF)
Blocking threshold: > 90 dB μ V (EMF)
Co-channel rejection: > -12 dB
Reradiation: < 2 nW (0.03...1 GHz)
< 20 nW (1...12.7 GHz)
Frequency response: 300...2550 Hz, -3 dB
S/N ratio CCITT: > 40 dB
Distortion factor: < 5 %
AF output power: 2.5 W on 4 Ω
Squelch: noise, switchable

1.3.4 Tone Call Facility

FFSK according to ZVEI-Regionet 43.

1.3.5 Power Supply

Supply voltage: 13.2 V (10.8...15.6 V), negative pole grounded

Current consumption

- Standby: approx. 500 mA
- Reception: approx. 1 A
- Transmission: approx. 6.5 A/25 W

1.3.6 Dimensions and Weight

Dimensions (height x width x depth): 171 mm x 52 mm x 175 mm

Weight: approx. 1.5 kg

1.3.7 Ambient Temperatures

Operation

- Operation within given data: -20...+55 °C
- Operable: -30...+70 °C

Storage: -40...+80 °C

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Part 2

**Instructions for Mobile Radio
Installation**

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2 INSTRUCTIONS FOR MOBILE RADIO INSTALLATION

2.1 General

Installation is to be performed along electrical safety guidelines for installations in vehicles.

Ascom radio units are manufactured only for negative chassis 12 V vehicular power supplies. For installation in vehicles with other polarities or voltages please refer to your distributor or the manufacturer.

2.2 Set of required tools

- o Socket puncher for feed-through holes
- o Electric drill
- o High speed drill set 2 to 10 mm
- o Soldering iron and solder
- o Set of straight blade screwdrivers
- o Set of pozidriv screwdrivers
- o Set of open ended spanners
- o Universal pliers
- o Wire cutter & stripper
- o Reflectometer/VSWR-bridge

2.3 Radio Unit Cradle

Select a safe and convenient place for the cradle holding the radio unit, such that:

- o the radio unit can be operated conveniently by a user with seat belts on, with the radio display well readable
- o the ventilation outlets neither are blocked or blow onto the radio
- o the radio does not hinder passengers in entering/leaving the vehicle
- o the radio does not present a hazard to occupants in case of a collision (e.g. knee protection)

In order to avoid interferences/suceptibilities with/from other vehicular electric systems on board (ignition system, injection control system, ABS anti-skid, etc.), it is recommended to route the radio's power supply cables as far as possible away from these systems. Consult your car manufacturer's recommendations for best installation places.

The cradle should be mounted on a flat surface, large enough to accomodate the whole mounting plate. This will guarantee a solid hold and connection ease.

Use the supplied self threading screws and the template to install (refer to section 2.11) the cradle.

Free and good ventilation around the finned heat sink area is essential. There should be at least 20 mm free space to the rear, above and below for air circulation. Avoid installing the radio in the glove compartment if it will be used for long periods of time. Otherwise a heat build-up will cause a self-protecting reduction in rf-output power, which will impair the communication quality.

2.4 Power Supply

Please refer to installation diagram/pictures in sections 2.10.3 to 2.10.6.

2.4.1 Positive Lead

The positive lead (red) is to be routed directly from the battery's positive (+) pole and must include an in-line fuse (refer to section 2.4.3) within a fuseholder placed as close as possible to the battery.

Use existing feed-through holes where possible. If additional feed-through holes have to be made, they should be fitted with a rubber grommit or similar protection.

2.4.2 Negative Lead

The negative lead (black) must be connected on the shortest possible way to the chassis using the ring cable connector, and never be connected directly to the negative (-) pole of the battery. See the diagram 1 in section 2.10.3. Otherwise noise loops exist which will cause annoying noise effects in the radio (mainly alternator generated noise).

2.4.3 Fuse

The required fuse (value 8 A) to protect the supply line, is to be fitted as close as possible to the battery.

Insert the fuse only after completion and last check of the wiring, before the radio is to be taken into operation.

2.4.4 Wire cross section

For lead lengths up to 2,5 m use a wire with 2,5 mm² cross section. Longer leads will require 4 mm². Be aware that leads with insufficient cross section cause voltage brown-outs leading to severe malfunctions of the radio.

2.4.5 Lead routing

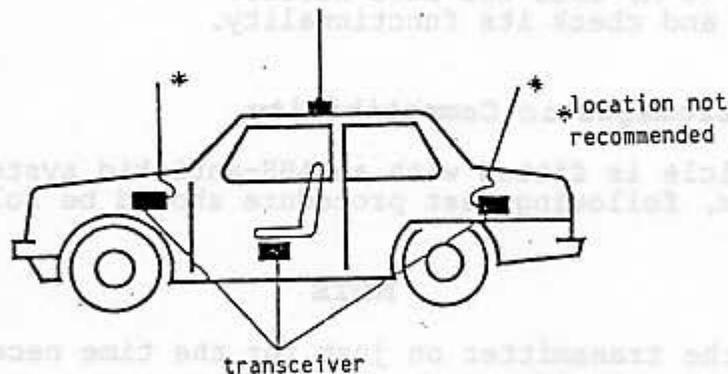
Keep leads such that a short and neat wiring installation is achieved. Pay attention not to lay the leads over sharp edges etc., which will end up in shorts through isolation damage. A good practice is the use of flexible plastic tube insulation. When routing through feed-through holes, check for rubber grommit protection on sharp edges.

2.5 Antenna Mounting

The transmission quality of a radio link depends to a high extent on the antenna itself and its placement.

To reduce the rf-attenuation due to antenna cable losses, the length of this cable is to be kept as short as possible. Avoid mounting the antenna close to the engine, as this may lead to interference.

The antenna outlet of the radio has been designed for a 50 Ohm nominal load. This nominal value will be presented by the antenna only if the operating frequency range is correct. A mismatch in antenna or antenna cable will cause a reduction in rf-output power.



Best results are achieved with an antenna mounted vertically in the centre of the roof area.

If mounting in the roof centre is not feasible, keep mounting holes at least 300 mm from the edge of the roof.

An antenna mounted on the wing will cause strong lobing of the radiation pattern with pronounced directional negative effects.

The mounting surface around the antenna base flange should be cleared from varnish/priming colour to ensure a satisfactory ground connection. Antenna efficiency depends largely on the quality of the ground contact.

Use only 50 Ohm coaxial cable of proven quality of the types RG-58/U, RG-223/U or similar types. If the antenna lead is longer than 5 m, RG-213/U is recommended.

Recapitulating:

- o Mount the antenna vertically and as high as possible
- o Avoid mounting the antenna close to the vehicle's engine
- o Keep antenna lead as short as possible

2.6 Handset/Microphone Mounting

Choose an appropriate place for the cradle. Mark the holes from the template (refer to section 2.12) or from the base plate.

2.7 External Speaker

The external speaker is mounted on a convenient spot and wired with a 2 x 0,75 mm² wire to the speaker connectors. Polarity of the cabling is irrelevant. Mark the holes from the template (refer to section 2.12) and refer to the installation diagrams in section 2.10.4 to 2.10.6.

2.8 Putting into Service

Re-check the wiring against possible errors.
Insert the radio unit into the cradle, until it locks in.
Insert the fuse (8 A) into the fuse holder.
Switch radio on and check its functionality.

2.9 Electromagnetic Compatibility

In case the vehicle is fitted with an ABS-antiskid system or electronic injection system, following test procedure should be followed:

NOTE

Turn the transmitter on just for the time necessary.

Test: Vehicle at rest, parking hand-brake pulled on.
Engine at high idle RPM. Activate transmission key (PTT). The ABS pilot lamp should not light up. The engine should keep running smoothly.

ATTENTION

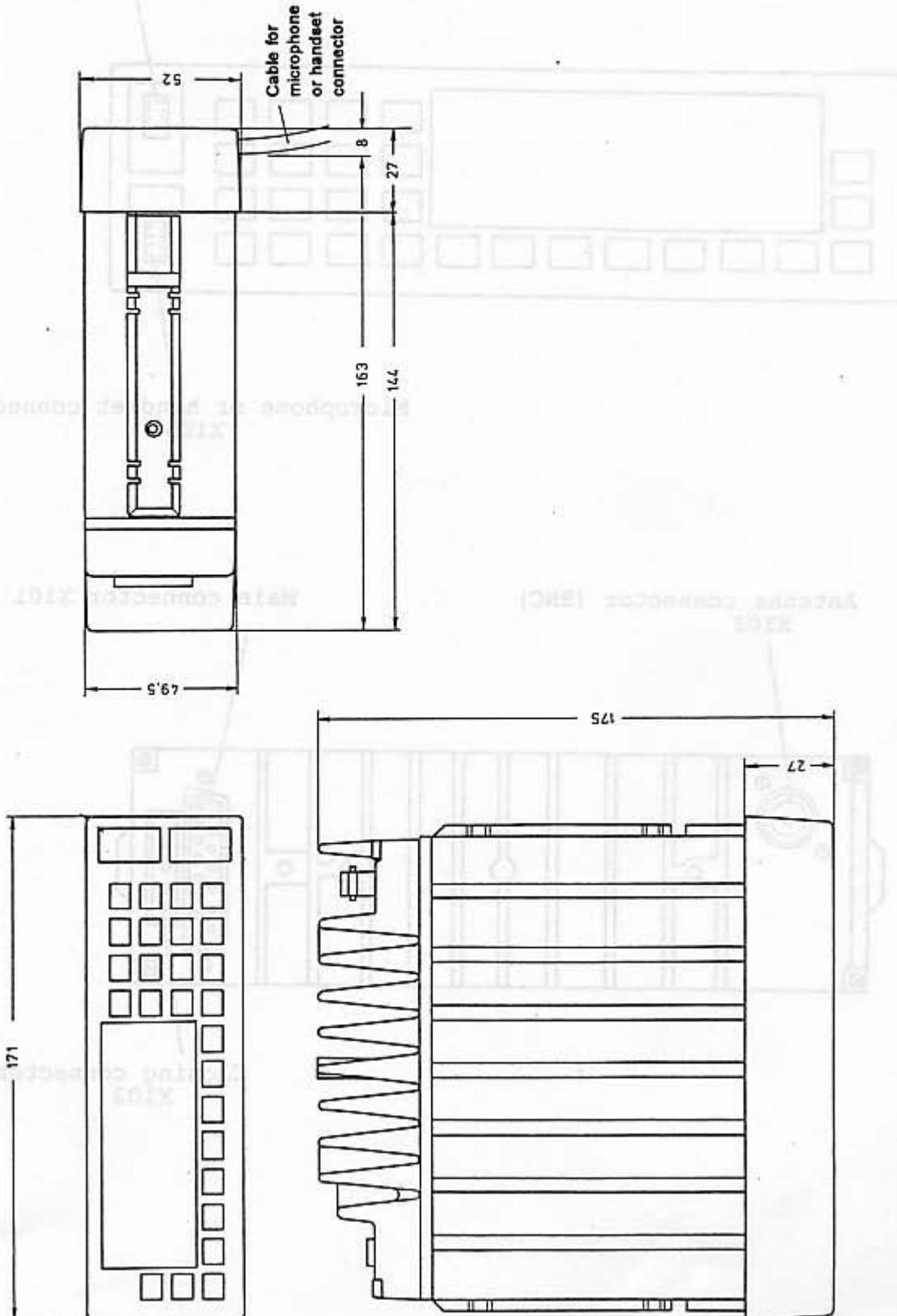
If malfunction of brakes or ignition/injection is observed, re-route antenna cable, check antenna ground contact. In case of a plastic roof: make a ground plane by glueing a sheet metal foil (either 1/2 wavelength in diameter or side length) from the inside and connect it to the antenna base.

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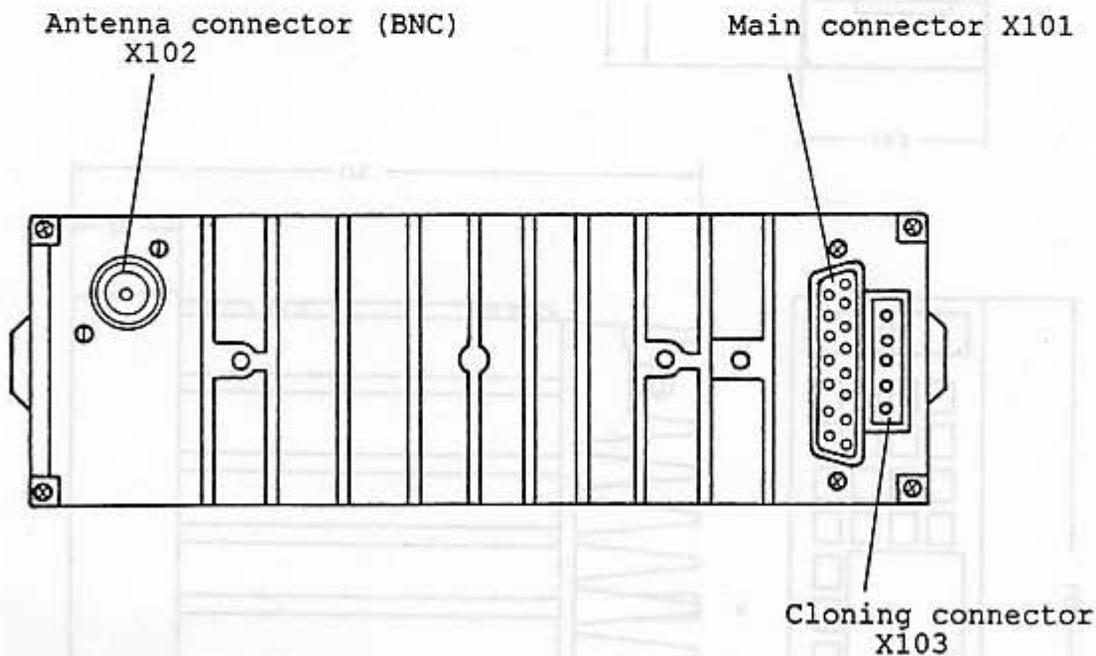
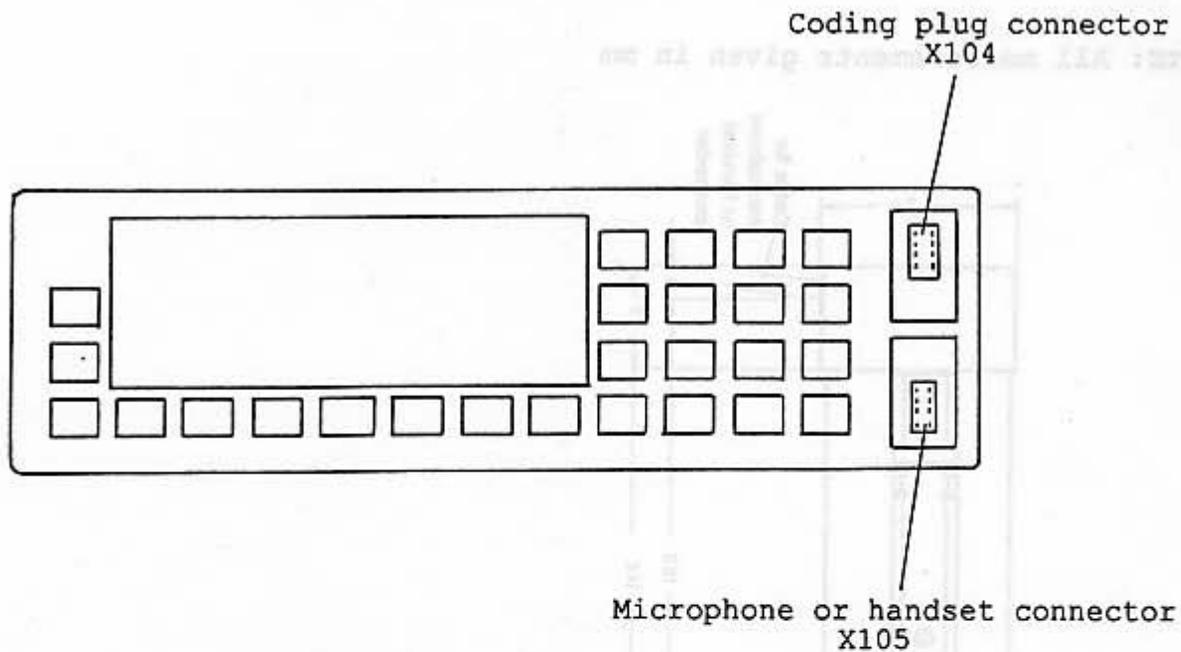
2.10 Installation Diagrams

2.10.1 Measurement Drawing SE 550

NOTE: All measurements given in mm



2.10.2 Overview External Connectors SE 550

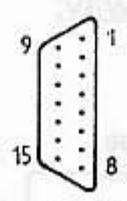


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2-10-2

X101

Views of the connecting side



+UB	1	+ UB } battery voltage
+UB	2	+ UB } (prot. by external fuse)
LSP⊥	3	Loudspeaker 4 Ω
AS	4	Signalization, max. 12 V, 500 mA (BC817)
Res	5	Free
AF Ear	6	AF Earphone (600 Ω)
Gnd	7	Ground
Gnd	8	Ground
RF-10dB	9	RF power reduction - 10 dB
LSP~	10	Loudspeaker
PTT A	11	active = L
AFIN	12	AF 600 mV
Emerg.	13	Emergency contact, active = L
+9V	14	+ 9 V •→
Mic A-	15	Microphone 100 m V

X103

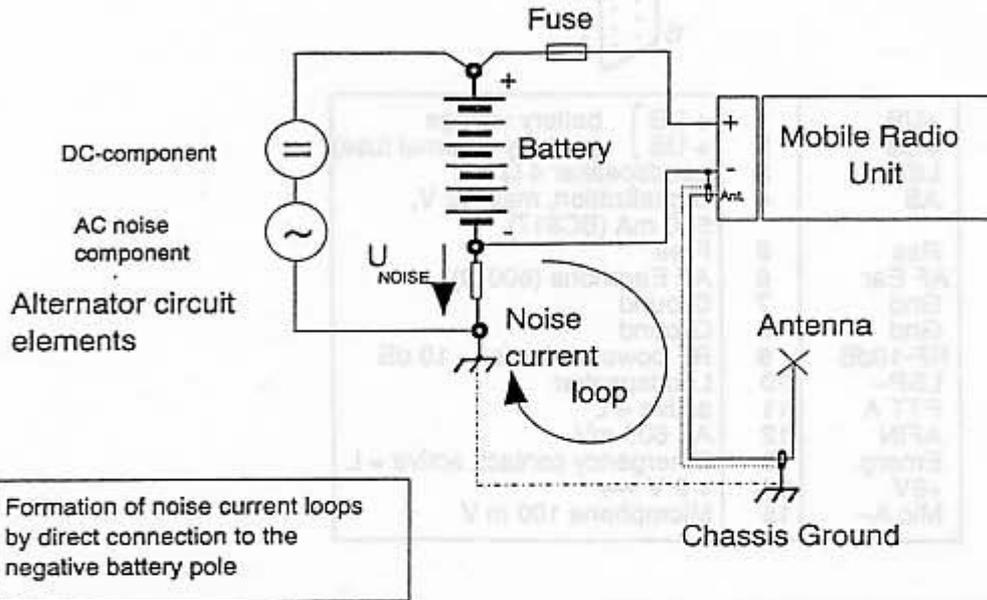
□	1	1	Cloning on
□		2	TxD
□		3	RxD
□		4	RTS
□	5	5	CTS

X105

□	1	Mic B-	1	Micro signal, 1 mV
□		HA	2	Cradle contact, unused
□	2	+9V	3	Micro supply, unused, input
□		PTT B	4	active = L
□		Ec~	5	Earphone
□		Mic ⊥	6	Ground micro
□	7	Gnd	7	General ground
□		Ec ⊥	8	Ground earphone

2.10.3 Cabling

Do NOT wire your radio this way:



Recommended wiring:

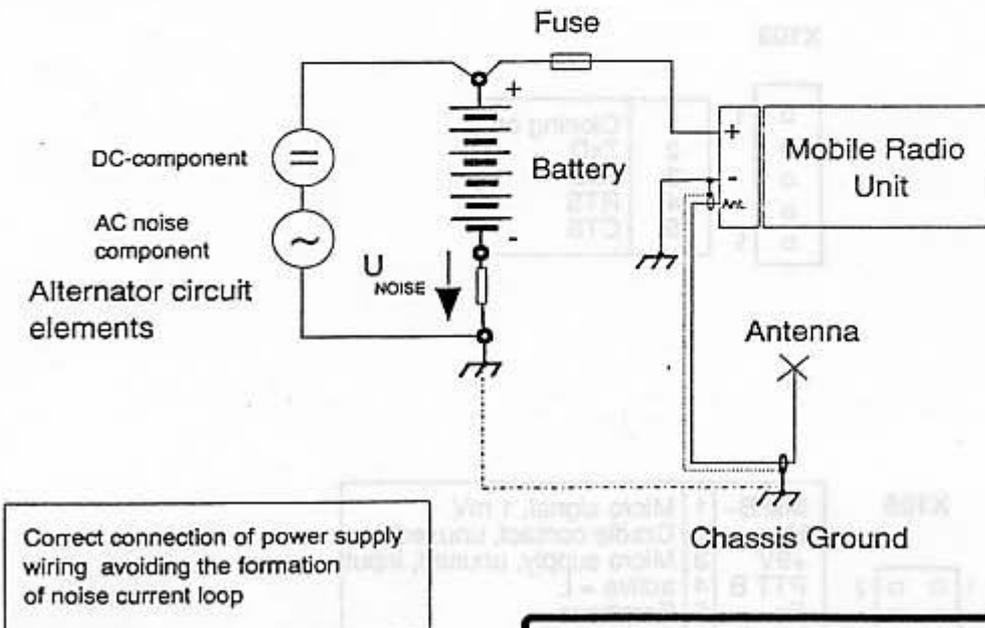
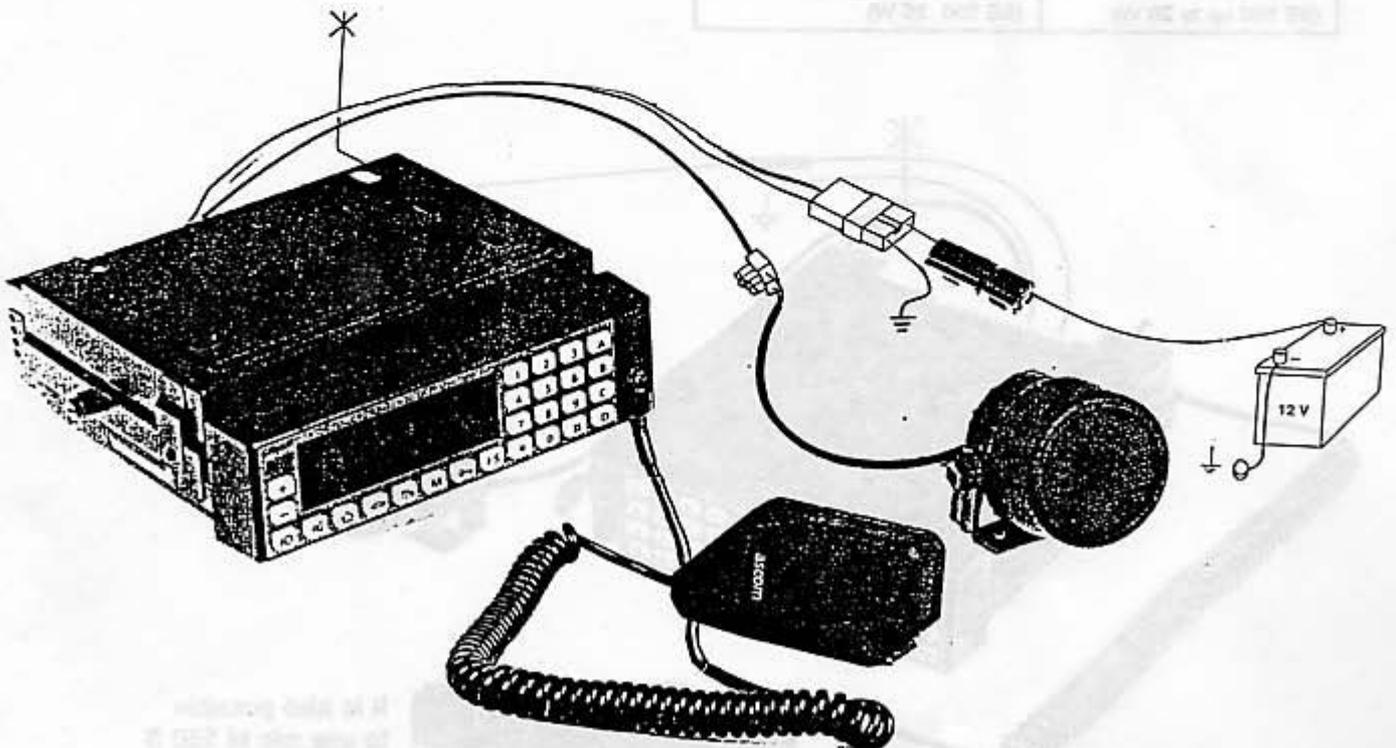
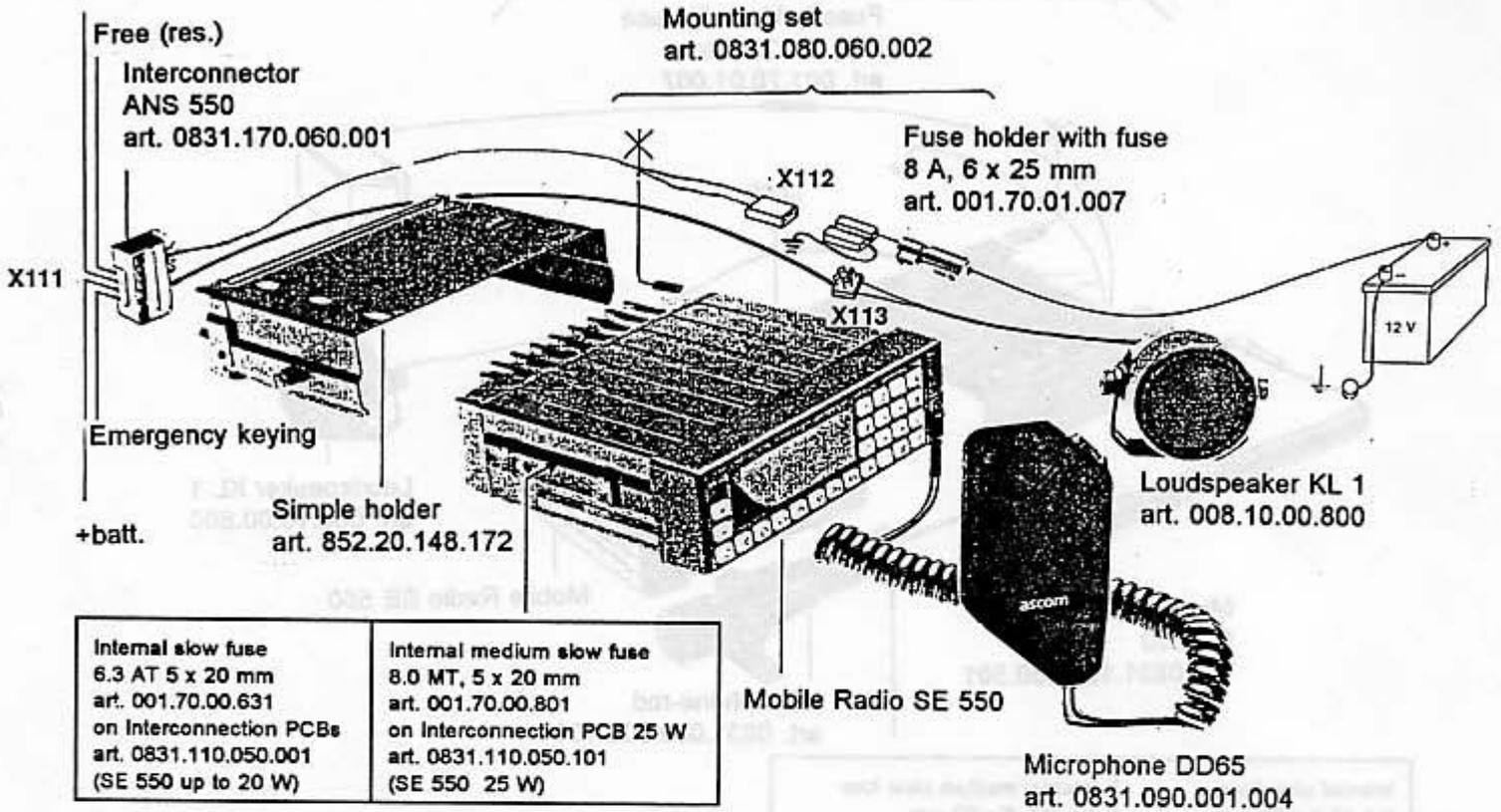


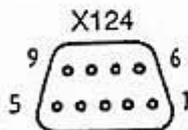
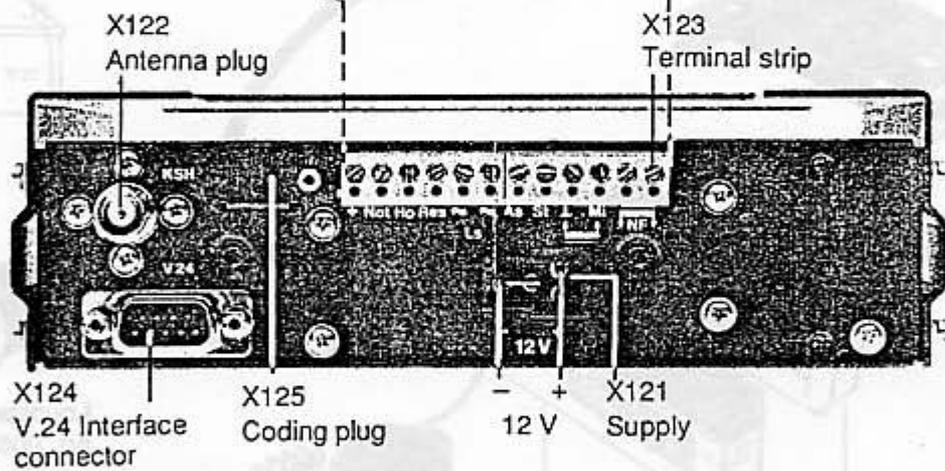
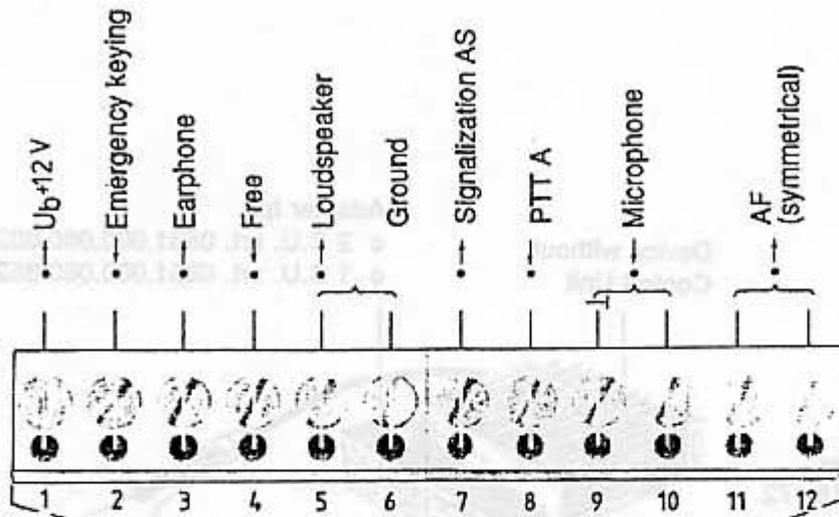
Diagram 1.
Noise loop in power leads

2.10.4 Installation on the Simple Mounting Holder

Signalization AS



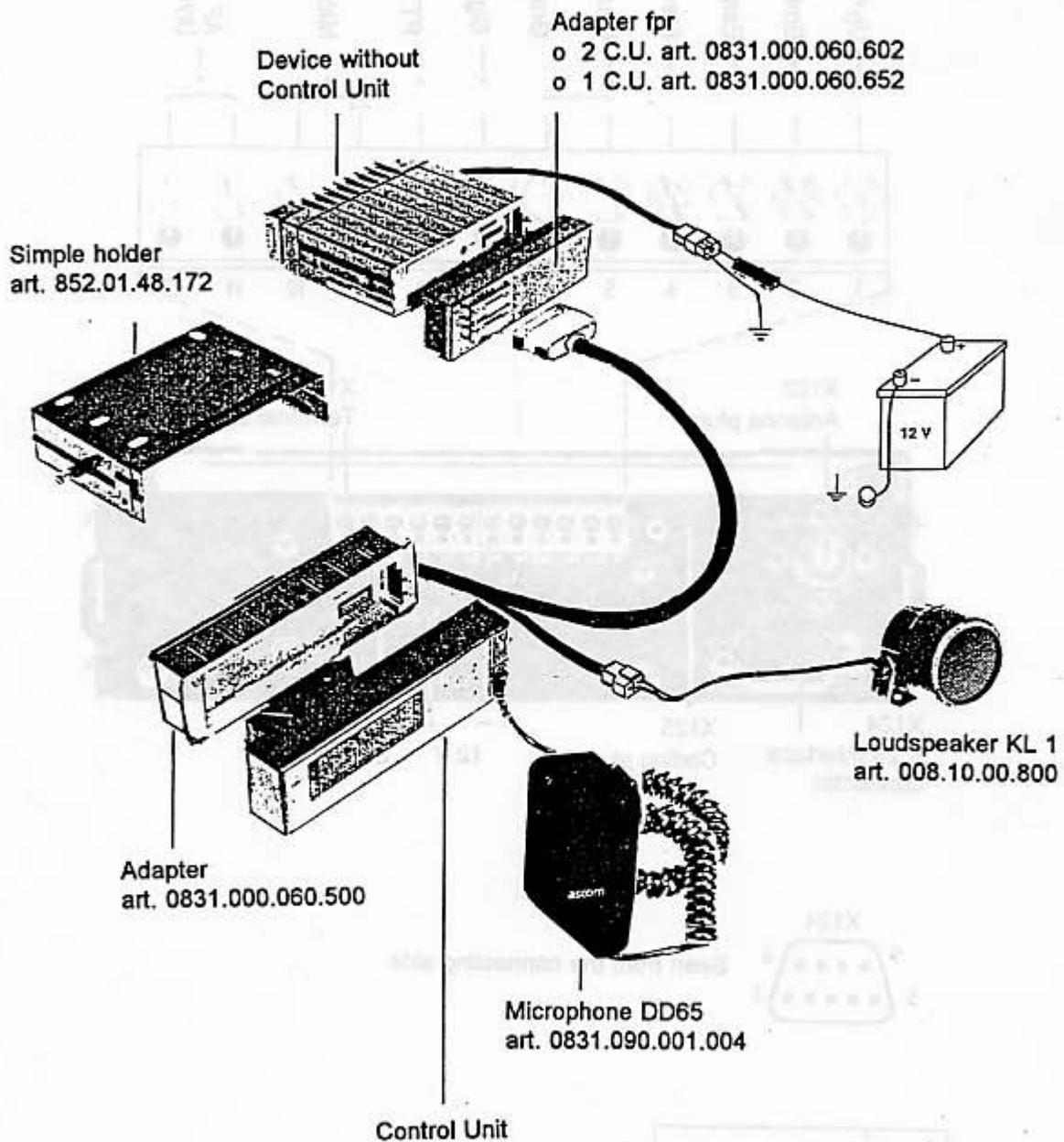
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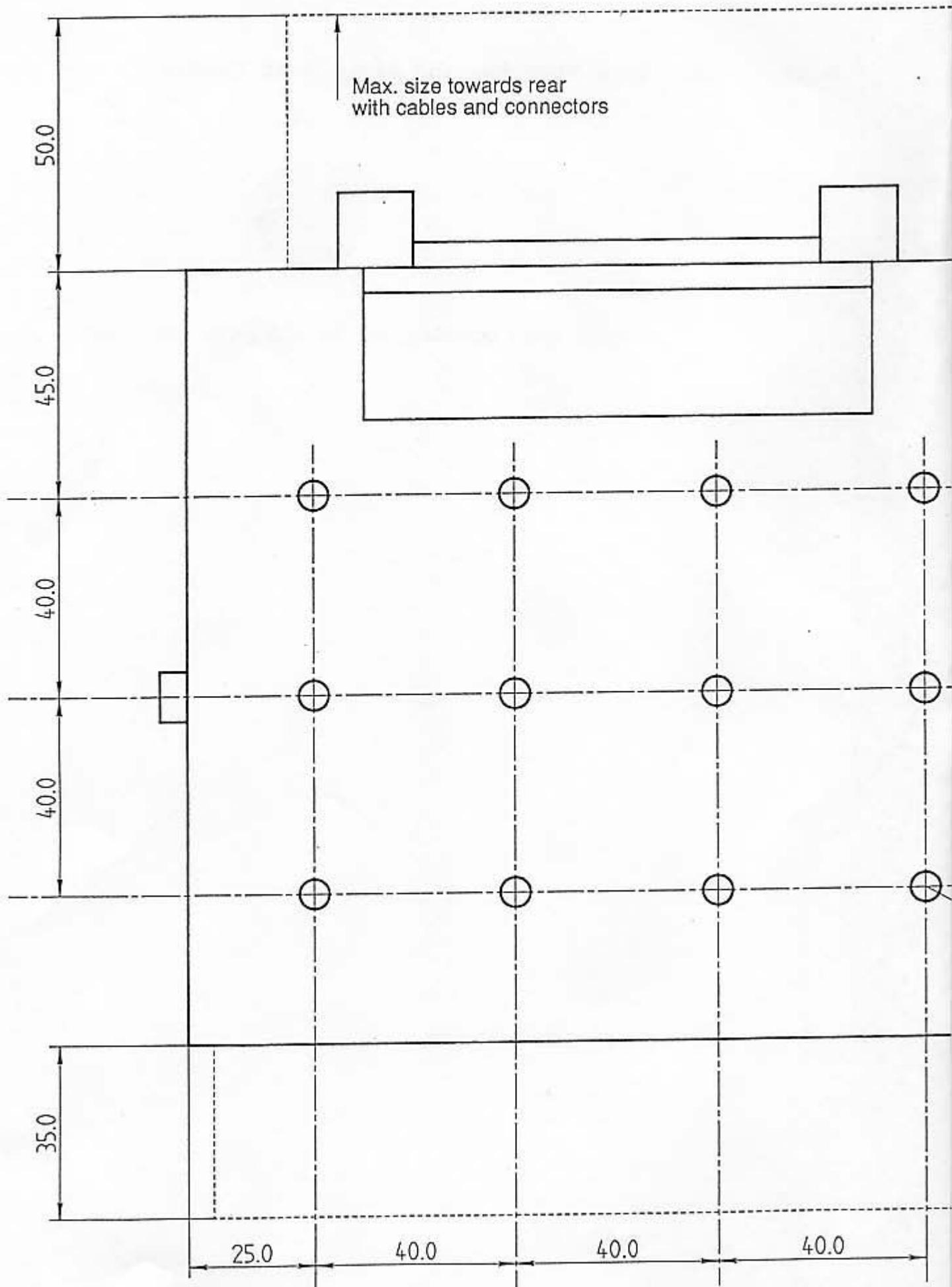
Seen from the connecting side

1	
2	TxD
3	RxD
4	+ UB
5	⊥
6	
7	CTS
8	RTS
9	

2.10.6 Version with Remote Control Unit

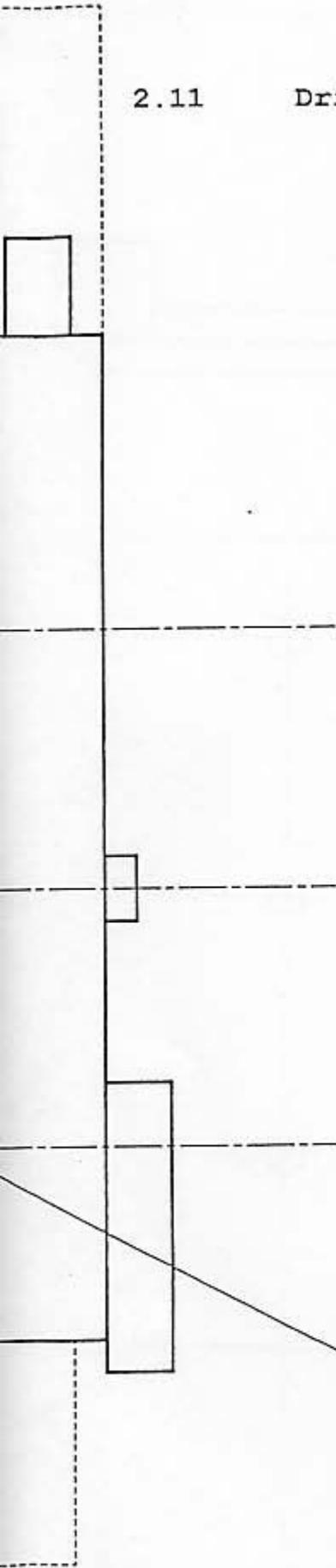


Q27	1
Q28	2
80	3
4	4
80	5
470	6
470	7
	8
	9
	10

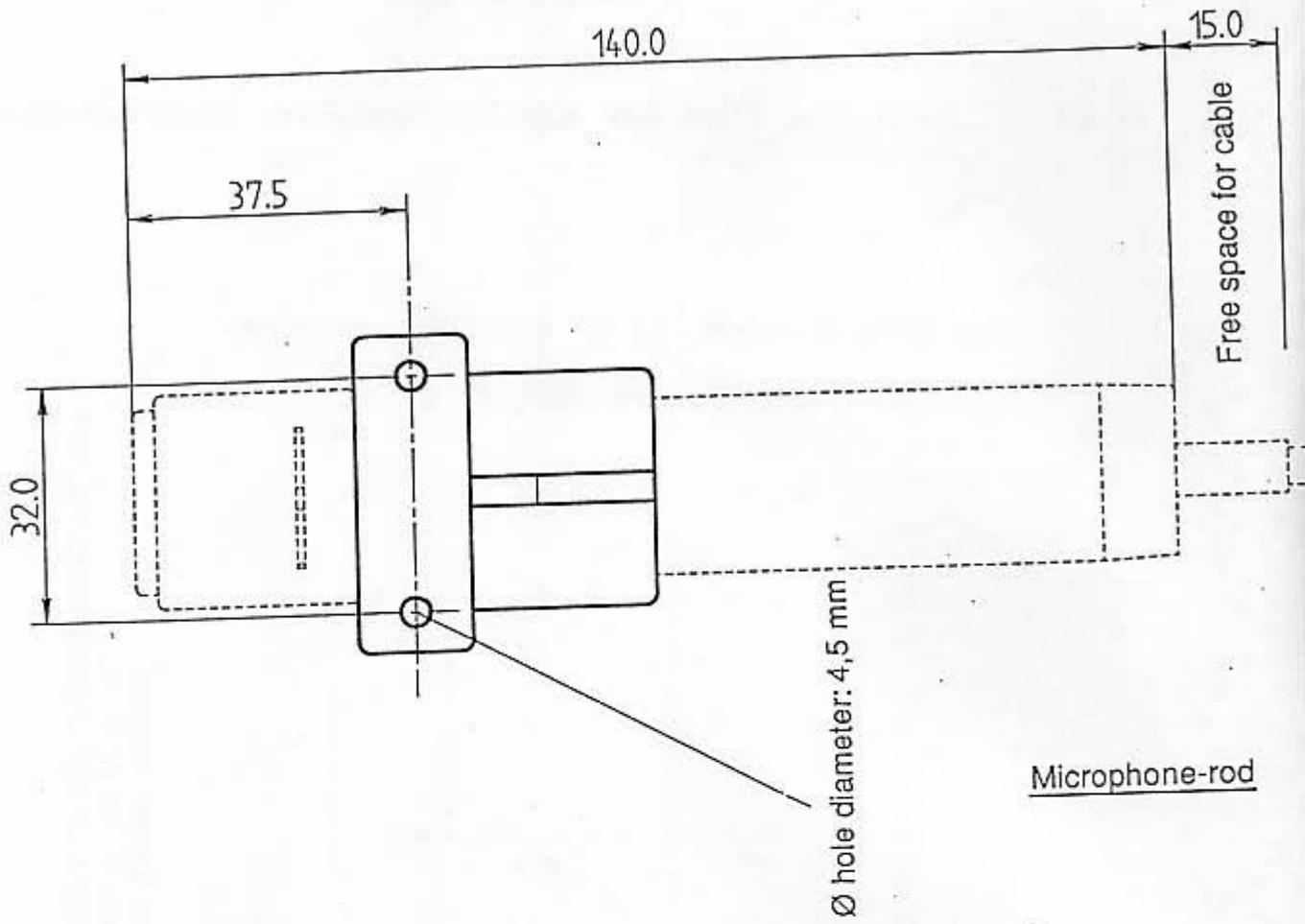


2.11 Drilling Plan for the Radio Unit Cradle

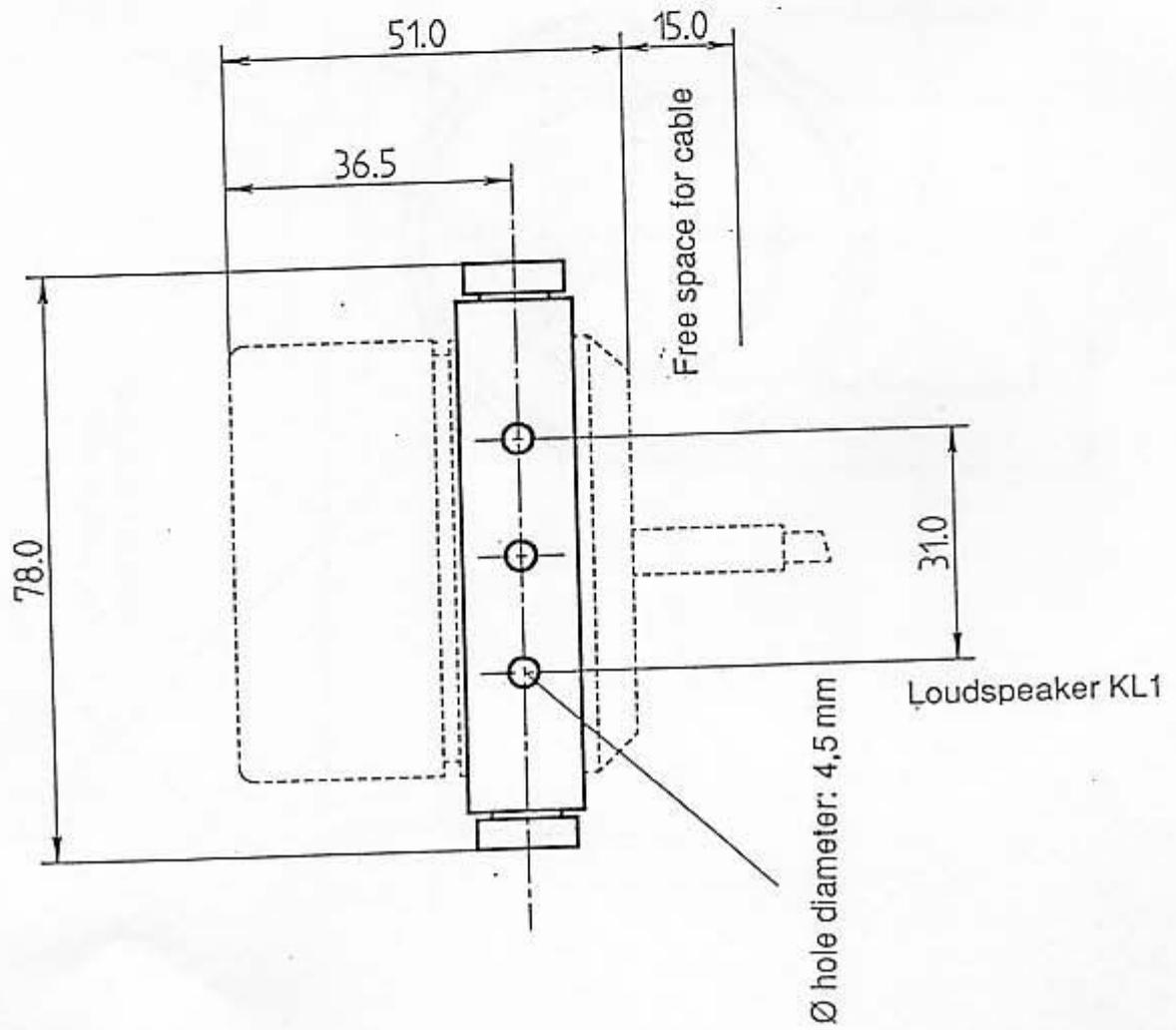
Copy this drawing 1:1 to get hole patterns.



Ø hole diameter: 6 mm



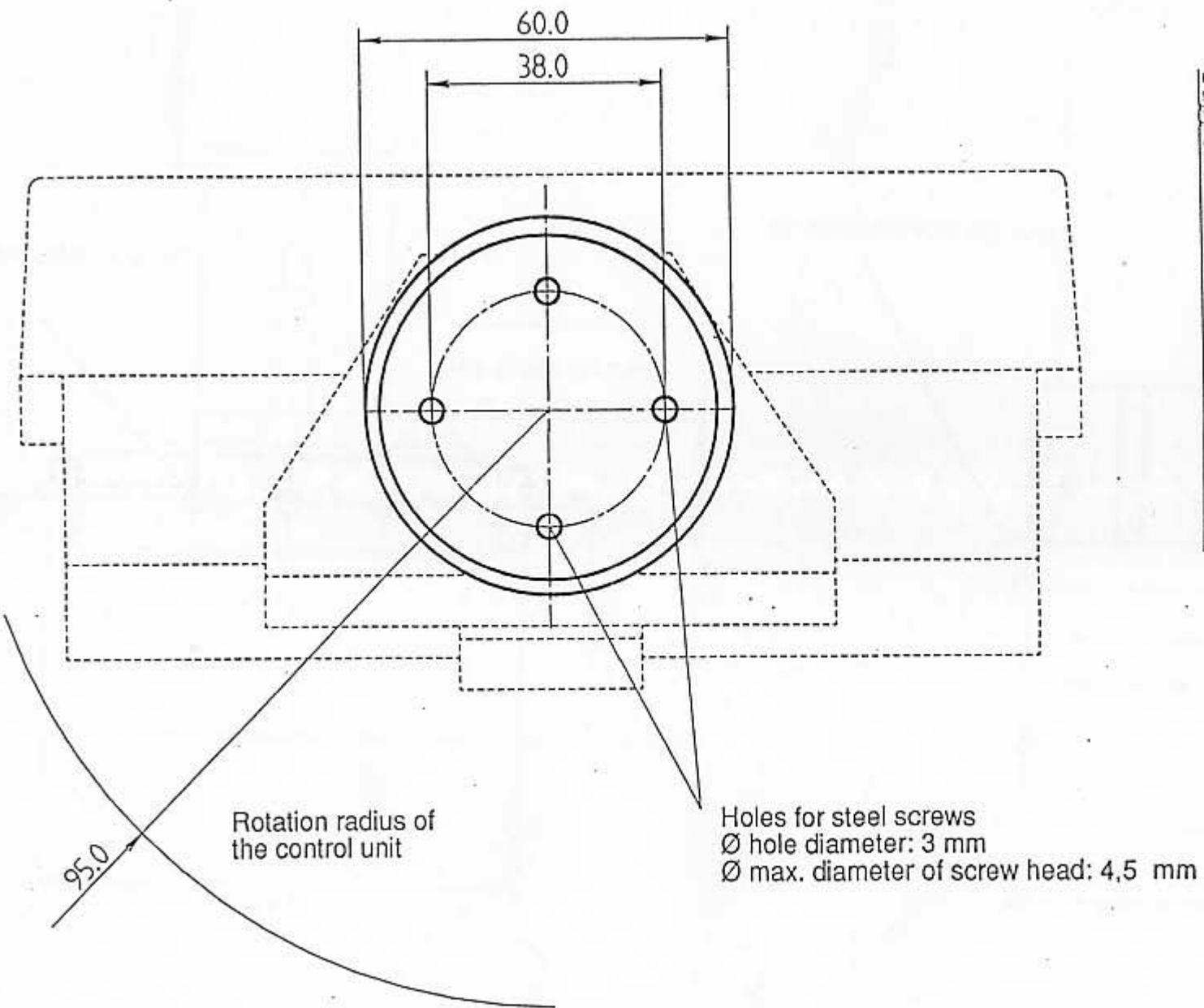
Microphone-rod



2.12 Drilling Plan for the Loudspeaker, Microphone-Rod,
Control Unit

Copy this drawing 1:1 to get hole patterns.

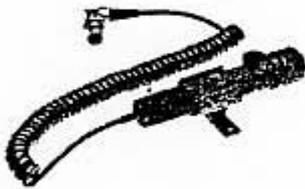
Support of the control unit BG



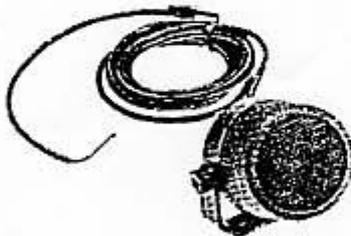
2.13 Accessories (Option)



Microphone DD65
art. 0831.090.001.004
Front plugging



Microphone-rod with
microphone preamplifier
art. 0831.090.001.101
for connection at rear of
the plugging holder
art. 0831.190.060.501



Loudspeaker KL1
art. 008.10.00.800



Coding plug
art. 0831.000.000.941



Accessories (Optional)

21.5

Mounting set
art. 0831.080.060.002

Microphone
Microphone pre-amplifier
art. 0831.080.001.001
For connection at rear of
the plugging holder
art. 0831.180.060.001

Loudspeaker kit
art. 0831.10.00.800

Endling plug
art. 0831.000.000.041

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Part 3

Functional Description

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3 FUNCTIONAL DESCRIPTION

3.1 General

The Mobile transceiver SE 550-08-25-1 is controlled by two processors. One processor is in the transceiver and the other is in the control unit BG3.

Transmit and receive frequencies are generated with two independent synthesizers. The operating software is stored in an EPROM. Specific parameters depending on the carrier network are stored in a RAM and can be modified by way of the data or the coding plug.

3.2 Rx Branch

3.2.1 Rx Signal Path

(1) Signal Path in the RF Stage

See circuit diagram: receiver 0850.210.210.201A

The PLL receiver operates with a synthesizer of its own in accordance with the double super principle. The antenna signal arriving from the antenna socket passes through the antenna low pass (0832.300) and is passed through a three-pole plug connector to the RF stage (0850.210).

During transmission, + 9 V level is applied via L1. D1 becomes conductive and shorts the RX input.

No DC voltage is applied during reception. D1 is reverse biased and the signal path via L1 and C2 to the filter L2 is open.

The Rx signal is passed through the dual circuit band filter L2 (preselection), the first buffer amplifier stage V1 and the triple circuit band filter L6 (main selection) to the FET mixer V2.

After band selection and signal amplification (V1), the signal is converted to the first intermediate frequency (IF1) of 21.4 MHz with the FET mixer V2. The signal of the Rx oscillator is monitored and regulated by the synthesizer module and is frequency stabilized to a high precision. It is forwarded to the FET mixer V2 via LB.

The differential signal from the carrier and Rx oscillator frequency (1st IF) passes through the quartz crystal filter Q1. The frequency response of the quartz crystal filter Q1 is influenced with L12 and L16 (wobulation curve).

Via the IF stage V4, the IF signal is amplified and forwarded to the discriminator in the IF component J1.

The diodes D16 and D17 serve to limit the input signal for the IF component J1. The IF component J1 contains the second IF oscillator (with Q3 = 20.945 MHz or Q2 = 21.855 MHz), the second IF stage (with QF = 455 kHz ceramic filter) and the demodulator (phase shifter circuit L21, C63, R40).

The unfiltered AF signal is passed from the output of the discriminator (J1/9) via the high pass filter J7.II to the squelch submodule (0831.250) and via the AF low pass filter J7.I to the low pass Rx submodule (0831.290).

The squelch signal RSP is forwarded via the connectors B3/9 --> B3/3, and the AF is forwarded via connectors B3/8 --> B3/2, to the control assembly (0950.410).

(2) Signal Path in the Control Assembly

Refer to the trunking control circuit diagram 0850.410.210.003

On the control assembly (0850.0410), the prefiltered AF signal is picked up at B3/2 and is fed via a switchable analog active filter chain. Data signals at tapped at J2/1 and are made available to the FFSK evaluator on the MPT 1327 modem (0831.470).

The AF path can be deactivated at the analog switch J3/1. By way of J3/2 it is possible to feed signals into the receiver or loudspeaker when the receive path is deactivated.

J3/3 renders the demodulation characteristic switchable according to the deemphasis characteristic.

The signal is forwarded via B6/4 to the AF amplifier on the stabilizer board (0831.140) and is passed via the interconnection board (0831.110) to the unit's loudspeaker. With J26 on the control board the loudness level is determined.

3.2.2 Receiver Phase Control Loop

See circuit diagrams:

Receiver	0850.210.210.201A
RF control	0850.210.310.201B
VCR receiver	0832.510.410.002

The SE 550-08-25-1 has as its reference oscillator (TCXO 0833.560) a temperature-compensated crystal oscillator containing crystals of maximum quality. The TCXO generates the reference frequency. This is forwarded to Pin 1 of the synthesizer J3, which forms a PLL stage together with VCO RX, the buffer stage V8 and the frequency divider J2.

The synthesizer J3 receives the frequency information serially via J3/10, which is forwarded to J2/6 according to the predivider ratio. An analog setting voltage, which sets the frequency-defining phase circuit of the VCO RX to the corresponding frequency range, is generated by way of the digital/analog converter J4 (RF control assembly circuit diagram) and is forwarded via the OP amplifier J14 to the VCO RX (VCO Rx circuit diagram) and to the capacitance diodes D3, D5, D8 ... D15 and D45 (receiver circuit diagram) for selection tuning.

The VCO Rx supplies a precise local oscillator frequency. It is forwarded through the buffer stage V8, divided by 64/65 in the predivider J2 and is passed on to the main divider in the synthesizer J3. Here, in the phase comparator it is compared against the reference frequency applied to J3/1 and supplied by the reference oscillator TCXO, which is also divided. In the event of a deviation from the TCXO frequency, an analog control frequency is generated that cancels the frequency deviation.

The processor on the control board (0850.410) supplies the digital necessary for the main divider in J3. The phase comparator therefore generates a control voltage proportional to the phase deviation that readjusts the VCO Rx (MP 2).

3.2.3 VCO for the Receiver

Refer to the circuit diagram of the VCO Rx 0832.510.410.002

The function of the oscillator V1 is defined by the capacitive voltage divider C7 and C8. The setting voltage fed to P2 modifies the capacitance of D2...D4, thus modifying the phase condition. The generated frequency is coupled via the buffer stage V2.

The control at P3 generated with the PLL circuit modifies the capacitance of D5. This counteracts a frequency deviation.

3.2.4 Low Pass Rx

Refer to the low pass Rx circuit diagram 0831.290.410.001

The low pass Rx lends a specific frequency response characteristic to the AF in the demodulation path. The AF signal is fed to the impedance converter J1/II via the low pass filter R1/C1, R3/C2, J1/I and RC low pass filter R2/C3.

The Rx low pass board is soldered onto the RF stage board.

3.2.5 Squelch 12.5 kHz

Refer to the squelch 12.5 kHz circuit diagram 0831.250.410.101

The AF signal is applied via a band pass filter and the impedance isolation stage V1 to the filter chain containing D1 and D2 for rectification. At the output 7, the hysteresis amplifier J1/II switches the RSP criterion between high and low level. The hysteresis is defined by negative feedback with R11 and R12 (test shop value).

The squelch board is soldered onto the RF stage board as a subboard.

3.3 Tx Branch

3.3.1 Tx Signal Path

Refer to the trunking control circuit diagram 0850.410.210.003

Modulated analog voice signals, which are fed to the VOC TX (0832.510) via the modulation path (analog input filter chain) are sent, or data signals that are fed into the active AF filter path.

The microphone signal at B5/1 of the display board (0831.920) in the control unit is applied to B1/14 of the control board. The nominal deviation of the modulated carrier is set with the potentiometer R65. By means of software, the preemphasis characteristic can be switched over on the analog switch J23/1. The microphone or data signal is selected with J23/2. DTMF data (optional board) or FFSK data (MPT 1327 modem 0831.470) can be routed into the modulation path.

The respective signal is amplified in linear fashion with J22/2. The deviation is set with the potentiometer R111.

The operational amplifier chain and the analog switches receive idle operating potential U/2 from the impedance converter J25/2. Thus, the deviation symmetry can be influenced via the potentiometer R96.

3.3.2 Transmitter

See circuit diagrams:

Transmitter	0850.210.310.210C
RF control	0850.210.310.201B

Via the low pass Tx submodule (0831.280), the modulation signal is forwarded to the max. deviation regulator R150. It is then fed into the VCO for the transmitter (VCO TX 0832.510) for direct VCO modulation. Together with the synthesizer J12 and the predivider J11, the VCO TX constitutes a PLL stage which operates like the Rx oscillator PLL stage.

As in the case of the receiver, a setting voltage for coarse tuning of the VCO TX is generated by the digital/analog converter J13 and the amplifier J14 (circuit diagram: RF control). This is adjusted with R150.

V30 (circuit diagram: transmitter) serves to switch over the phase locked loop for swift latching or slow settling within the scope of modulation. The phased or non phased state of the PLL stage is interrogated via J12/7 (unlock Tx).

The modulated carrier is routed via the amplifiers V18, V19, V20 to the Tx module J16, where maximum power amplification is realised.

Power regulation for the Tx module J16 is realised by way of the differential amplifier V26 and V27. The current level of the differential stage is adjusted with R117 (power adjustment).

By means of software, the Tx power can be switched in a maximum of three stages at the base of V26 (see RF control J15, pins 11, 12).

3.3.3 VCO for Transmitter

See circuit diagram of VCO Tx 0832.510.410.502

The frequency of the oscillator V1 is defined by the capacitive voltage divider C7 and C8. The setting voltage fed to P2 alters the capacitance of D2...D4 and therefore alters the phase condition. The generated frequency is coupled out via the buffer stage V2.

The AGC voltage at P3 generated with the PLL circuit alters the capacitance of D5. This counteracts a frequency deviation.

The modulation signal for VCO modulation is fed via P1.

3.3.4 Low Pass Tx

See circuit diagram: low pass Tx 0831.280.410.002

The low pass Tx lends a specific frequency response characteristic to the AF in the modulation path.

The AF signal is fed via the input amplifier J2/II the and active low pass chain of the fourth order, which consists of the OP amplifiers J2/I and J1/1.

The low pass Tx board is soldered as a subboard onto the RF stage board.

3.4 Reference Oscillator TCXO

See circuit diagram TCXO 0833.560.410.001

The temperature-compensated reference oscillator is soldered onto the RF stage board as an independent shielded submodule.

The binary counter in the counter component J1 generates an exact 400 kHz signal from the 6.4 MHz reference signal of the oscillator V1. This is made available to the synthesizers of the two PLL stages in the Rx and Tx paths.

The board also contains a voltage cascade to generate a 24 V DC voltage. This produces an extended setting voltage range for the VCOs or for input selection.

3.5 Antenna Low Pass

See circuit diagram: antenna low pass 0832.300.410.002

On reception, the carrier signal arriving from the antenna socket passes through the passive LC low pass filter and is made externally available at B2.

The signal path is reversed in the transmit mode. Harmonics are cut off by the LC filter chain.

The antenna low pass is accommodated in a shielded housing.

3.6 Interconnection Board 25 W

See circuit diagram: interconnection board 0831.110.410.001

The 15-pole central connector B1 and the five-pole data connector B2 for cloning are attached on the interconnection board.

Signal separation to the control and RF stage boards takes place on the interconnection board.

The +U_B line is fused with the fuse link F1.

3.6.1 Cloning

Via the connector B2, which is accessible on the rear panel, data, including cloning data, can be exchanged with an external data transceiver. The external data transceiver is then a PC with which interactive parameter programming (IPP) is realised, or with which a different Se 550 is cloned.

3.7 Control

See circuit diagram: trunking control 0850.410.210.003

3.7.1 Processor with Memory

The microprocessor J11 is clocked by an 11.0592 MHz crystal. It works together with the ASIC J12 for the addresses and with the memory components J13 (EPROM) and J14 (RAM) for process data transfer. The ASCII 12 generates frequency signals with defined timing conditions for different signalisation tasks.

3.7.2 Process Periphery

The operating voltage of the processor is monitored and the defined power on reset is generated with J7. The EEPROM J8, through which data can be output serially, offers an additional memory option.

The enable signals of the shift registers (type 4094) are controlled in the unit with J10 as a 1 out of 10 decoder.

J17 and J18 are further interfaces for data poling. The data is applied in parallel to the respective component and is poled serially. Status information and system data are acquired in this way (ON functions, RSP etc.). The components J9, J5 and J6 are serial input, parallel output shift registers for process data transfer.

The volume of the AF can be set in five levels. This is done with the analog multiplexer J26 and the shift register J6.

3.7.3 MPT 1327 Modem

See circuit diagram: MPT 1327 modem 0831.470.410.001

With its 1200 baud FFSK modem J1, the MPT 1327 modem (0831.470) enables processing of the special data format conforming to MPT 1327 for trunking operation.

The level of the two sinusoidal FFSK key frequencies (1200/1800 Hz) is set to 0 DBM with R2.

3.7.4 Tone Signalisation

Tone signalisation is realised by the tone multiplexer J20/2. From here, the generated signals can be passed through J20/3 and the amplifier J25/1 into the modulation path (transmitter) or into the AF branch (receiver path).

3.7.5 Operating Data Backup (option)

As an option, a lithium battery can be installed on the stabilizer board (0831.140). The lithium battery applies a back up voltage to J14 (RAM) via B2/4. This ensures that the current operating information remains stored even when the unit is removed.

3.7.6 Temperature Monitoring

In the event of inadmissible overheating, the unit is switched off with V8 and the PTC resistor R55.

3.7.7 Center Voltage

The center voltage ($+U/2$) required for functioning of the filter chains is derived from +9 V with the voltage divider R94, R95, R96. It is available at the output of the impedance converter J25/2. The deviation symmetry is set with R96.

3.8 Stabilizer Board

See circuit diagram: stabilizer board 3 W 0831.140.310.002

+9.3 V stabilisation

On the board, a stabilized voltage of +9.3 V is derived from the operating voltage +UB and is made available at B3/6. The stabilisation circuit is switched on/off with ON signal at B6/2.

+5 V generation

A voltage of +5 V is generated with J3 from the +9.3 V voltage and is used to power the digital ICs via B6/1.

Loudspeaker amplifier

The AF for the loudspeaker is fed to B6/4 and is amplified with J1.

Controlled by the processor, the loudspeaker can be switched on/off via the input B6/3. When the loudspeaker is ON, +UB is switched to the AF amplifier J1 via V3 and the Darlington stage V1, V2.

Lithium battery (option)

As an option, a lithium battery can be installed on the stabilizer board.

The lithium battery generates a voltage for powering the RAMs J14 on the control board (0850.410). This guarantees that the operating data stored in the RAM will not be destroyed in the event of a power failure or removal of the unit.

3.9 Control Unit BG 3

3.9.1 General

The control unit is available with different operating interfaces (key pad) depending on the application.

Unit and user system information is visualised on the two-line vacuum fluorescent display and on the status symbol displays.

The control unit is controlled by a microprocessor on the display board.

3.9.2 Key Board

See circuit diagram: key board 0831.930.310.001

The statuses of the coded keys are interrogated by the microprocessor of the display board via the connector B2. The microprocessor sends serial display data via B1 and the shift registers J1 and J2. The LEDs D27...D42 for illumination of the symbols are controlled via the outputs of the shift registers.

The footer transistor V2 measures the ambient luminous density and controls the brightness of the display unit.

Switched by V1, the LEDs D1...D26 illuminate the key pad on the control unit.

The "On" key T26 serves to switch the unit on/off.

3.9.3 Display Board

See circuit diagram: display board 0831.910.110.005

The connectors B1 and B2 connect the display board to the key board, B4 to the coding plug, B5 to the microphone and B3 to the converter board.

A microphone amplifier (J101/I) is connected between B5/1 and B3/18 and can be rendered inactive by jumpers (Br9) whenever the microphone level requires no further AF amplitude boosting.

The mask-programmed microprocessor J1 is the central control for the control unit. It is clocked by an 11.059 MHz crystal.

The soldered jumpers B6, B7, B8 at J1/4, 5, 6 set the status of the control unit. A power on reset at J1/10 guarantees that the processor will function faultlessly even after a drop in the operating voltage.

The display data for the vacuum fluorescent display H1 is read into the display drivers via the port lines P0.1...P0.7 and P3.6 of J1 and the 8-bit parallel-to-serial shift register J3.

With its frequency, PLL AF oscillator J2 synchronises data acceptance of the display drivers J7 and J8.

Via the data lines P3.0 and P3.1 (RxD, TxD), the control unit's processor communicates with the control processor on the control board (0850.410)

3.9.4 Converter Board

See circuit diagram: converter BG3 0831.910.310.203

The converter board supplies the necessary operating voltages for the display board.

A voltage of +5 V for the logical ICs is generated from +9 V by means of the voltage stabilizer J1.

To provide a display, the vacuum fluorescent display on the display board requires a +60 V anode voltage. To be able to separate electrons from the grid (cathode), an AC heating voltage (FF) also has to be applied. A half sinusoidal voltage is tapped from the output at D4 and is forwarded to the comparator J2/1 via the voltage divider R17 and R8. J2/1 switches its output to high or low potential and charges or discharges C7. The changing level causes J3 to trigger the negative feedback stage V3, V8.

V5 as a switching transistor for the transformer T1 operates in the cycle of the switching frequency. C13 and R16, as well as C9, protect the circuit against retroactive effects of the transformer T1. J2/II monitors the 9 V line and prevents triggering of the display in the event of voltage errors. The 9 V operating potential in the SE unit is smoothed with the T network L1, L2 and C4.

3.9.5 Coding Board 2 kBytes

See circuit diagram: coding board 2 kBytes 0831.940.410.001

The coding board is located in the coding plug. It is equipped with the EEPROM J1. The data for operator-specific identification and the channels enabled for the data are stored here. They are read out by the processor on the display board of the control unit. This identifier can be read into the coding plug using a corresponding EEPROM programmer.

The coding plug is plugged into the right of the control unit by way of the microphone plug.

3.10 Interconnector SE 550

See circuit diagram 0831.170.410.002

The interconnector SE 550 is connected to the 15-pole connector X101 located on the rear side of the transceiver SE 550. It provides the following external interconnections:

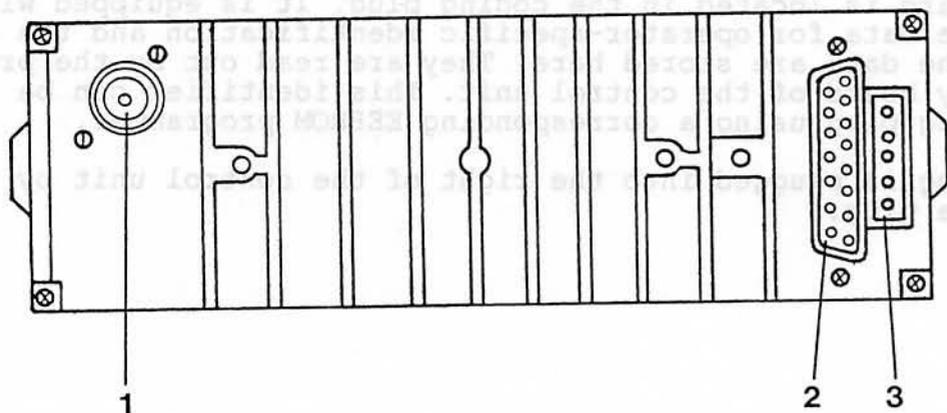
- battery voltage supply +UB 12 V (X4, X5)
- loudspeaker 4 Ω (B3)
- emergency keying by external PTT, active = low (B2/4)
- external signalization, max. 12 V/ 500 mA (B2/2)
- voltage output +UB 12 V (B2/3)

The line from B1/5 to B2/1 is a spare line. The diode D1 protects for confusing the poles.

3.11 External Interfaces (Pin-Assignment of Connectors)

The transceiver SE 550 provides the following connectors for external interconnections, given in sections 3.11.1, 3.11.2.

3.11.1 Transceiver Rear Side



- 1 X102 Connector BNC, 50 Ω
Antenna connector
- 2 X101 Connector 15-pole, D-Sub,
Main connector to interconnector SE 550 0831.170...
- 3 X103 Multipoint connector 5-pole
Cloning connector

ASCOM GmbH
TECHNICAL HANDBOOK
 SE 550-08-25-1

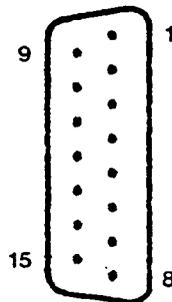
X102 BNC connector

BNC connector B2 located on antenna low pass 0831.300...
 Impedance 50 Ω

X101 Connector 15-pole, D-Sub

Filter connector B1, 15-pole, D-Sub, located on interconnection board 0831.110...

X 101

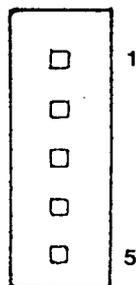


Pin	Designation	Explanation
1	+UB	+UB] Battery voltage +UB] protected by external fuse
2	+UB	
3	LSP \perp	Loudspeaker 4 Ω
4	AS	Signalization, max. 12 V, 500 mA (BC817)
5	Res	Spare
6	AF Ear	AF earphone (600 Ω)
7	Gnd	Ground
8	Gnd	Ground
9	RF -10dB	RF power reduction -10 dB
10	LSP~	Loudspeaker
11	PTT A	Tx key PTTA, active = low
12	AFIN	AF 600 mV
13	Not	Emergency keying, active = low
14	+9V	+9 V $\bullet \rightarrow$
15	Mic A~	Microphone 100 mV

X103 Multipoint connector 5pole

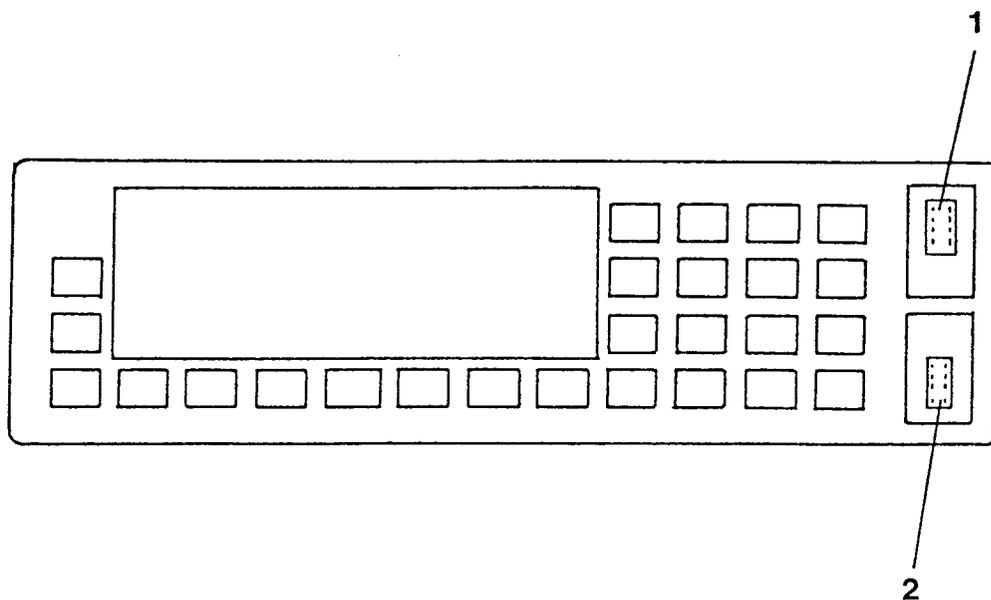
Multipoint connector B2, 5pole, located on interconnection board
0831.110...

X 103



Pin	Explanation
1	Cloning on
2	TxD
3	RxD
4	RTS
5	CTS

3.11.2 Control Unit, Front Side

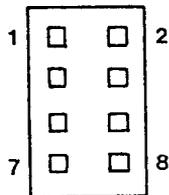


- 1 X104 Multipoint connector 8-pole
Coding plug connector 0831.000.000.941
- 2 X105 Multipoint connector 8-pole
Microphone or handset connector

X104 Multipoint connector 8-pole

Multipoint connector B4, 8-pole, located on display board 0831.920...

X 104

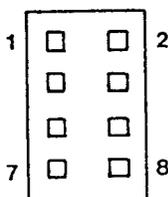


Pin	Designation	Explanation
1	DI	Data in
2	5V	5 V operating voltage
3	EN	Enable
4	DO	Data out
5	CL	Clock
6	⊥	Ground
7	-	ON/OFF
8	-]	

X105 Multipoint connector 8-pole

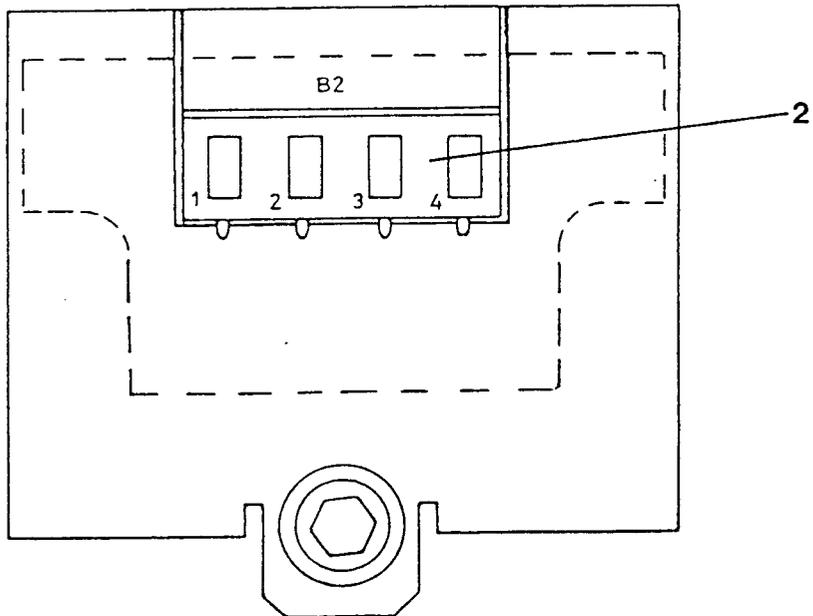
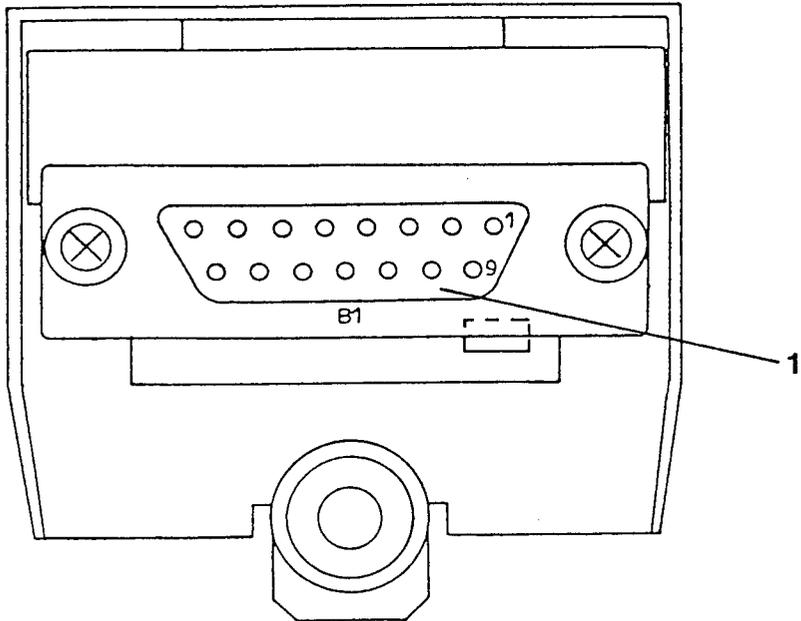
Multipoint connector B5, 8-pole, located on display board 0831.920...

X 105



Pin	Designation	Explanation
1	Mic B~	Microphone signal, 1 mV
2	HA	Cradle contact, not used
3	+9V	Microphone supply input, not used
4	PTT B	Tx keying PTTB, active = low
5	Ec~	Earphone
6	Mic ⊥	Ground microphone
7	Gnd	General ground
8	Ec ⊥	Ground earphone

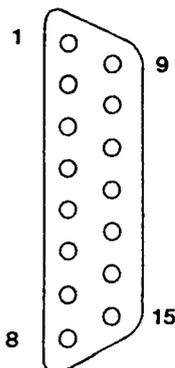
3.11.3 Interconnector SE 550



- 1 B1 Connector 15-pole, D-Sub
Transceiver connector
- 2 B2 Terminal strip 4-pole (X111)
Signalization, +UB, emergency keying

B1 Connector 15-pole, D-Sub

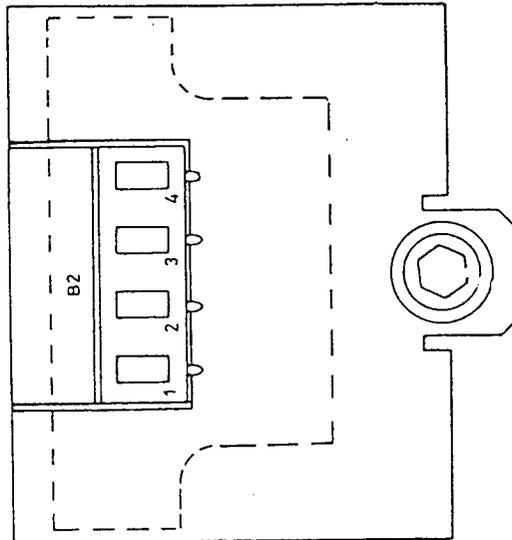
B1



Pin	Designation	Explanation
1	+UB	+UB } Battery voltage protected by external fuse
2	+UB	
3	LSP ⊥	Loudspeaker 4 Ω
4	AS	Signalization, max. 12 V, 500 mA (BC817)
5	Res	Spare
6	AF Ear	AF earphone (600 Ω)
7	Gnd	Ground
8	Gnd	Ground
9	RF -10dB	RF power reduction -10 dB
10	LSP~	Loudspeaker
11	PTT A	Tx key PTTA, active = low
12	AFIN	AF 600 mV
13	Not	Emergency keying, active = low
14	+9V	+9 V •→
15	Mic A~	Microphone 100 mV

X111 Terminal strip 4-pole (B2)

X 111

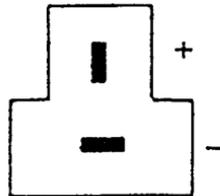


Pin	Designation	Explanation
1	Res	Spare line
2	AS	Signalization, max. 12 V, 500 mA
3	+UB	Battery voltage
4	Not	Emergency keying, active = Low

X112 Flat connector 2-pole (X5)

Battery voltage supply connector +UB, +UB protected by external fuse

X112

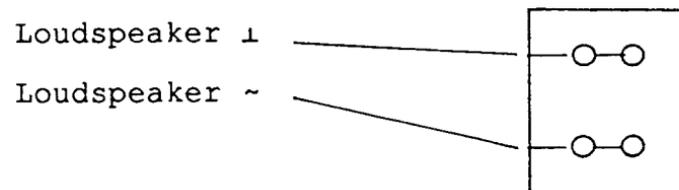


Pin	Explanation
+	+UB Battery voltage, protected by external fuse
-	Ground

X113 Clamp 2-pole (B3)

Connection to loudspeaker

X113



Technical Handbook

SE 550-08-25-1

Part 4

Maintenance,

Disassembly and Reassembly

TABLE OF CONTENTS

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4 MAINTENANCE, REMOVAL AND INSTALLATION OF MODULES

The unit may only be removed, serviced and dismantled by service personnel trained on the SE 550.

4.1 Maintenance and cleaning

The SE 550 requires no special care and maintenance. Clean the unit at regular intervals, which depend on the operating and environmental conditions, and check its outer condition. Neither petroleum or solvents may be used to clean the unit.

Remove loose dust with a soft dusting brush. If required, clean the outside of the unit with a slightly moistened lint-free soft cloth. Make sure that no moisture penetrates into the inside of the unit. Dry cleaned moist parts with a dry lint-free cloth.

The connectors must not show any corrosion. If corrosion of the connectors is suspected, plug them in and unplug them several times to remove any oxide residues. Only use contact cleaning agent such as Kontakt 60 for cleaning.

4.2 General Notes on Repair

(1) Handling PC Boards

Excessive bending of PC boards leads to hair cracks, which are often very difficult to localise. Therefore, handle PC boards with care. Measurement cables must not be soldered onto PC board conductors.

(2) Soldering

Soldering on PC boards must be limited to a minimum. A temperature-controlled miniature low voltage soldering arm should be used. The soldering temperature must not be higher than 350 °C.

C-MOS and SMD components should only be soldered by service personnel trained appropriately and acquainted with the soldering techniques involved.

(3) C-MOS components and FETs

C-MOS components and field effect transistors may be destroyed by static charges.

This can be prevented with a few precautionary measures:

- Earth tools when carrying out repairs
- Do not remove or install PC boards while the power supply is activated
- Do not apply external control signals without activating the power supply

(4) SMDs

SMDs on PC boards must only be desoldered and soldered in by appropriately trained service personnel using the necessary soldering tools.

The instructions given by the manufacturer/distributor must be observed precisely when handling soldering tools. Only in this way can damage to the surfaces of PC boards be avoided.

(5) Disposal of Devices, Modules and Components

Devices, modules and components that have become useless or have been scrapped must be disposed of properly.

They must not be disposed of in normal domestic refuse!

4.3 Control Unit (Figure 4-1, 4-2)

1. Remove the coding plug (Figure 4-2/3) and the plug of the microphone (2) after undoing the hexagon socket screw (1).
2. Undo the captive hexagon socket screw (1) underneath the coding plug (see also Figure 4-1).
3. Swivel the right side of the control unit by 30 ° and unlatch the control unit to left.
4. Installation: before installing the control unit, the two guide rails (16) along the groove must be slid open. Their positions are defined by holes.

Install the control unit by first of all inserting the pegs in the corresponding side on the left of the front panel. Then carefully plug in the plug. Tighten the hexagon socket screw (1).

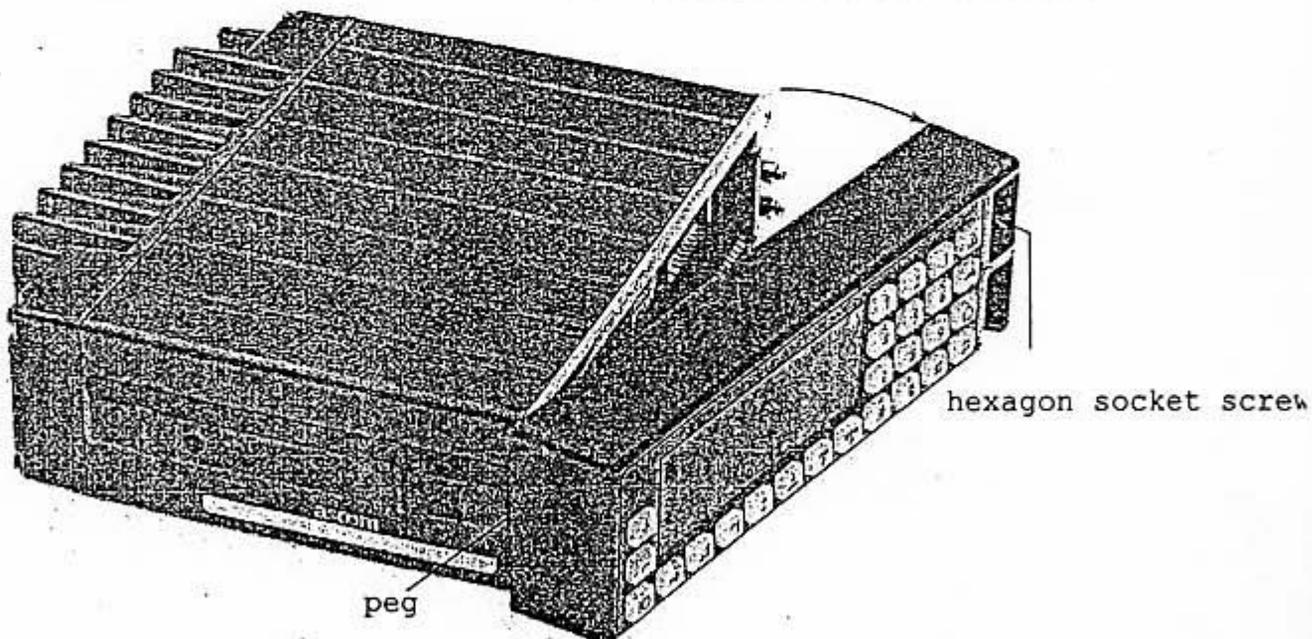


Figure 4-1 Disassembly control unit

4.4 Control Assembly (Figure 4-2)

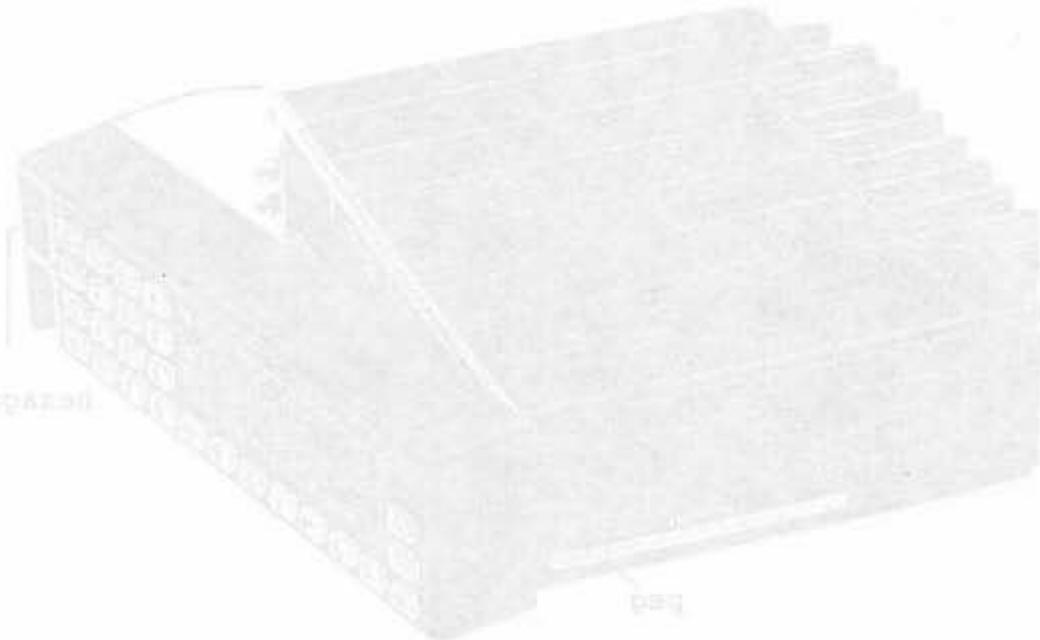
1. Remove the control unit as described in Section 4.3.
2. Unscrew the four countersunk screws (Figure 4-2/17) and carefully pull the control assembly out of the two guide rails in the housing.

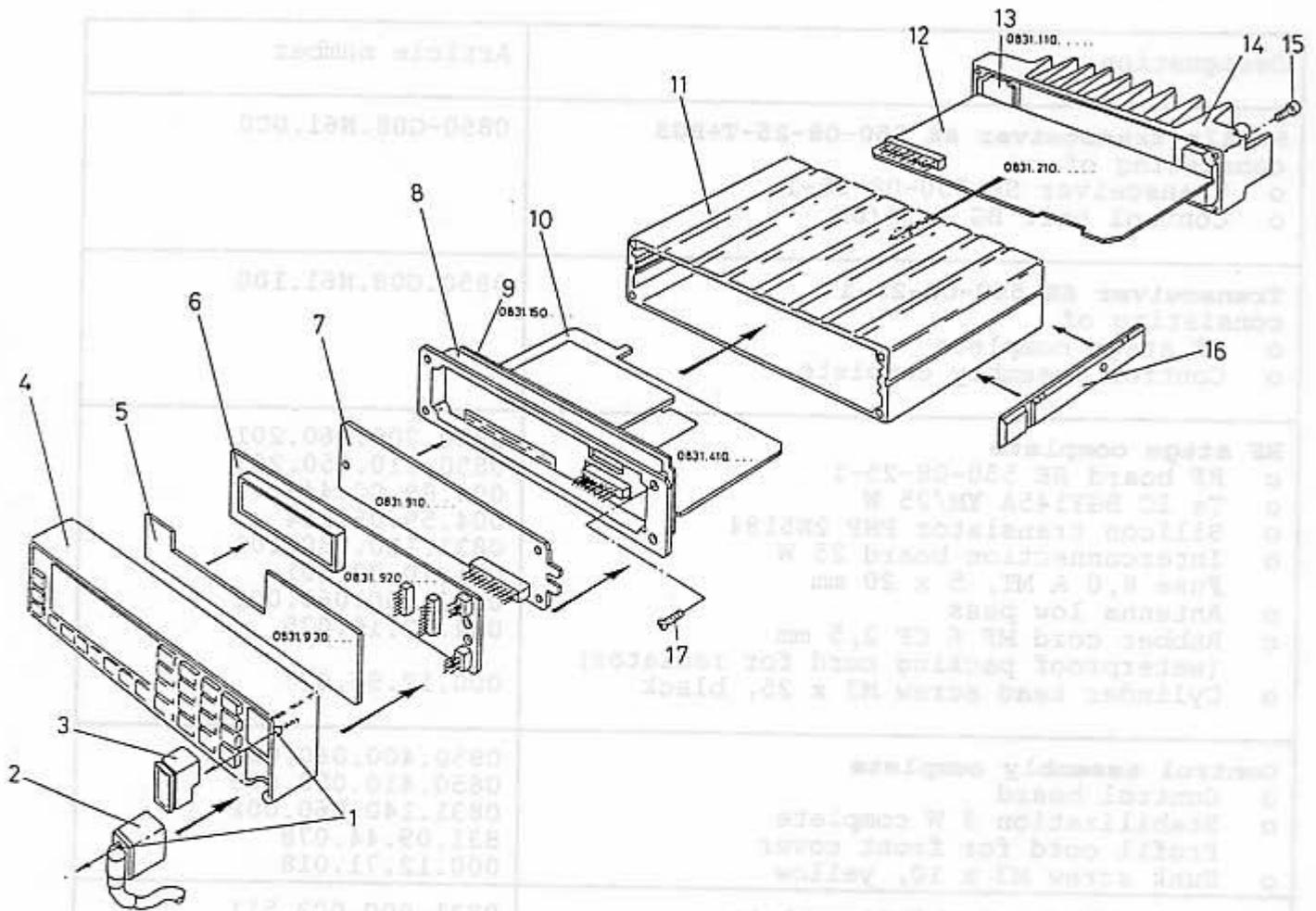
IMPORTANT: When reinstalling the RF stage and the control, make sure that the seal ring does not jump out of its groove (although it is stuck in, it is possible that it may be shifted when inserting the screws). If necessary, apply a light coating of silicone grease to the seal ring.

3. Install the control assembly in reverse order.

4.5 RF Stage (Figure 4-2)

1. Unscrew the four fillister head screws (Figure 4-2/15) from the rear panel and carefully pull the RF stage out of the two guide rails in the housing.
2. Install the RF stage in reverse order. Pay attention to the "IMPORTANT" note in Section 4.4.





- 1 Hex socket head screw (2x)
- 2 Microphone connector
- 3 Coding plug
- 4 Control unit
- 5 Key board
- 6 Display board
- 7 Converter board
- 8 Cover plate
- 9 Stabilization board

- 10 Control board
- 11 Casing
- 12 RF board
- 13 Interconnection board
- 14 Rear panel
- 15 Cylinder head screw (4x)
- 16 Guide rail (2x)
- 17 Sunk screw (4x)

Figure 4-2 Exploded view

ASCOM GmbH
TECHNICAL HANDBOOK
 SE 550-08-25-1

4.6 Parts List SE 550-08-25-1

Designation	Article number
Mobile transceiver SE 550-08-25-T+BG3 consisting of <ul style="list-style-type: none"> o Transceiver SE 550-08-25-1 o Control unit BG 3-TR/UK 	0850-G08.N61.0C0
Transceiver SE 550-08-25-1 consisting of <ul style="list-style-type: none"> o RF stage complete o Control assembly complete 	0850.G08.N61.100
RF stage complete <ul style="list-style-type: none"> o RF board SE 550-08-25-1 o Tx IC BGY145A YM/25 W o Silicon transistor PNP 2N5194 o Interconnection board 25 W o Fuse 8,0 A MT, 5 x 20 mm o Antenna low pass o Rubber cord MP 6 CP 2,5 mm (waterproof packing cord for radiator) o Cylinder head screw M3 x 25, black 	0850.200.060.201 0850.210.050.201 004.89.00.449 004.59.05.194 0831.110.050.101 001.70.00.801 0832.300.060.002 002.72.10.035 000.12.96.027
Control assembly complete <ul style="list-style-type: none"> o Control board o Stabilization 3 W complete o Profil cord for front cover o Sunk screw M3 x 10, yellow 	0850.400.060.003 0850.410.050.003 0831.140.060.002 831.09.44.078 000.12.71.018
Control unit BG 3-TR/UK complete <ul style="list-style-type: none"> o Coding plug complete o Converter board BG 3 o Display board BG 3 o Profil cord for front frame o Protective foil for window o Hex socket head screw M3 x 6, black 	0831.000.003.511 0831.000.000.941 0831.910.050.203 0831.920.050.005 831.09.44.079 831.03.44.299 000.12.06.031
Casing	0831.01.38.154
Mounting set complete <ul style="list-style-type: none"> o Bag for universal mounting set o Fuse 8 A, 6 x 25 mm o Interconnector SE 550 complete 	0831.000.060.304 0831.080.060.002 001.70.00.800 831.10.00.800
Loudspeaker 4 Ω/5 W	008.10.00.800

4.7 Transportation, Storage and Packing

Original packaging or normal commercial packing materials should be used when storing, dispatching or transporting equipment.

The storage temperature range is -40 to +80 °C.

Technical Handbook

SE 550-08-25-1

Part 5

Alignment

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5.1	General	1
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5.17	Selective Call, Deviation and Response Threshold	17
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5.19	Current Consumption	19

5 ALIGNMENT

5.1 General

For each alignment step a separate page is reserved. On each page the test layout and a view of the p.c.b board with the test and alignment points are given. The test layout also lists the equipment to be used in each case. No significance need be attached to empty (instrument) boxes.

When selecting the RF test set, the high transmitter output (up to 25 W) of the SE 550 should be taken into account. Eventually a suitable attenuator should be connected between the transmitter and the test set.

The test channels are indicated as follows:

- | | |
|----------------------|--|
| - H: highest | } channel within the band
of the SE 550
to be tested |
| - M: medium (center) | |
| - T: lowest | |
| - X: any channel | |

Unless specified otherwise, all alignments should be made at a supply voltage of 13,2 V and at a ambient temperature between +18 and +28 °C.

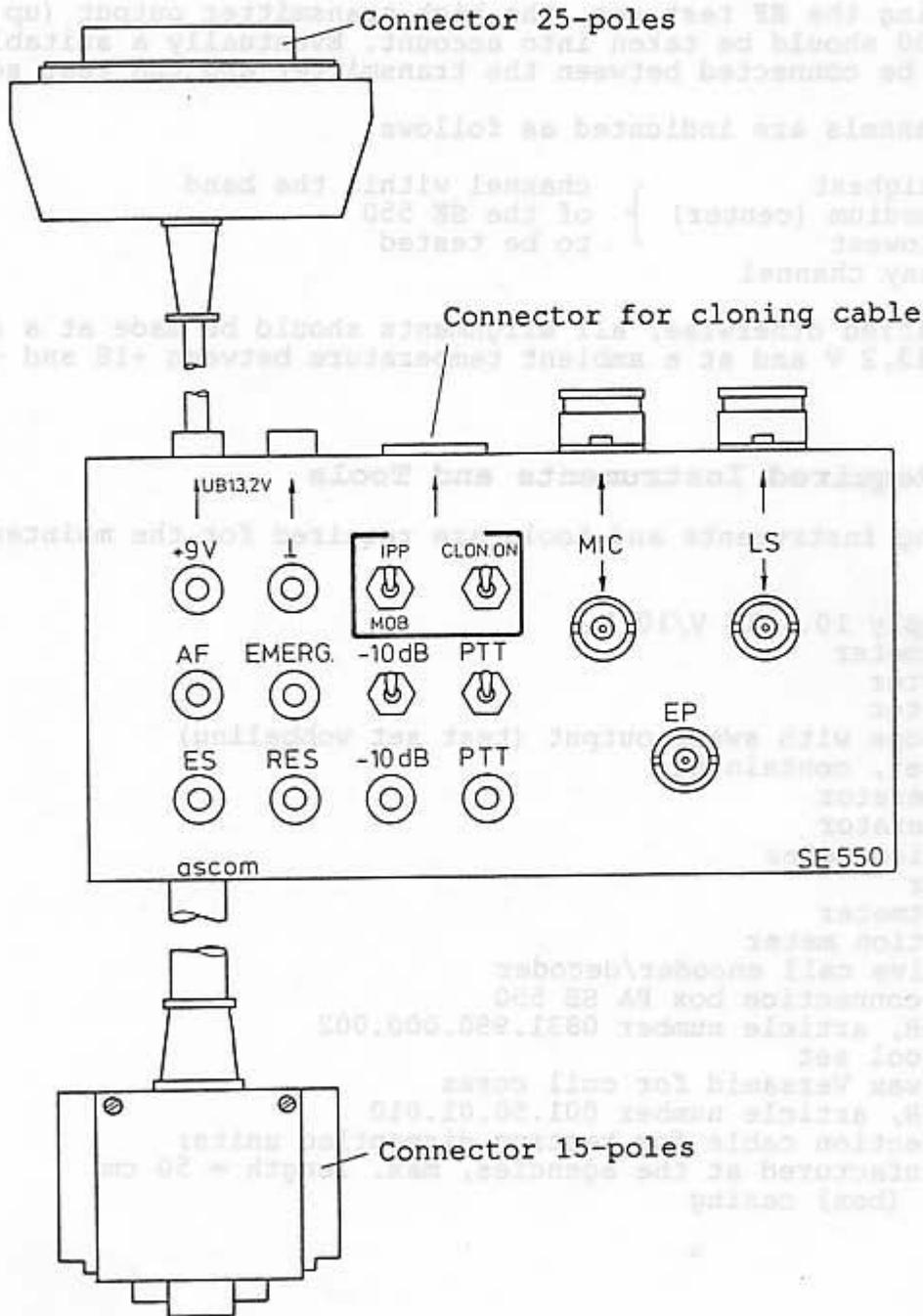
5.2 Required Instruments and Tools

The following instruments and tools are required for the maintenance of the SE 550:

- o Power supply 10...16 V/10 A
- o DC amperemeter
- o AF voltmeter
- o DC voltmeter
- o Oscilloscope with sweep output (test set wobbling)
- o RF test set, containing:
 - RF generator
 - AF generator
 - Deviation meter
 - Counter
 - RF wattmeter
 - Distortion meter
 - Selective call encoder/decoder
- o Test and connection box PA SE 550
Ascom GmbH, article number 0831.990.000.002
- o Regular tool set
- o Securing wax Versamid for coil cores
Ascom GmbH, article number 001.50.01.010
- o Interconnection cable for testing dismantled units;
to be manufactured at the agencies, max. length = 50 cm
- o Alignment (box) casing

Drawing Test and Connection Box PA SE 550

Ascom GmbH, article number 0831.990.000.002



Explanation of control and connector elements on test and connection box PA SE 550

UB 13,2 V	Supply voltage +13.2 V from power supply unit
+9 V	Operating voltage +9 V from SE 550
⊥	Ground
AF	Earphone output from SE 550
EMERG.	Releasing emergency call, active = low
-10 dB	Tx power reduction -10 dB (toggle switch)
PTT	Tx on/off (toggle switch)
ES	External signalization, max. 12 V
RES.	Reserve line
-10 dB	Tx power reduction -10 dB, controlled by external devices (PC etc.)
PTT	Tx on/off, controlled by external devices (PC etc.), active = low
MIC	Two microphone inputs 100 mV
LS	Two loudspeaker outputs 4 Ω
EP	Earphone output
IPP/MOB	Selector switch for interactive parameter programming (IPP) or normal operation (MOB)
CLON.ON	Cloning on/off switch (selector switch IPP/MOB in position IPP)

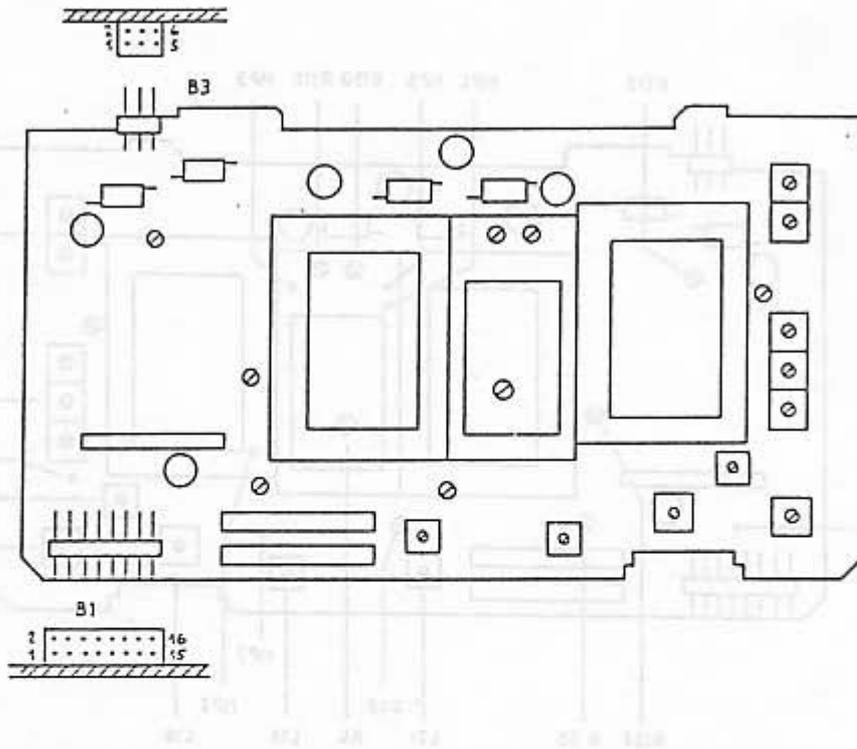
5.3 Preparing, Disassembly

1. Demount the SE 550 assemblies as follows:
 - o Control unit, refer to section 4.3 in part 4
 - o Control board, refer to section 4.4 in part 4
 - o RF board, refer to section 4.5 in part 4
2. Carefully re-assemble the boards without the casing. All alignment points are accessible from outside.

5.4 List of Potential Designations

Potential	Designation
+ 60 V	Power supply for the display
+ 9 V	Stabilized voltage +9 V
+ 5 V	Stabilized voltage +5 V
+ E	+9 V, receiver supply
+ S	+9 V, transmitter supply
+ UB, + Batt	Battery voltage +12 V
+ UB/2	Reference voltage
- 10 dB	Control for reduced output power
A/D Data	A/D converter output data
AS	Open collector output for external signalling
CD	Clock, processor bus
Cloning Ein	Cloning on
Cloning TxD	Tx data cloning
Cloning RxD	Rx data cloning
Cloning RTS	Ready to send cloning
Cloning CTS	Clear to send cloning
Da, Data	Data line
Data v. STG	Data from control board
Data z. STG	Data to control board
DTMF	Double frequency signaling
Ein	Switching ON criterion
EN, Enable	Control line
EN OPT IN	Enable input, option board
EN OPT OUT	Enable output option board
FF	Display filament voltage
Gnd	Ground of the transceiver
Hö	Earphone output
LS ein	Loudspeaker ON criterion
Lsp	AF signal to the loudspeaker
Masse	Ground of the transceiver
MI IN	Microphone signal after high pass
MI OUT	Output signal of the microphone amplifier
Mic	AF signal from microphone
Mod	Conditioned AF towards VCO
µP	Microprocessor
NF aus	AF output signal
NF ein	AF input signal
NF OPT IN	AF input, option board
NF OPT OUT	AF output, option board
NF von Dis.	AF signal from discriminator
NF zu Verst.	AF signal to output amplifier
PT z. STG	Subaudio tone to control board
PT v. STG	Subaudio tone from control board
Ref. 400 kHz	Reference frequency 400 kHz
RES	Not connected (reserve)
Rsp	Squelch criterion
Squelch	Carrier criterion
ST	Transmit key
Tx Enable	Transmitter control line
Tx' (+S)	Supply voltage of TX driver stages
Unlock	Unlock criterion of synthesizer
Ur	VCO regulation voltage
Ust	VCO preset voltage
z.b.V.	Not used

5.5 RF Board, Connectors and Pin-Assignment

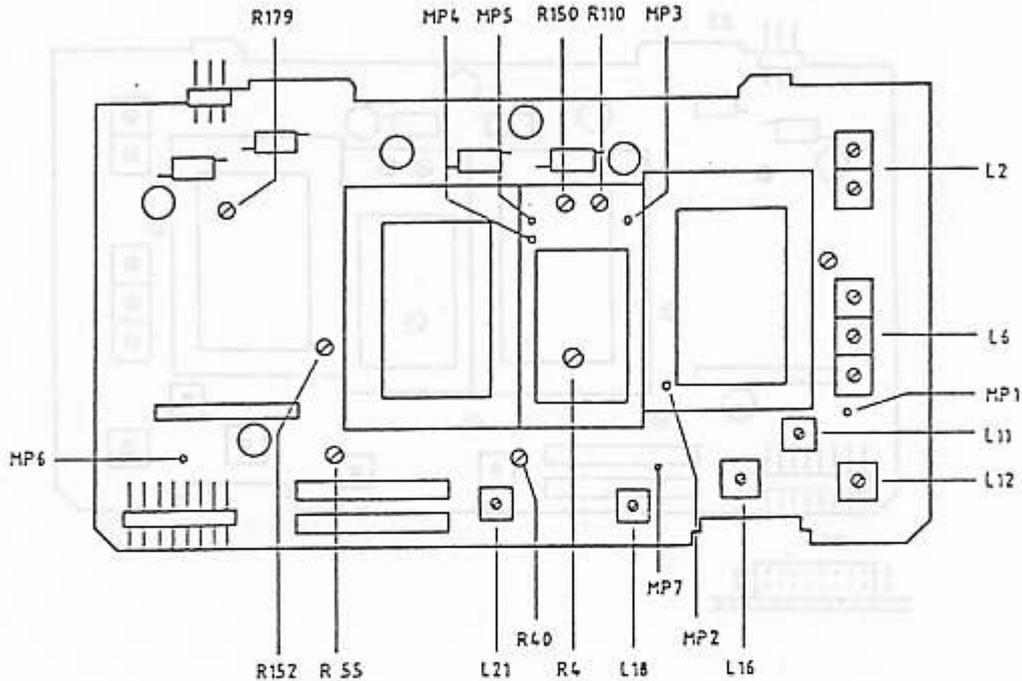


Pin assignment B1	
1	Clock
2	Data out
3	Enable Tx
4	Enable Rx
5	RF data
6	Enable RF
7	Mod vers RF
8	AF
9	RSP Squelch
10	RSSI
11	Reserve
12	+9 V
13	+UB
14	+UB
15	Gnd, ground
16	Gnd, ground

Pin assignment B3	
1	-10 dB
2	Reserve
3	Reserve
4	+ 9 V
5	RSP, Squelch
6	AF to final ampl.

These connections are soldered to the inter-connection board.

5.6 RF Board, Test Points and Alignment Elements



Tuning elements

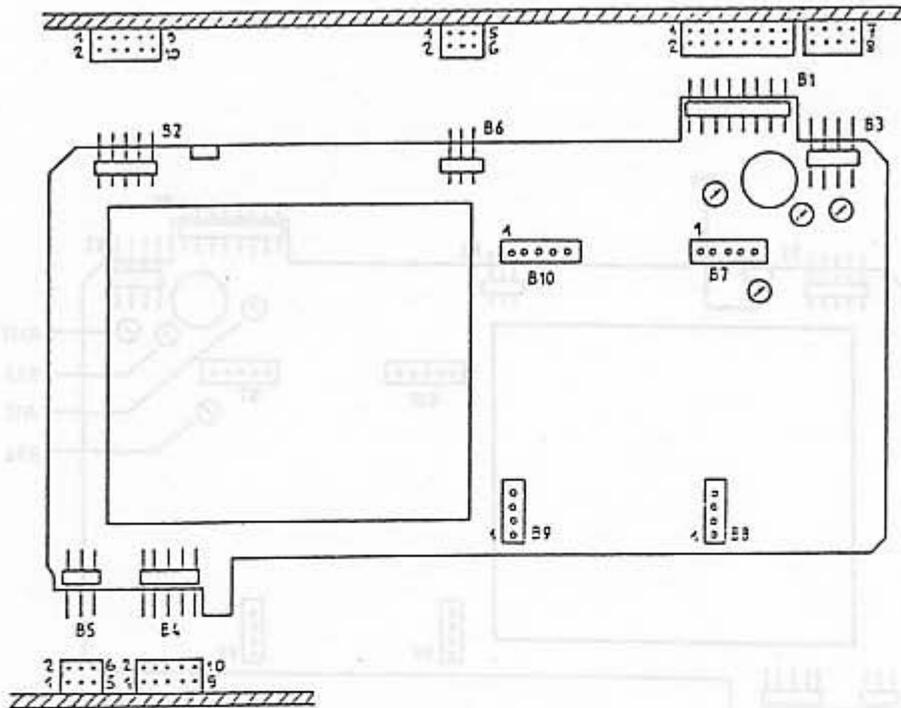
- L2: RF filter (2 circuits)
- L6: RF filter (3 circuits)
- L11: Local oscillator filter
- L12, L16, L18 IF circuits
- L21: Discriminator circuit
- R4: TCXO frequency adjustment
- R40: AF level
- R55: Squelch switching threshold
- R110: Adjustment of receiver VCO
- R150: Adjustment of transmitter VCO
- R152: Max. deviation
- R179: Output power

Test points

- 1 RF signal behind L6
- 2 Regulation voltage VCO Rx
- 3 Preset voltage VCO Rx
- 4 Preset voltage VCO Tx
- 5 Regulation voltage VCO Tx
- 6 AF level
- 7 IF adjustment point

B1/12 Voltage 9,3 V

5.7 Control Board, Connectors and Pin-Assignment



Pin assignment B1	
1	--
2	--
3	Status
4	St
5	Reserve
6	RXD
7	TXD
8	En/Hors IN/OUT
9	+ 9 V
10	Ground
11	Ground earphone
12	Earphone
13	Ground microphone
14	Micro
15	--
16	--

Pin assignment B3	
1	Modulation → RF
2	AF + disc.
3	RSP
4	RSSI
5	Reserve
6	+ 9 V
7	+ UB
8	Ground

Pin assignment B4	
1	Reserve
2	As
3	AF in
4	Hö
5	ST
6	Emergency call
7	+ 9 V
8	Microphone
9	AF → speaker
10	AF → speaker

Pin assignment B2	
1	AF → speaker
2	AF → speaker
3	--
4	+ UB
5	Clock
6	Data → RF board
7	Enable TX
8	Enable RX
9	Data → RF board
10	Enable RF board

Pin assignment B7	
1	AF + option
2	AF → option
3	Micro ground
4	Micro in
5	Micro out

Pin assignment B8	
1	Ground
2	DTMF
3	PT in
4	Clock

Pin assignment B6	
1	+ 5 V
2	Enable
3	Speaker ON
4	AF → speaker
5	Speaker from BG
6	Speaker from BG

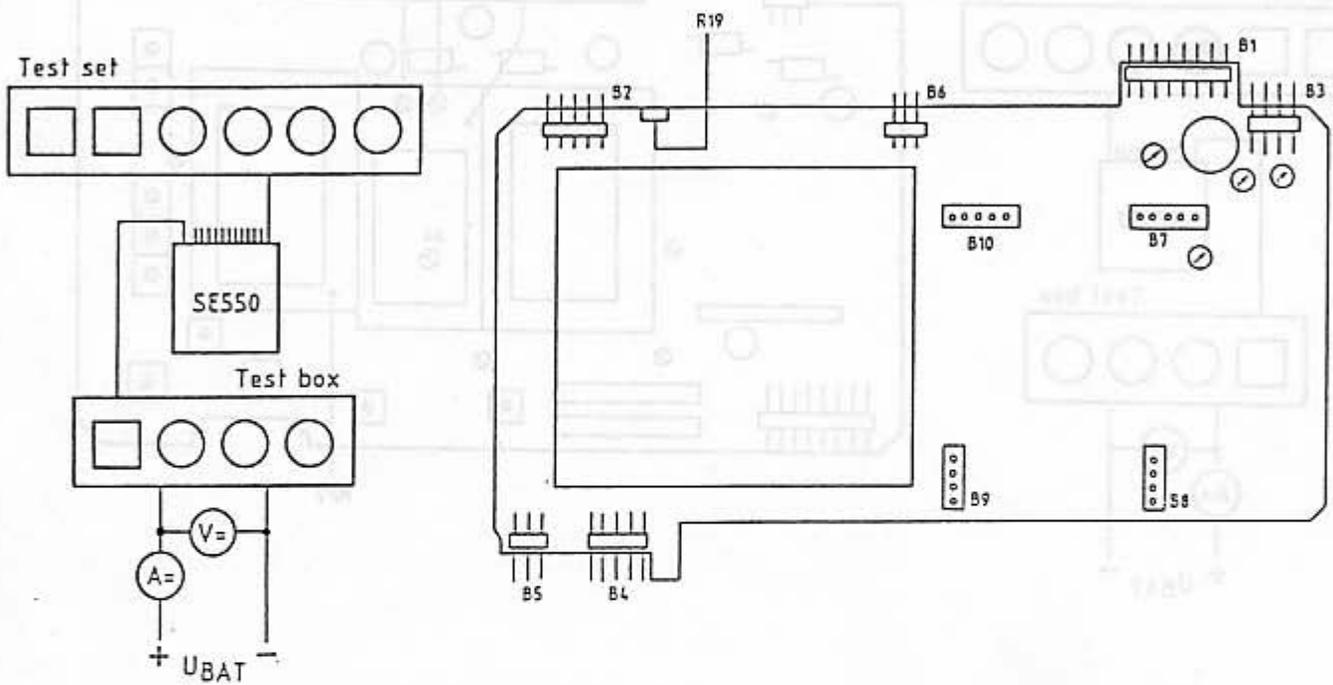
Pin assignment B5	
1	Cloning ON
2	Cloning TXD
3	Cloning RXD
4	Cloning RTS
5	Cloning CTS
6	Ground

Pin assignment B9	
1	Data → A/D conv.
2	Data → STE
3	Data → STE
4	PT → STE

Pin assignment B10	
1	RSSI
2	Enable option +
3	Enable option -
4	+ 5 V
5	+ 9 V

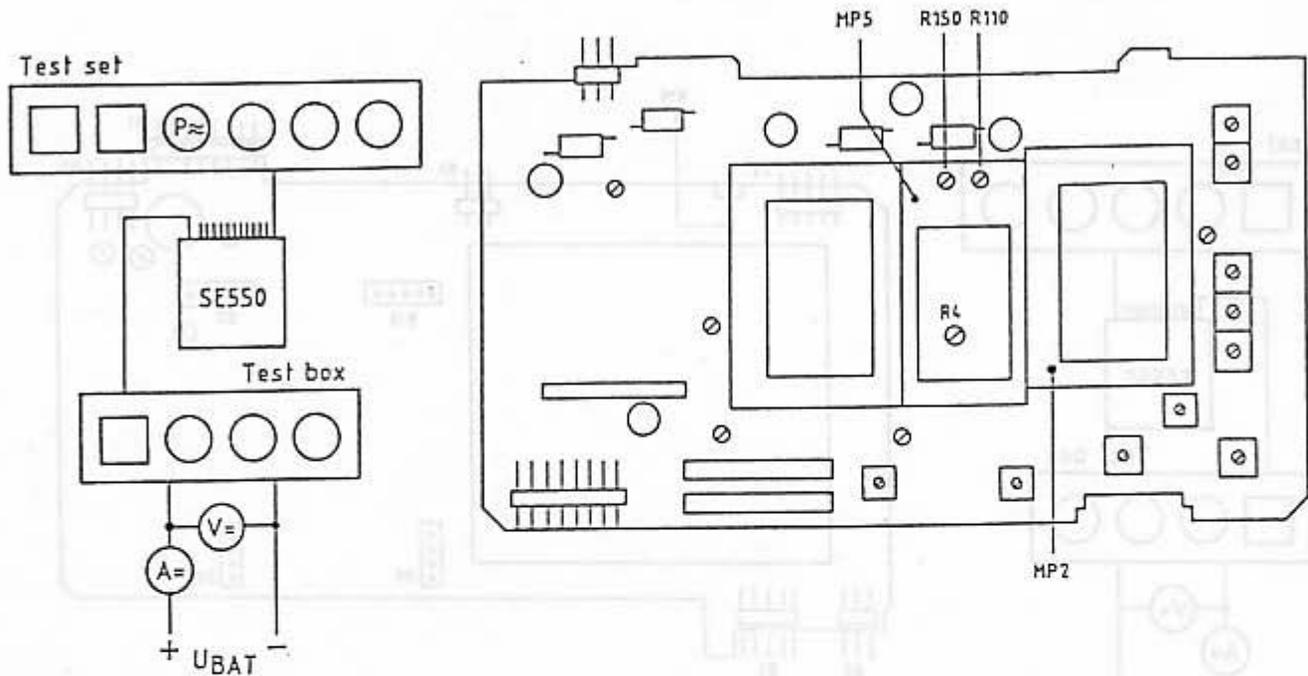
- The connections B1, B2, B5, B6 are soldered.
- B7, B8, B9, B10 are connections to the option p.c.b.

5.9 Operating Voltage 9,3 V



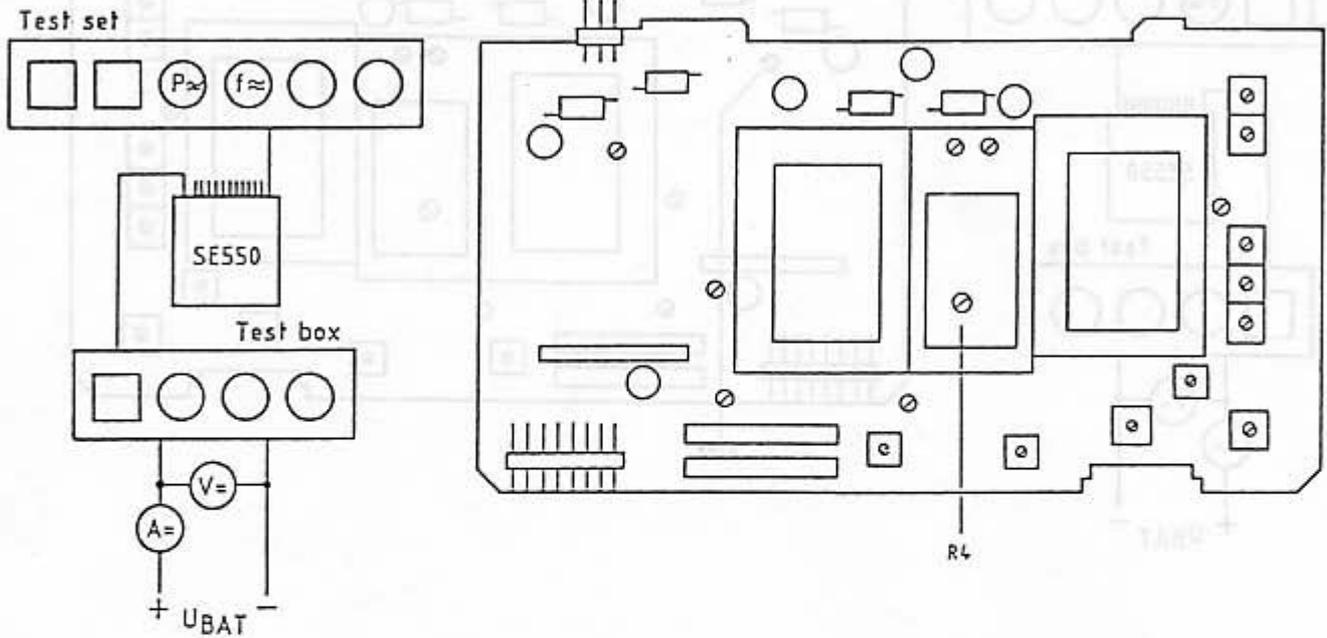
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	R	Set voltage 9.3 V with R19 on stabilization board. Measure on RF board connector B1	B1/12		9.3 ±0.1 V

5.10 Voltage Controlled Oscillators



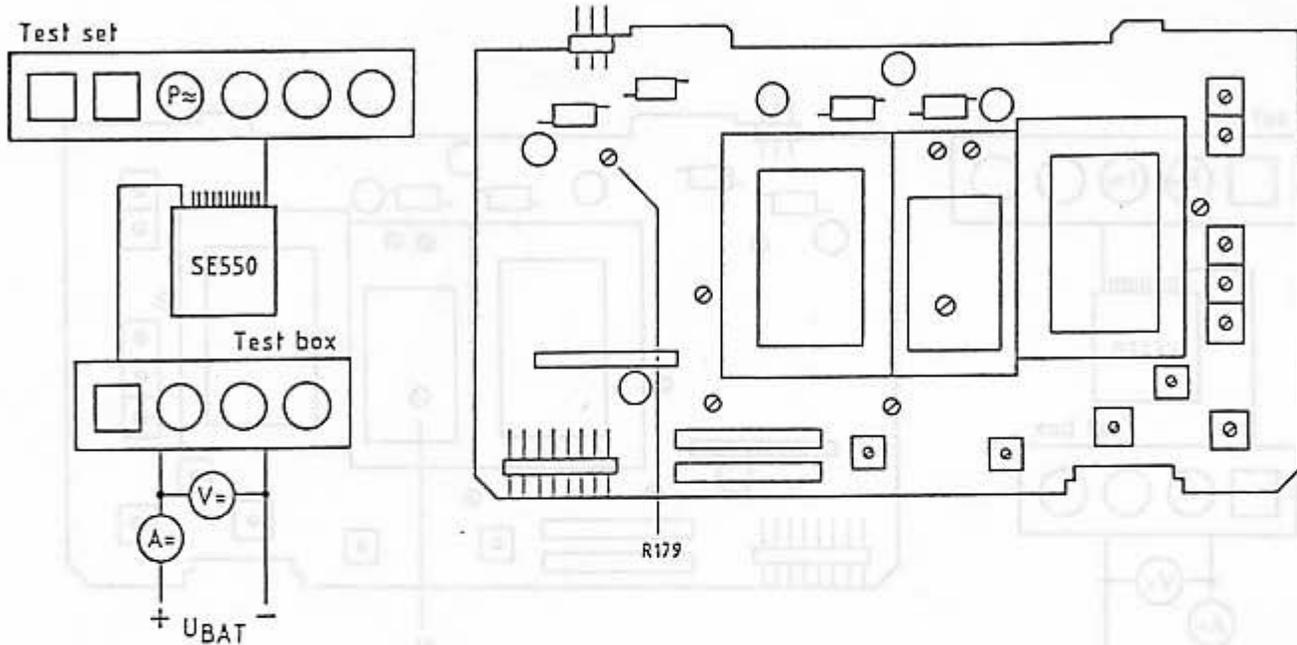
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	L	R	Set control voltage with R110	MP2	UR	5.0 ±0.2 V
2	All	R	Check control voltage for all channels	MP2	UR	3.5...6.5 V
3	L	T	Set control voltage with R115	MP5	UR	5.0 ±0.2 V
4	All	T	Check control voltage for all channels	MP5	UR	3.5...6.5 V

5.11 Frequency Setting



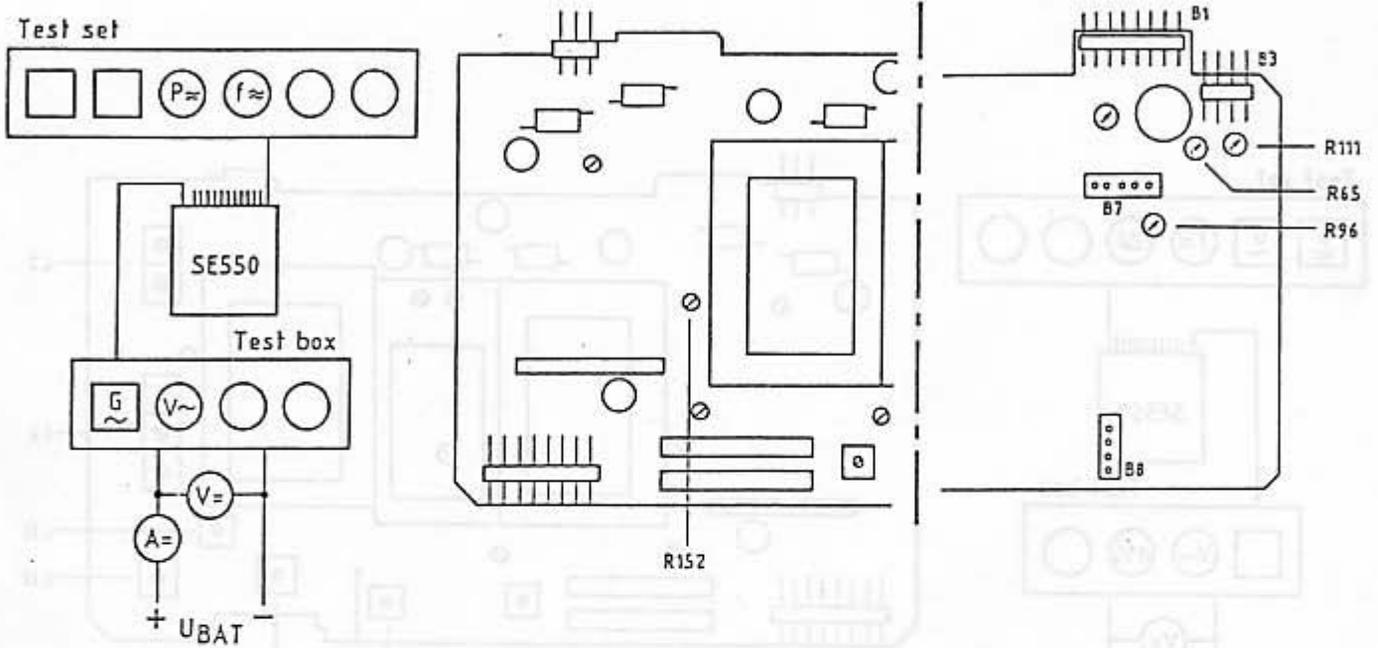
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	T	Set the transmitter frequency f nom. with R4 (TCXO) NOTE: X102 = BNC connector for antenna	X102		f nom. ± ≤ 500 Hz

5.12 Transmission Power



No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1			Adjust the supply voltage to 13.2 V			
2	M	T	Set the transmitter power with R179	X102	Pout	10(25)W ± 1.5 dB
3	L,M,H	T	Vary the power supply voltage between 10,8 and 15,6 V	X102	Pout	10(25)W ± 1.5 dB
4	M	T	Measure the reduced output power 10 W SE 550 25 W SE 550	X102 X102	Pout Pout	5(1)W ± 1.5 dB 12.5(2.5)W ± 1.5 dB

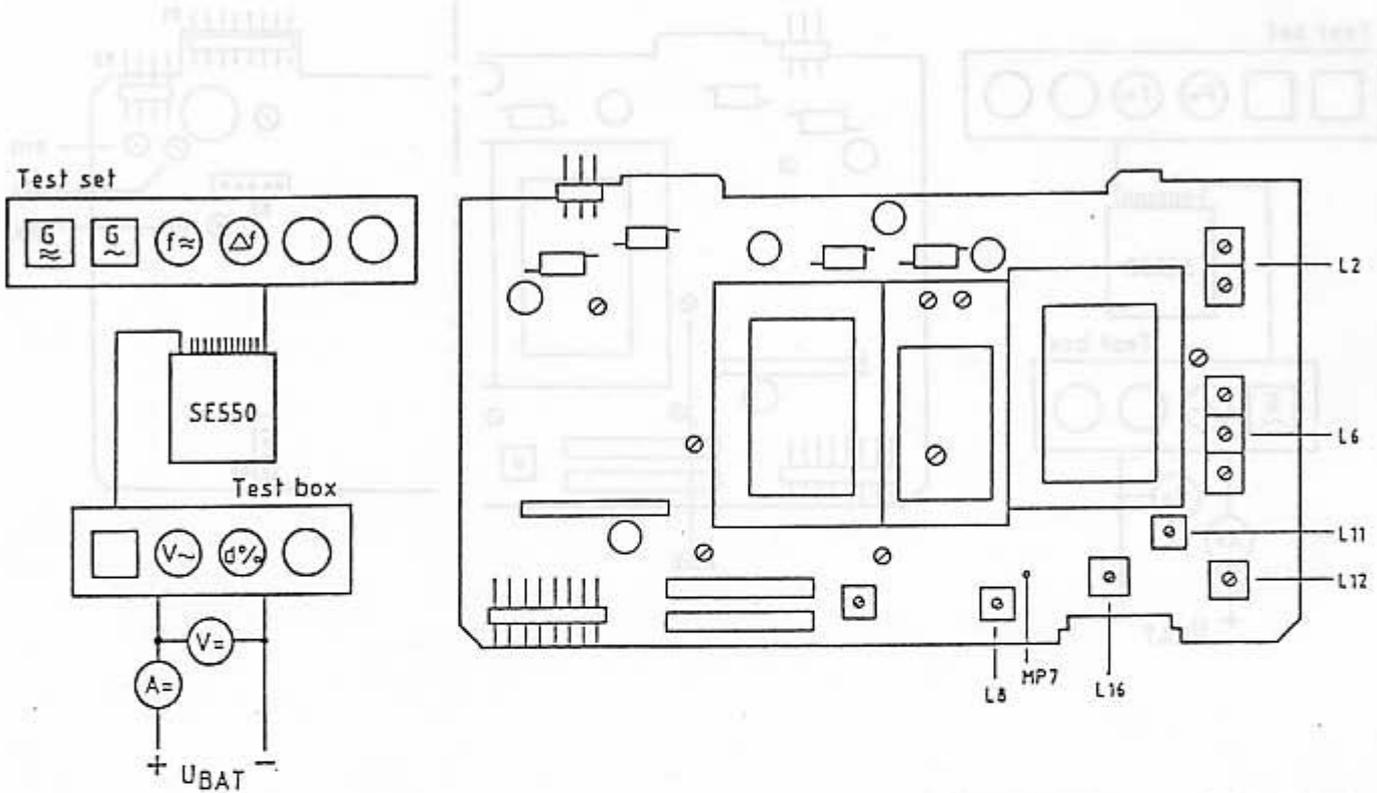
5.13 Modulation



NOTE: BG = control unit

No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1			Feed in modulation signal (Ri = 3 Ω)	BG	MIC	1000 Hz/10 mV
2			Adjust R65 and R111 to medium position			
3	M	T	Set peak deviation Δf max. with R152	X102		Δf = table
4			Feed in modulation signal	BG	MIC	1000 Hz/1 mV
5	M	T	Set nominal deviation Δf nom. with R65	X102		Δf = table
6	M	T	As 1+3, check peak deviation	X102		
7	H,L	T	Check peak deviation referred to channel M	X102		Δ ≤ 100 Hz
8	M	T	Adjust deviation symmetry with R96	X102		Δ ≤ 100 Hz
Channel spacing:	12.5 kHz 20 kHz 25 kHz		Peak deviation: ±1.8...2.5 kHz ±3.3...4.0 kHz ±4.3...5.0 kHz			Nominal deviation: ±1.3...1.7 kHz ±2.2...2.6 kHz ±2.8...3.2 kHz

5.14 RF and IF Settings Receiver

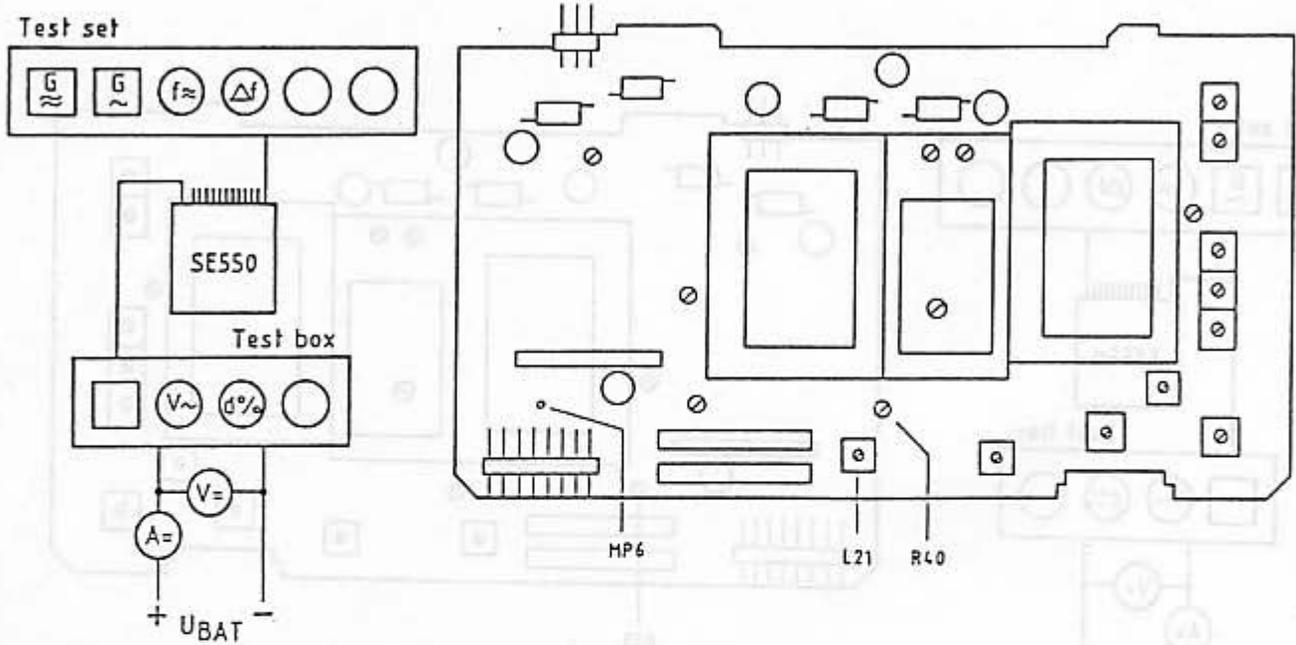


WOLFF: 08 - control unit

No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	R	Wobulate the RF test set. Set the unmodulated receiver frequency	X102		---
2	M	R	Tune RF filter L2, L6, L11 and L18 to maximum level and L12, L16 to minimum ripple	MP7		

No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	R	Wobulate the RF test set. Set the unmodulated receiver frequency	X102		---
2	M	R	Tune RF filter L2, L6, L11 and L18 to maximum level and L12, L16 to minimum ripple	MP7		

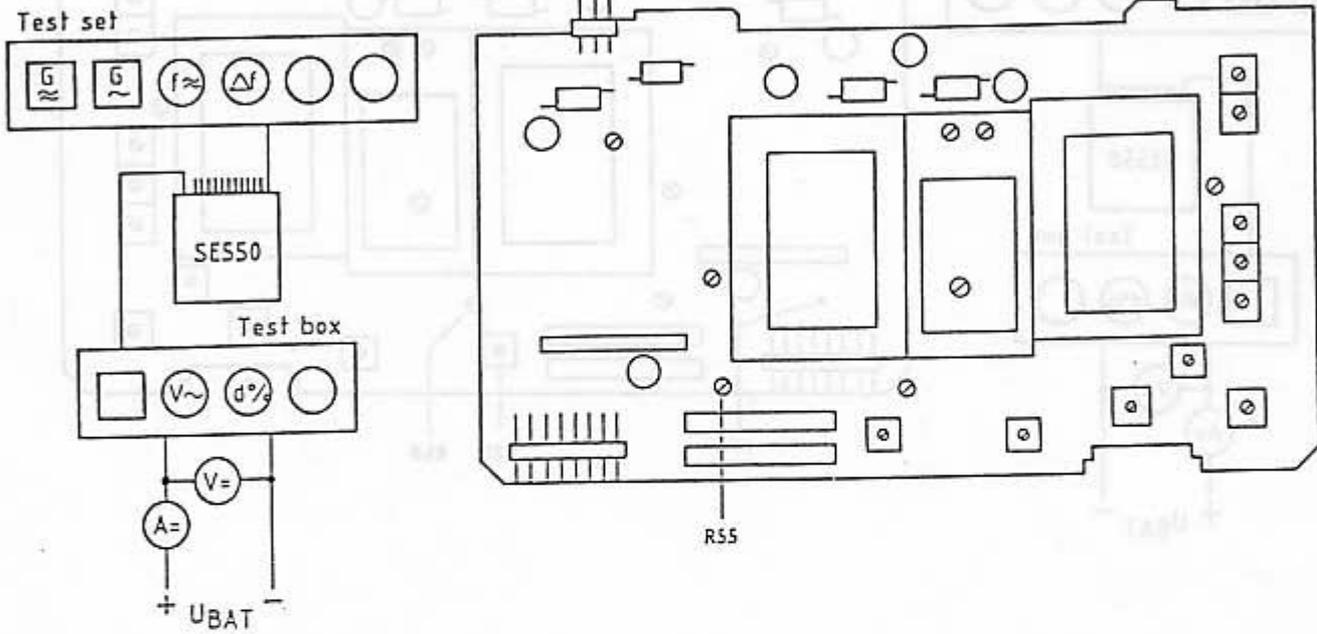
5.15 AF Settings Receiver



Note: PA = Test and connection box PA SE 550

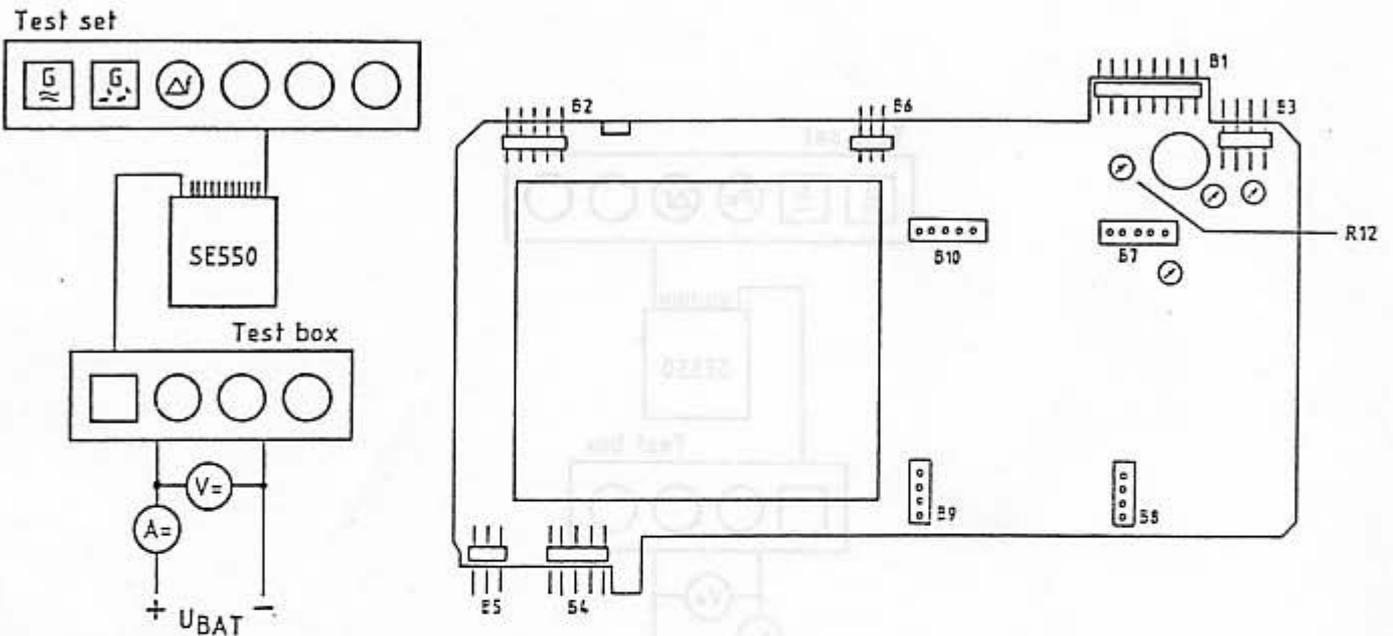
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M		Feed in reception frequency, modulation 1000 Hz, $\Delta f = 60 \% \Delta f \text{ max.}$	X102		100 μV
2	M	R	Tune L21 to maximum AF level	MP6		Maximum
3	M	R	Set AF level with R40	PA	H0	300 mV eff.
4	M	R	Check distortion	PA	H0	$\leq 4\%$

5.16 Sensitivity Check



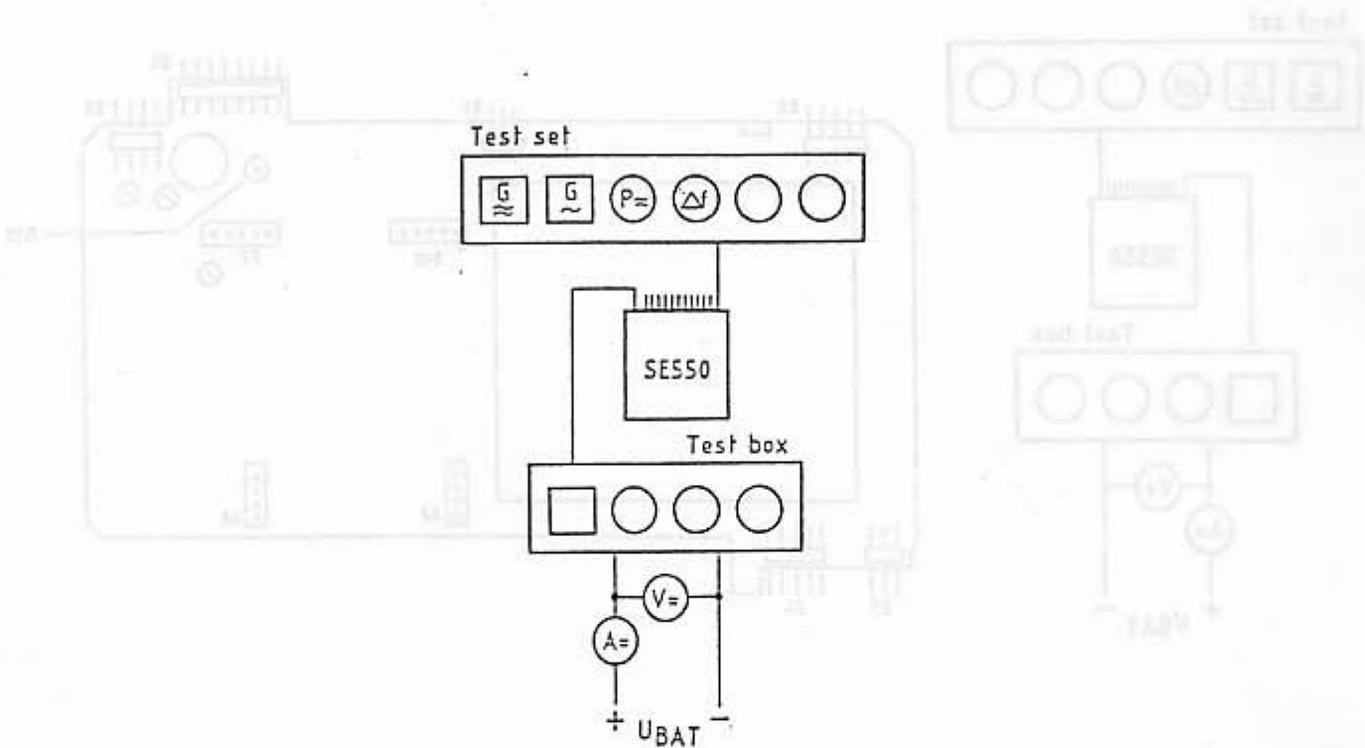
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1			Feed in reception frequency, modulation 1000 Hz, $\Delta f = 60\% \Delta f \text{ max.}$ Squelch off	X102		0,7 μV EMF (chan. spacing 20/25 kHz) 1,0 μV EMF (chan. spacing 12,5 kHz)
2	All	R	Check S/N ratio	PA	H0	≥ 20 dB
3	M	R	Set squelch switching level with R55	PA	H0	19 \pm 1 dB (SINAD)
4	M	R	Check switching hysteresis	PA	H0	2...4 dB

5.17 Selective Call, Deviation and Response Threshold



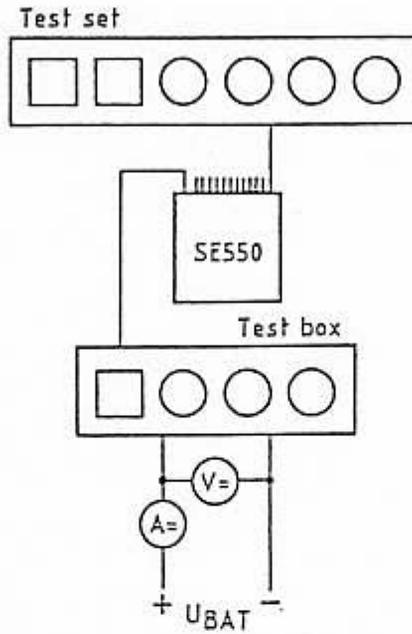
No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	R	Feed in reception frequency. Modulate with selective call encoder, code according to decoder	X102		100 μ V
2	M	R	Set R12 so that decoder responds at Δf decoder does not respond at Δf	X102 X102		≥ 1 kHz ≤ 0.4 kHz
3	M	T	Check selective call encoder deviation* *The output voltage (and, in consequence, the deviation) is set to a fixed value. If needed, a test PROM containing a single tone encoder may be programmed via IPP at the agency for further tests with selective call	X102		≥ 80 % of Δf

5.18 Tone Squelch, Deviation and Response Threshold

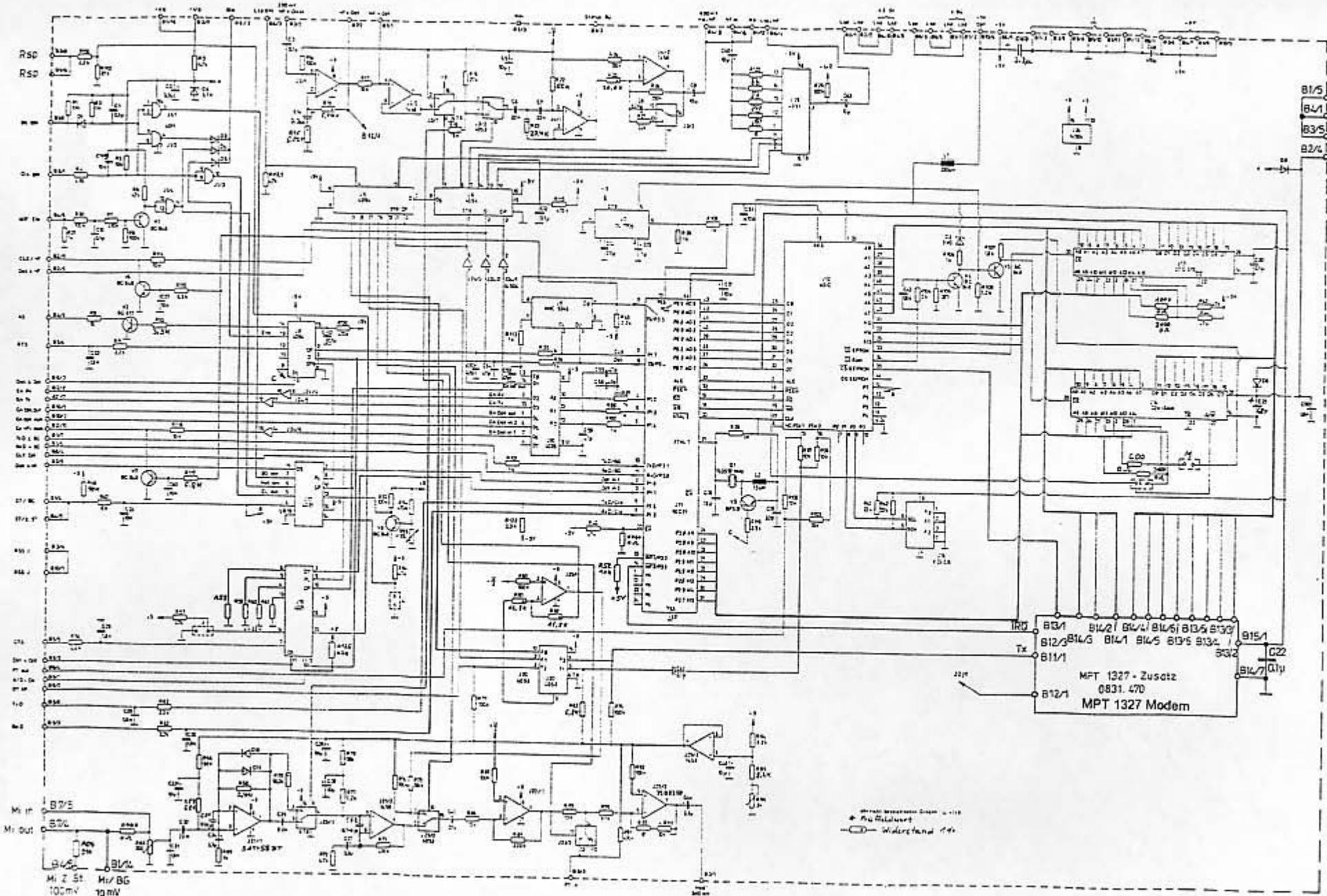


No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	X	T	Select channel with TSQ. Check deviation without modulation signal	X102		approx. 800 Hz
2	X	R	Feed in reception frequency modulated by TSQ frequency. Check whether: TSQ decoder responds at Δf TSQ decoder does not respond at Δf	X102 X102		100 μ V ≥ 400 Hz ≤ 200 Hz

5.19 Current Consumption



No.	Chan.	T/R	Setting, alignment, check	Meas. point	Pot.	Set value
1	M	R	Reception, standby	PA		approx. 0.5 A
2	M	R	Reception, squelch open, with modulation	PA		approx. 1.0 A
3	M	T	Transmit 25(10)W	PA		approx. 6(4) A
4			SE 550 switched off	PA		approx. 50 mA



- B1/5 Res.
- B4/1 Res.
- B3/5 Res.
- B2/4 U Batt Stützbatterie/ Stabi

Translations (right side of circ)

- Res =
- U_{Batt} =
- Stützbatterie/Stabi =

Translations (bottom side of circ)

- Mi Z.St. =
- Mi/BG =
- Mod. 300 mV f. NH =

Other Translations

Alle nicht bezeichneten Diode
All not designated diodes are

* Prüfwert = Value determ

Widerstand 1% = Resistor 1%

IR0
Tx
Rx
MPT 1327 - Zusatz
0831.470
MPT 1327 Modem

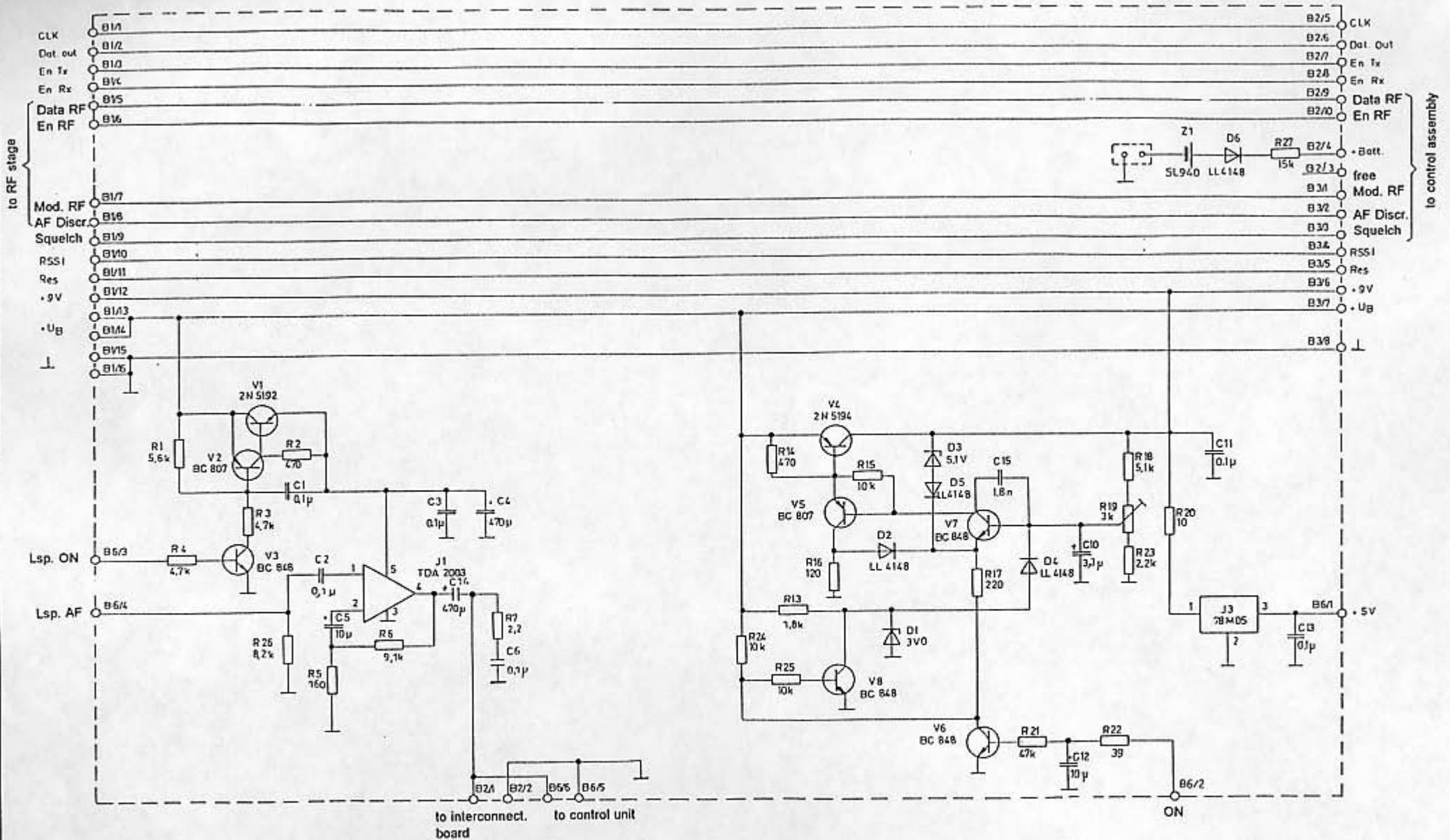
→ Diode
○ Widerstand 1%

Mi Z St. 100mV
Mi/BG 10mV

Lp.Nr.0850.410.390.00

Tag	Name
Bearb. 7.5.82	SCH
Gepr.	

Heinrich Pfitzner GmbH



Lp.Nr. 0831.140.390.002

Tag	Name	Stabilization Board 3 W	
Bearb	12.91 Pfeiffer	SE 550	0831.140.310.002
Gepr.			
Heinrich Pflitzner GmbH Nachrichten-Systeme u. Elektronik Frankfurt/Main 60			02

Änderungen vorbehalten

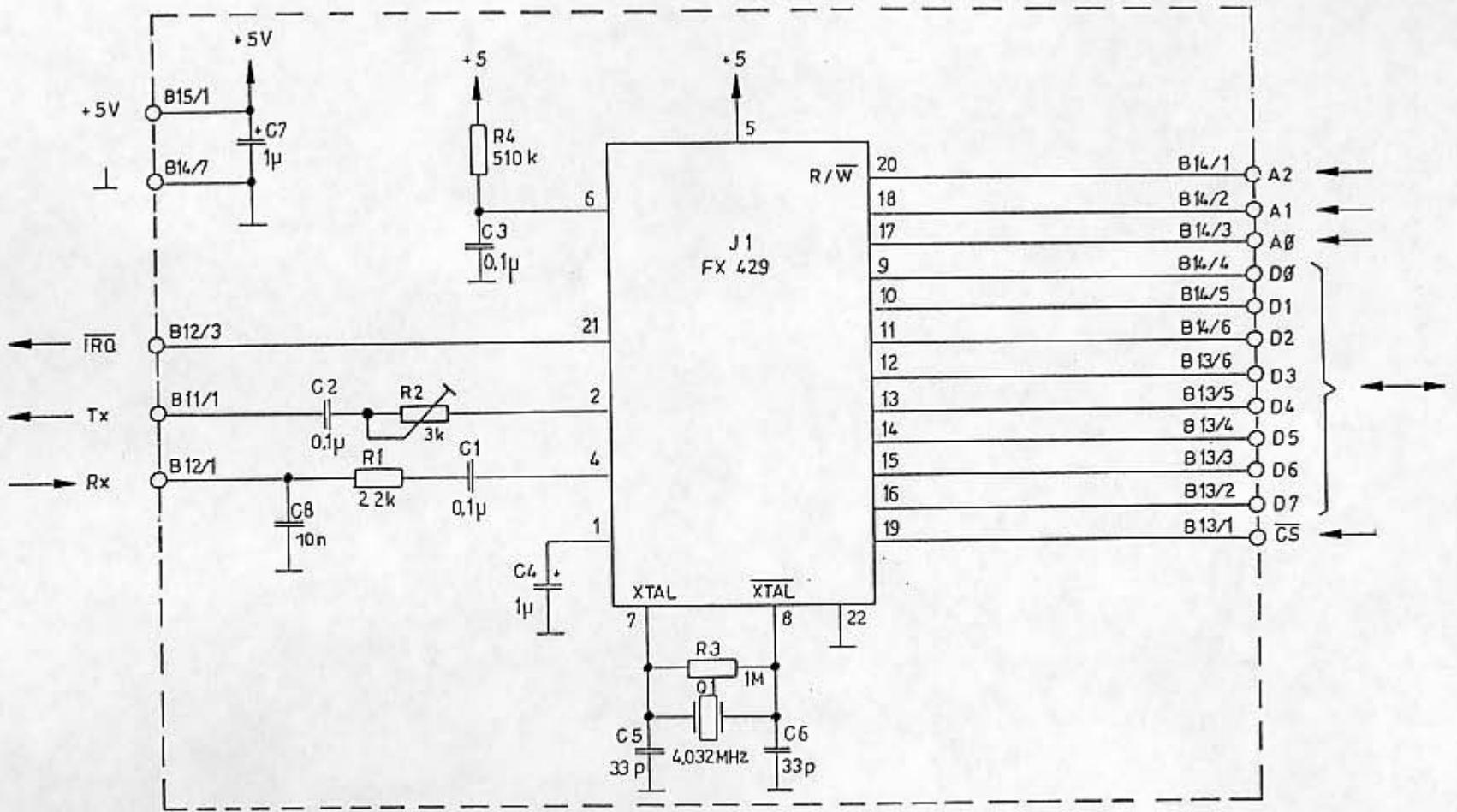
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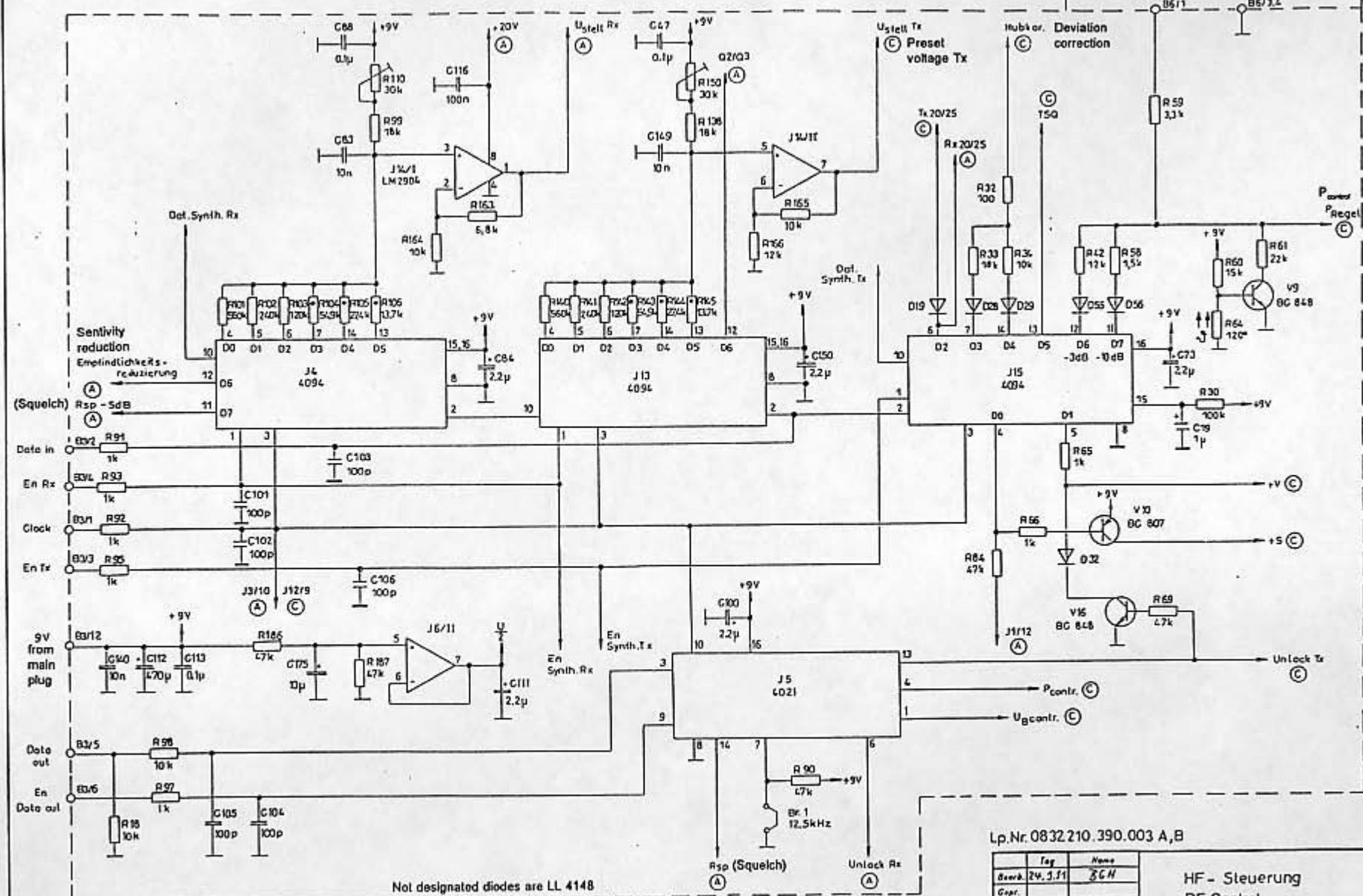
Änderungen vorbehalten

PFITZNER TELETRON <small>Ein Unternehmen der AXCOM</small> Nachrichtensysteme u. Elektronik Frankfurt/Main 60	Tag	Name
	Bearb. 3.4.90	Appelber
Gepr.		

LP-Nr. 0831.470.490.001

SE 550	MPT 1327 Modem
0831.470.410.001	MPT 1327-Zusatz





Not designated diodes are LL 4148

Nicht bezeichnete Dioden LL 4148

Resistor 1 %

Lp.Nr.0832.210.390.003 A,B

Heinrich Pflitzer GmbH
Nachrichten-Systeme u. Elektronik
Frankfurt/Main 60

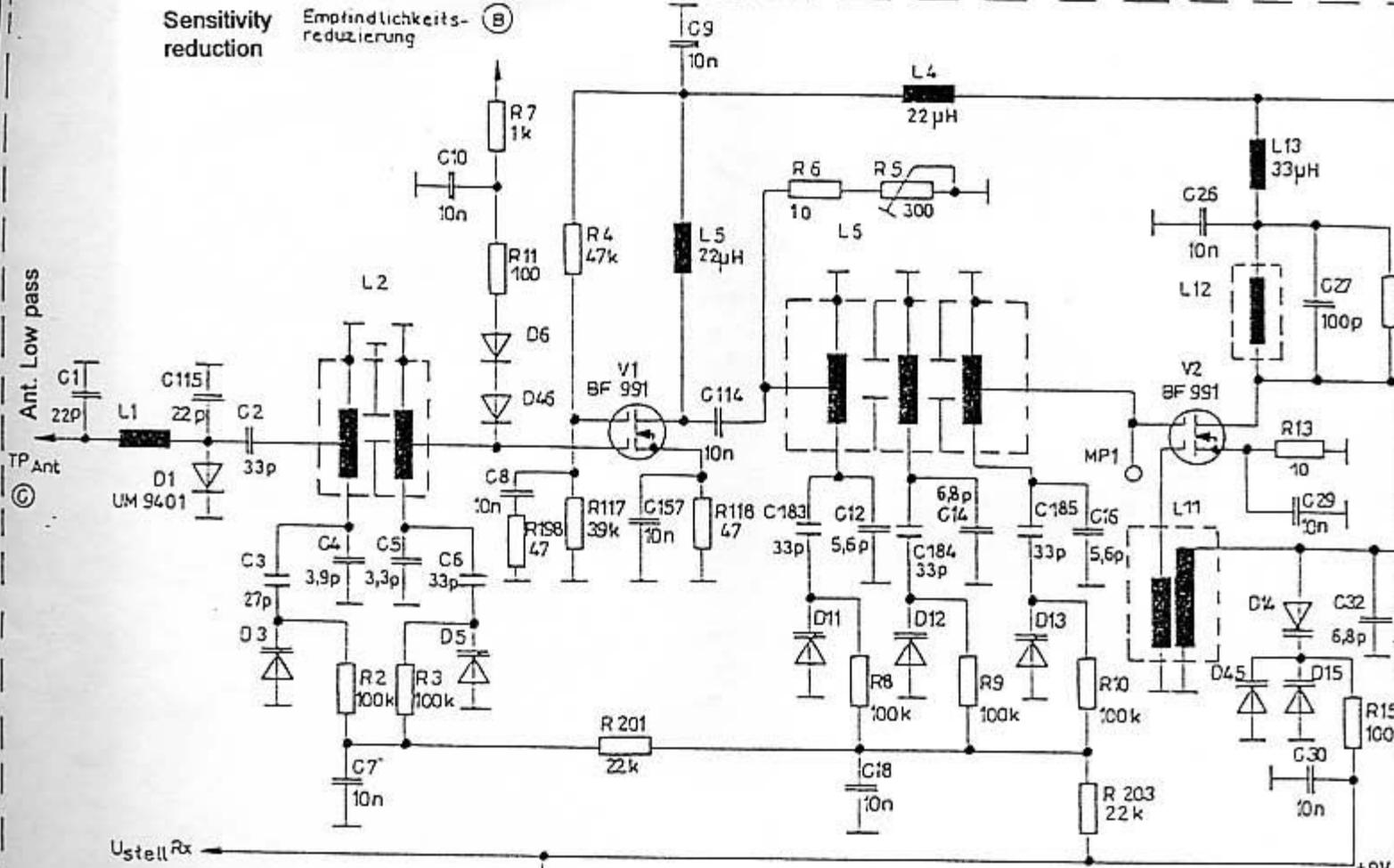
Tag	Name	HF-Steuerung RF-Control	SE550-08-25-1	0850 210.310.201 B
Bearb.	24.3.71			
Gepr.				
Blatt 2/3		Sheet 2/3		

Diese Zeichnung ist unser Eigentum.
 Jede Vervielfältigung, Verbreitung oder Mitteilung an
 Dritte, Personen für den Betrieb und den Service, ist
 ohne schriftliche Genehmigung, strengstens untersagt. (0831)

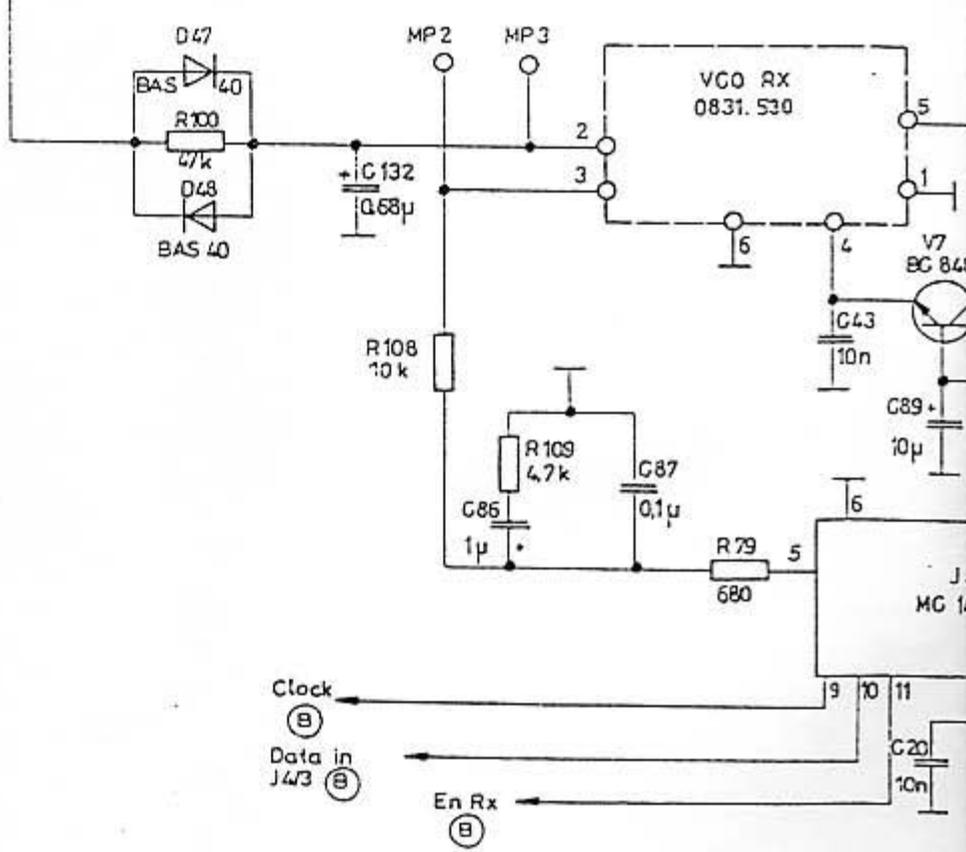
Änderungen vorbehalten

Sensitivity reduction

Empfindlichkeitsreduzierung



U_{stell Rx}
Preset voltage
VCO RX

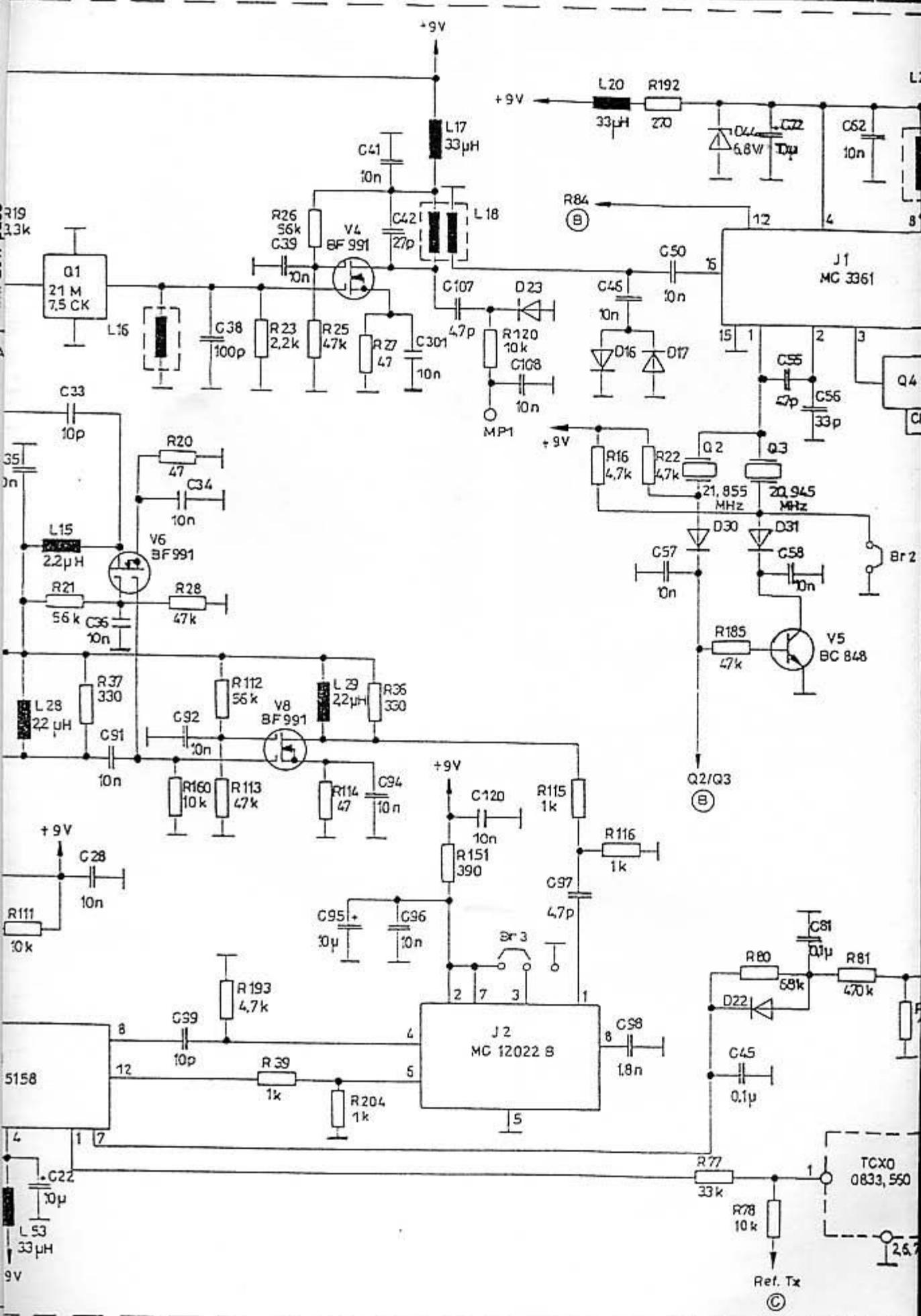


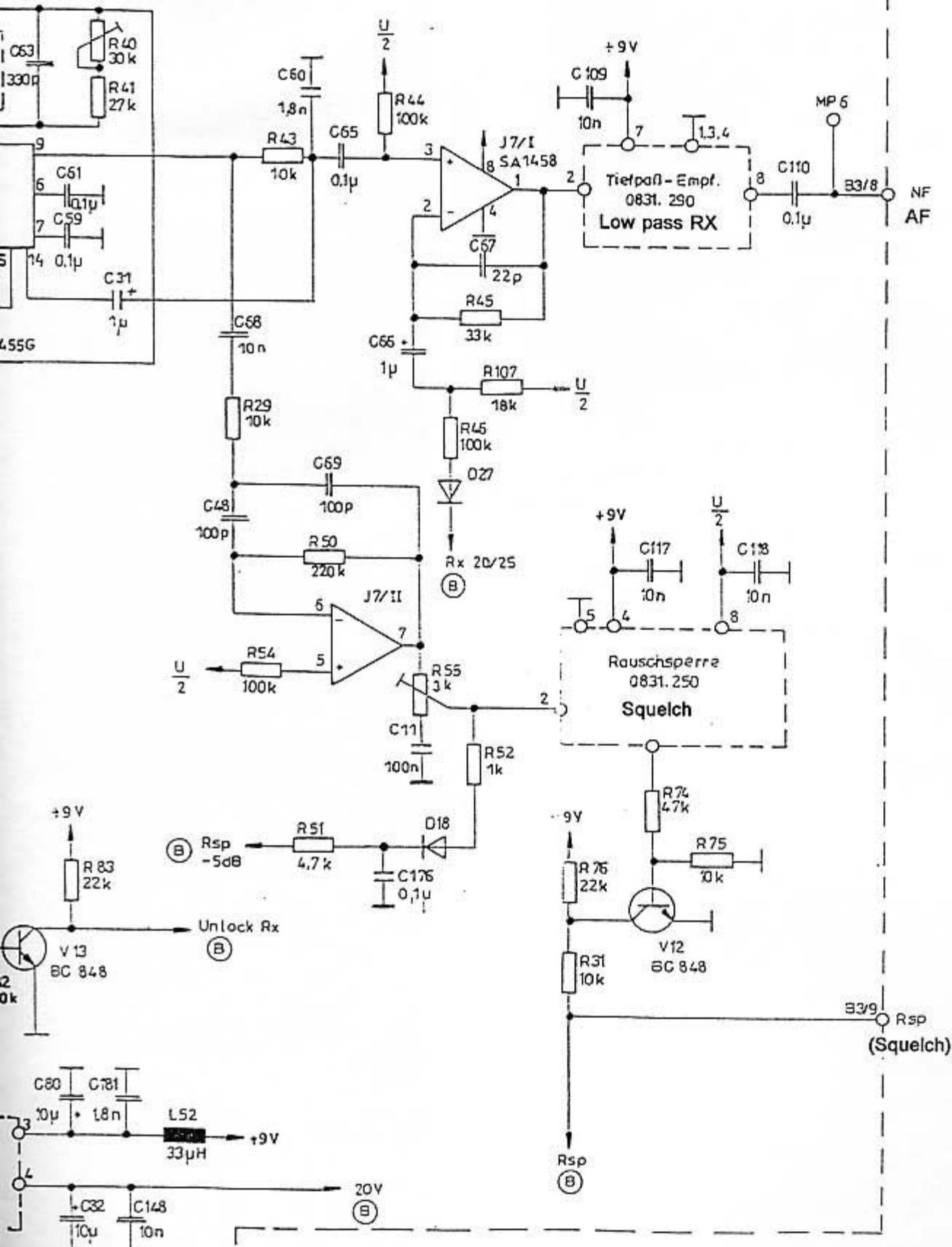
Not designated diodes are LL 4148

Nicht bezeichnete Dioden LL4148
D3, D5, D8 - D13 = BB 219
D6, D24, D25, D30, D31, D46 = BA 885

- L1 = 8V 0832.000.500.010
- L2 = 8V 39.832.104
- L6 = 8V 39.832.107
- L11 = 8V 39.832.108
- L12, L16 = 8V 39.852.108
- L18 = 8V 39.852.110
- L21 = 8V 39.852.114

Clock
Data in J43
En Rx





Lp.Nr.0832.210.390.003 A,B

Tag	Name
Bearb. 24.3.71	36H
Gepr.	
Heinrich Pfitzner	
GmbH	
Nachrichten-Systeme u. Elektronik	
Frankfurt/Main 60	

Empfänger
Receiver

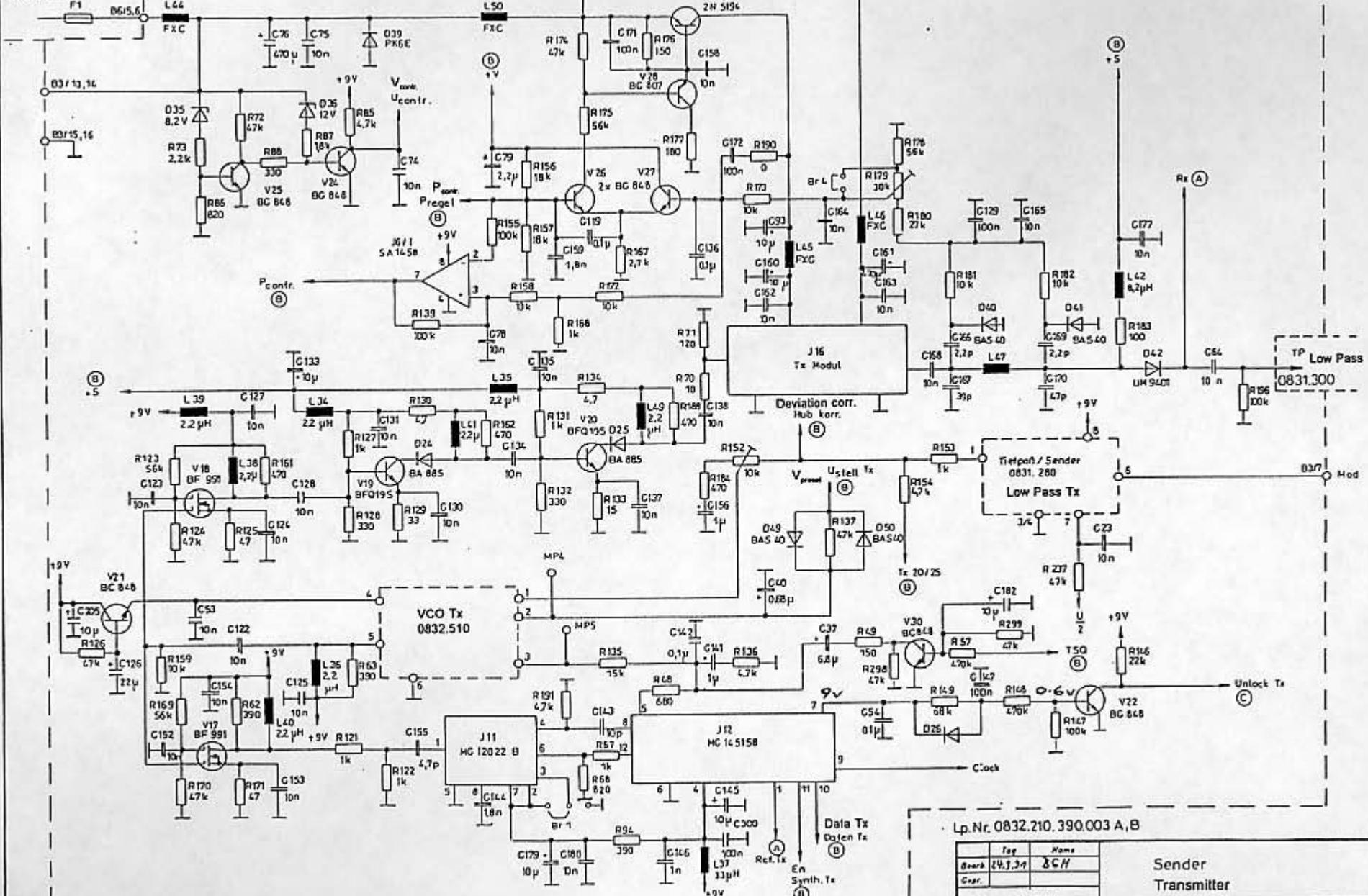
SE 550-08-25-1

0850.210. 210. 201 A

Blatt 1/2 Sheet 1/2

Änderungen vorbehalten

Interconnect. board
Verbindungsplatine
0831.170



All not designated diodes are LL 4148
Nicht bezeichnete Dioden LL 4148
L47 = BV 0832.000.500.009

Lp.Nr. 0832.210.390.003 A, B

Tag	Name	Sender Transmitter	
08.03.79	HC	SE550-08-25-1	0850.210.310.201C
Heinrich Pflitzner GmbH			
Nachrichtensysteme u. Elektronik			
Frankfurt/Main 50			
Blatt 3/3 Sheet 3/3			

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 meine schriftliche Genehmigung ist strafbar und wird polizeilich verfolgt.
 (Patentschutzgesetz, Gesetz über Urheberrecht und
 verwandte Schutzrechte)

Änderungen vorbehalten

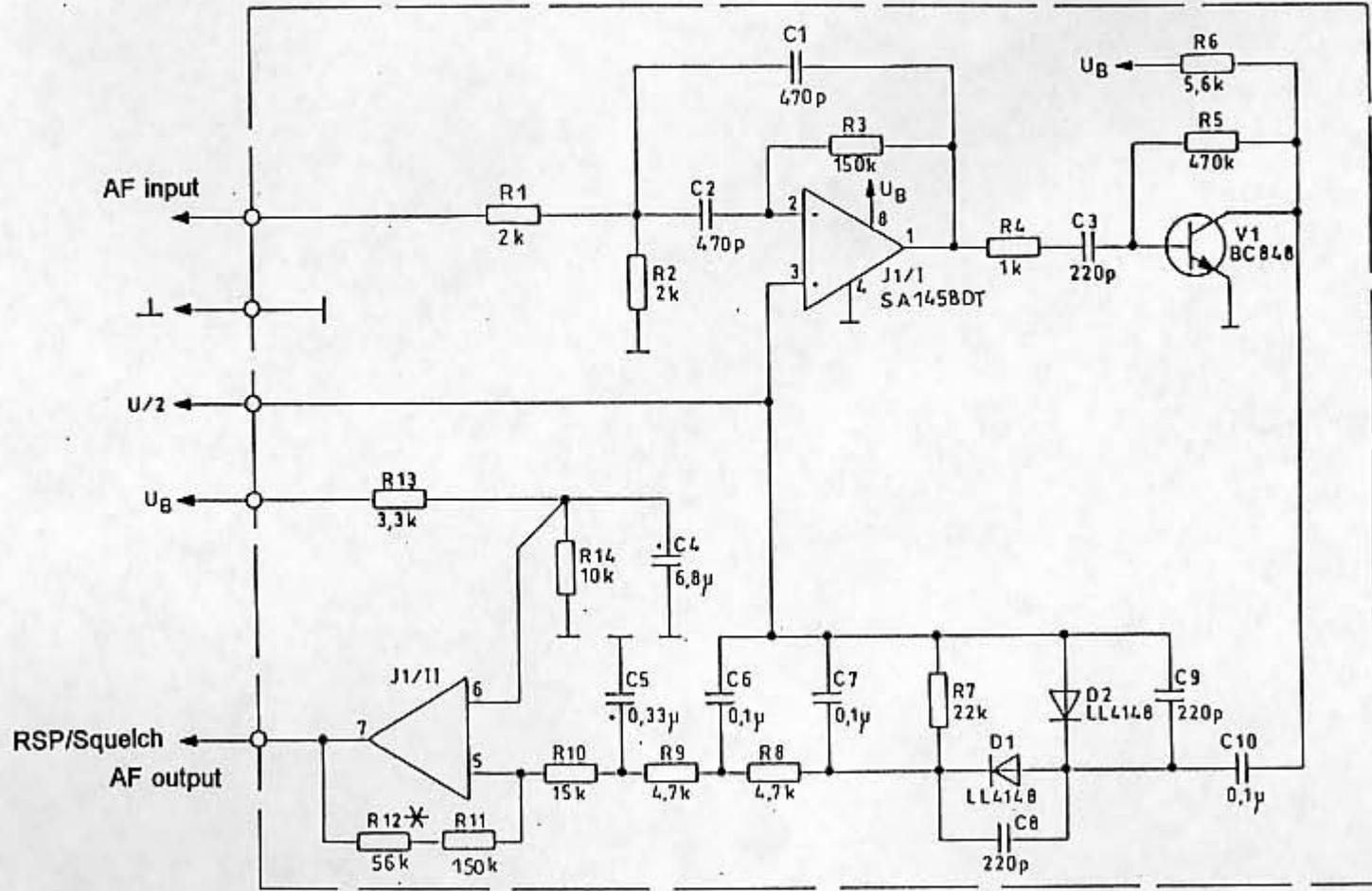
Änderungen vorbehalten

LP. Nr: 0831.250.490.003

Tag	Name
Beord. Nr. 1.31	8 CH
Ger.	

PFITZNER TELETRON
In Zusammenarbeit mit
 Nachrichten-Systeme u. Elektronik
 Frankfurt/Main 60

Rauschsperrre 12,5 kHz	
Squelch	
SE 550	0831.250.410.10



* Test department value

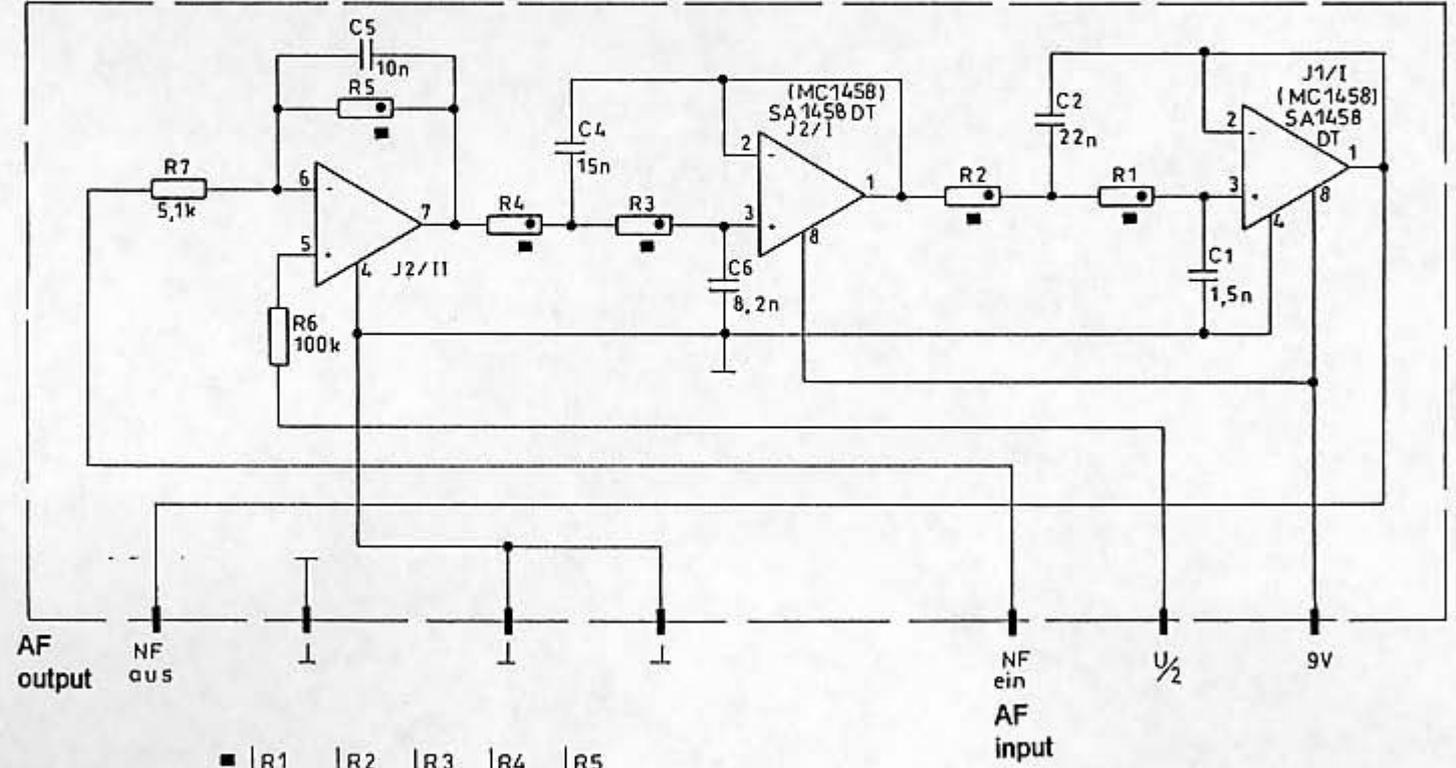
Änderungen vorbehalten

Tag	Name
Bearb. 25.8.84	JGH
Gepr.	

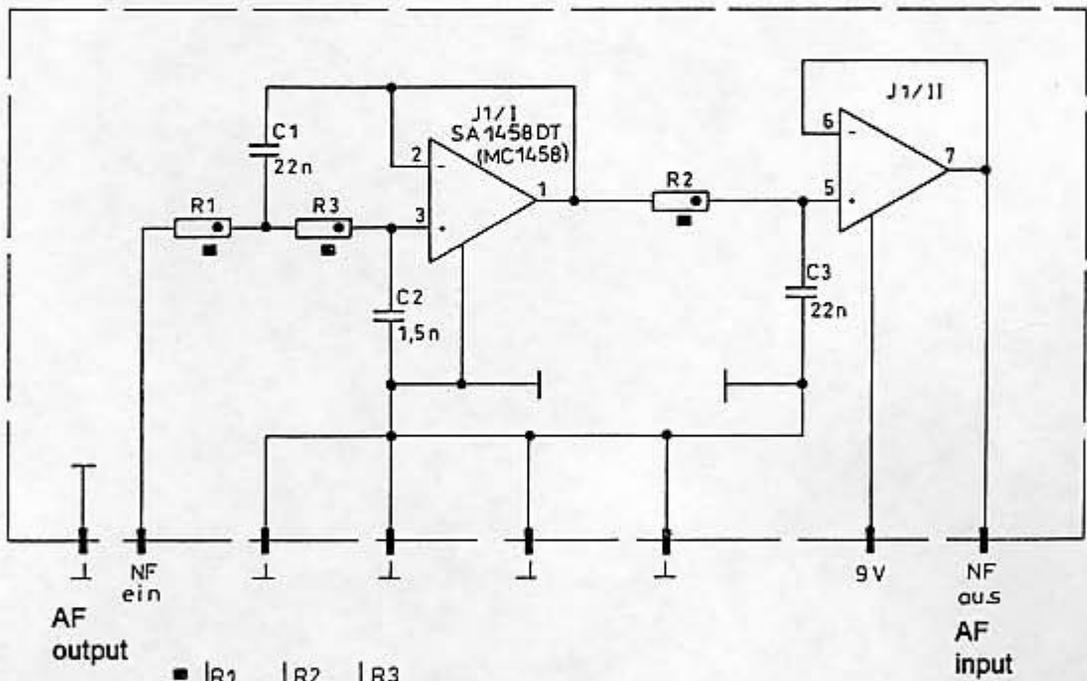
PFITZNER TELETRON
Ein Unternehmen der BAKOM
 Nachrichten-Systeme u. Elektronik
 Frankfurt/Main 50

L.P. Nr. 0831.280.490.003

SE 550	Tiefpass Sender
0831.280.410.002	Low Pass TX



■	R1	R2	R3	R4	R5
12,5kHz	5,49k	17,80k	3,32k	7,68k	5,62k
20/25kHz	4,53k	15k	2,8k	6,65k	4,75k



	R1	R2	R3
12,5 kHz	6,34k	4,53k	16,5k
20/25 kHz	15,00k	3,92k	5,49k

Lp. Nr. 0831.290.490.002

	Tag	Name
Bearb.	MOSER	BGH
Gepr.		
PFITZNER TELETRON <small>Ein Unternehmen der ASCOM</small> Nachrichten-Systeme u. Elektronik Frankfurt/Main 60		

Tiefpass Empfänger
Low Pass Rx

SE 550

0831.290.410.001

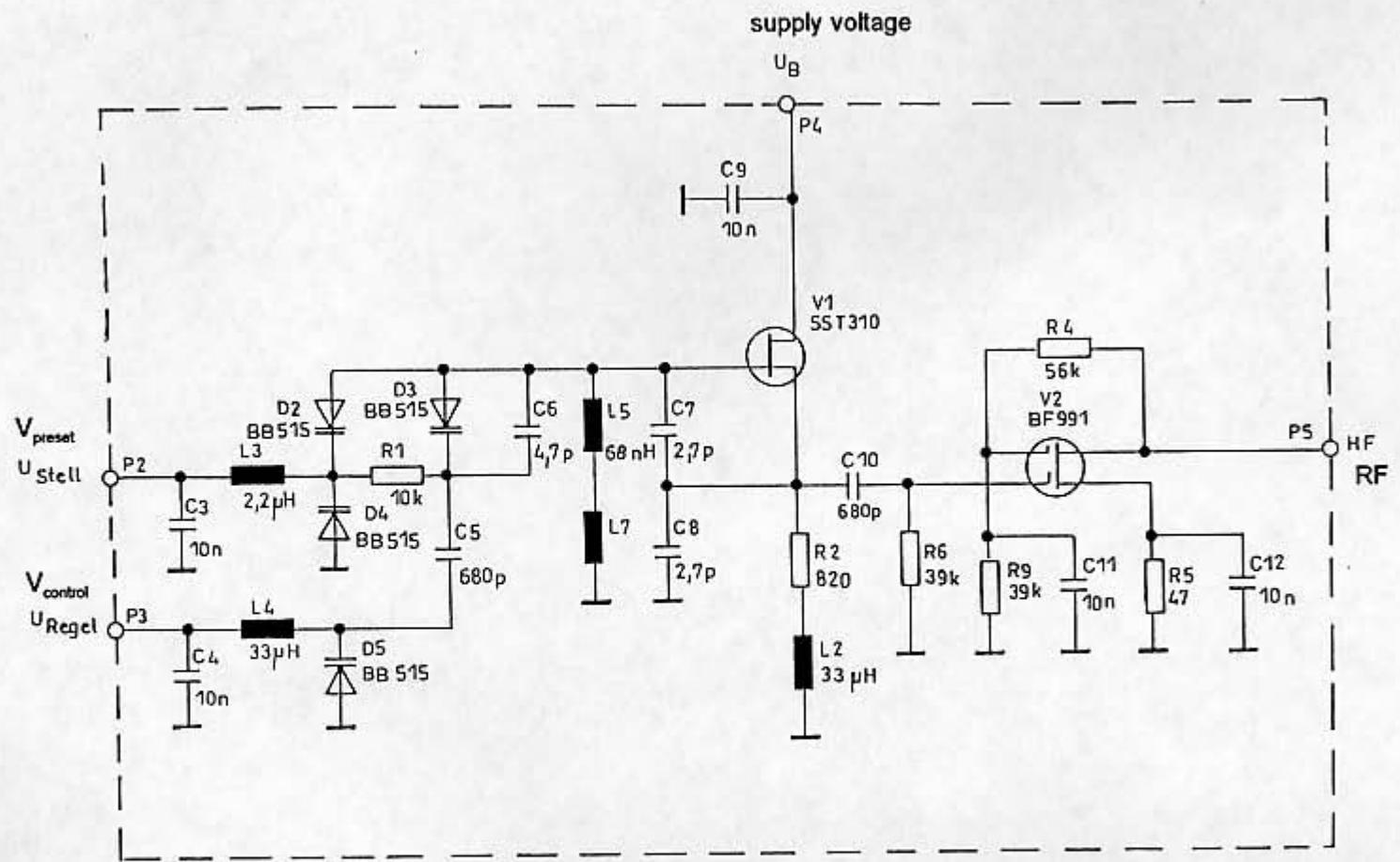
Anmerkungen vorbehalten

Änderungen vorbehalten

Lp. Nr. 0832.510.490.002

Tag	Bearb.	Ger.
2.5.90	36H	
PELITRON TELETRON <small>Ein Unternehmen der AGOSTINI</small> Nachrichtensysteme u. Elektronik Frankfurt/Main 60		

VCO - Empfänger	
VCO Rx	
SE 550	0832.510.410.002

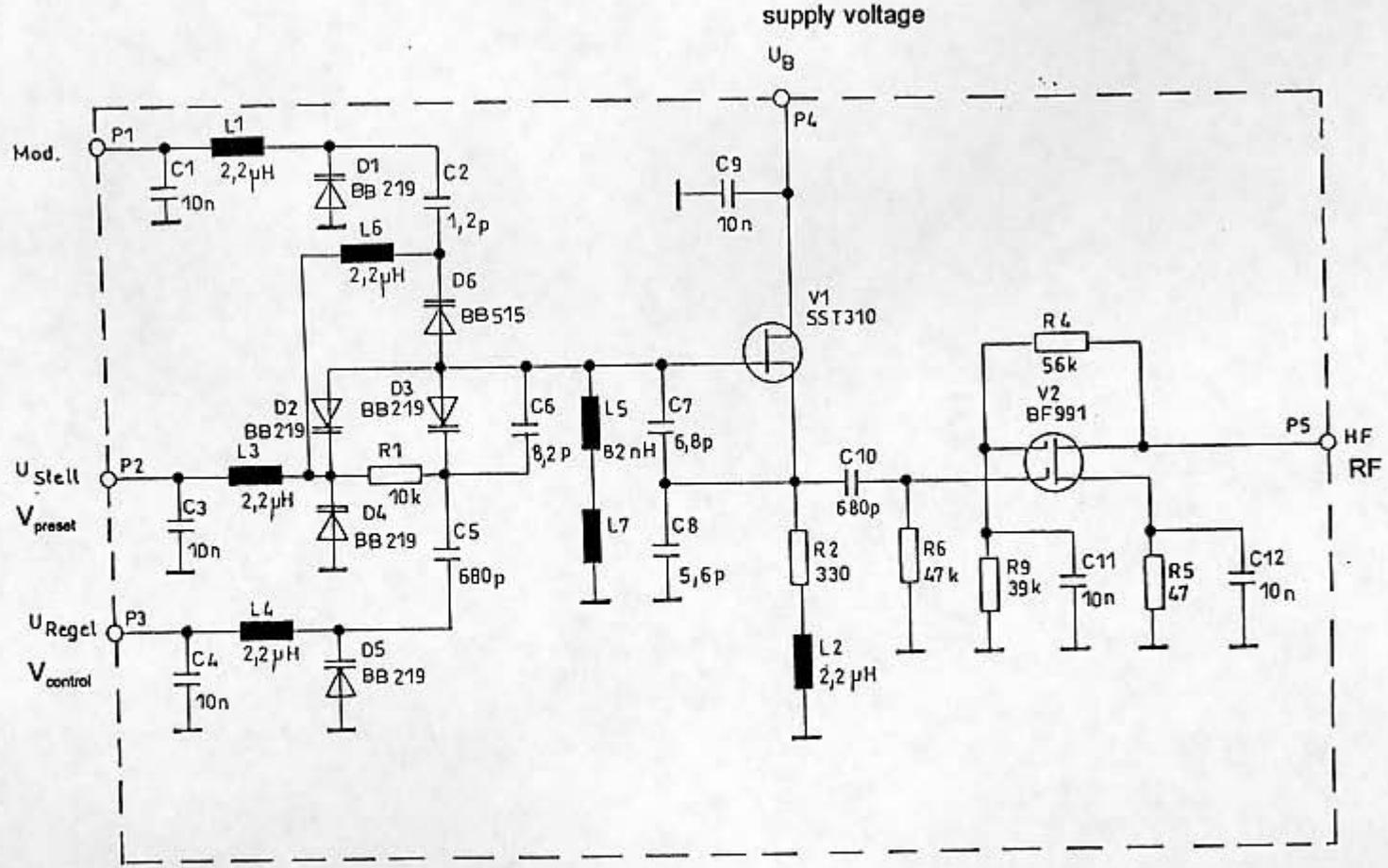


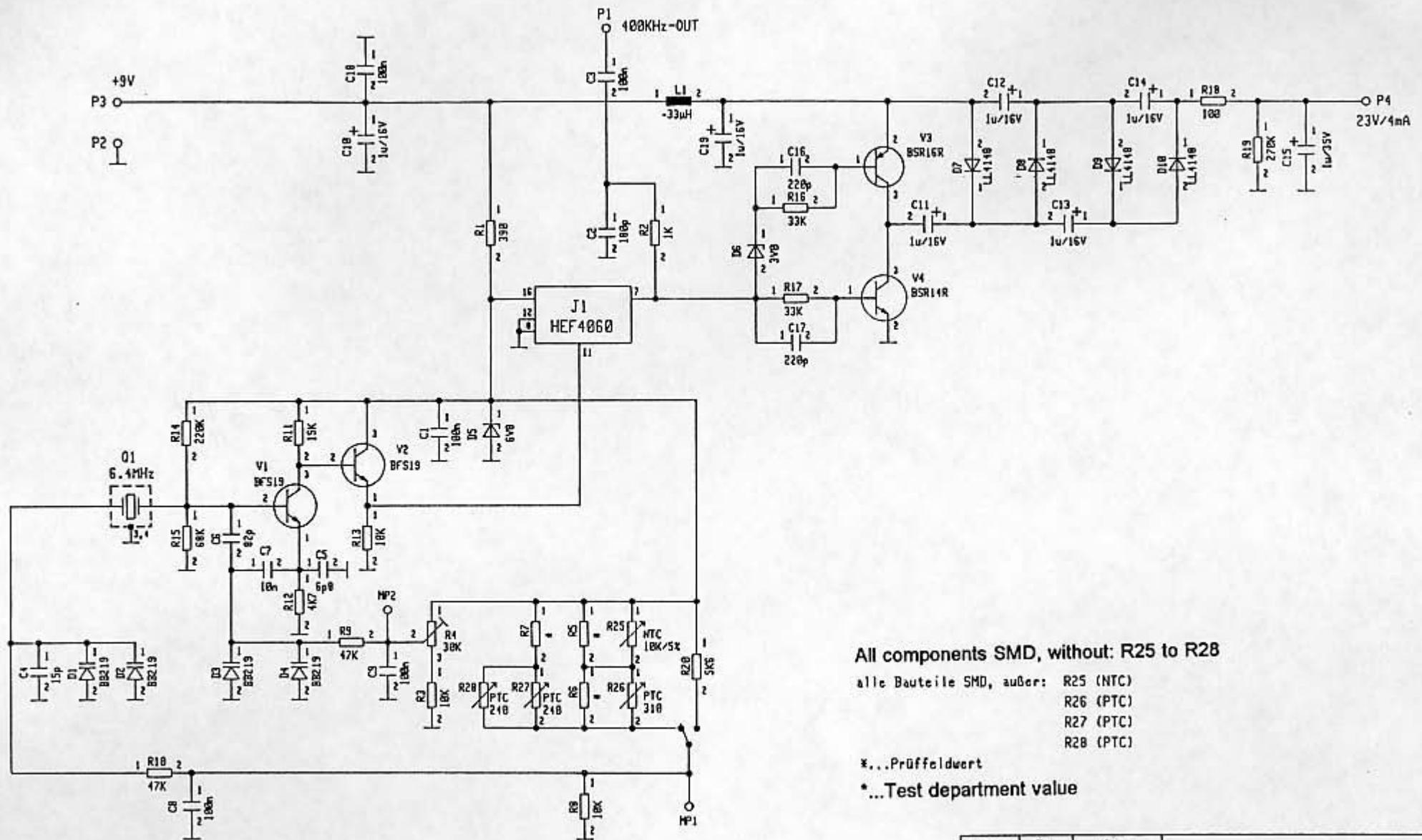
Änderungen vorbehalten

LP-Nr. 0832.510.490.002	
Mod.	P1
U _{Stell}	P2
V _{preset}	P3
U _{Regel}	P4
V _{control}	P5

SE 550	
VCO - Sender	
VCO Tx	
0832.510.410.502	
01	

LP-Nr. 0832.510.490.002





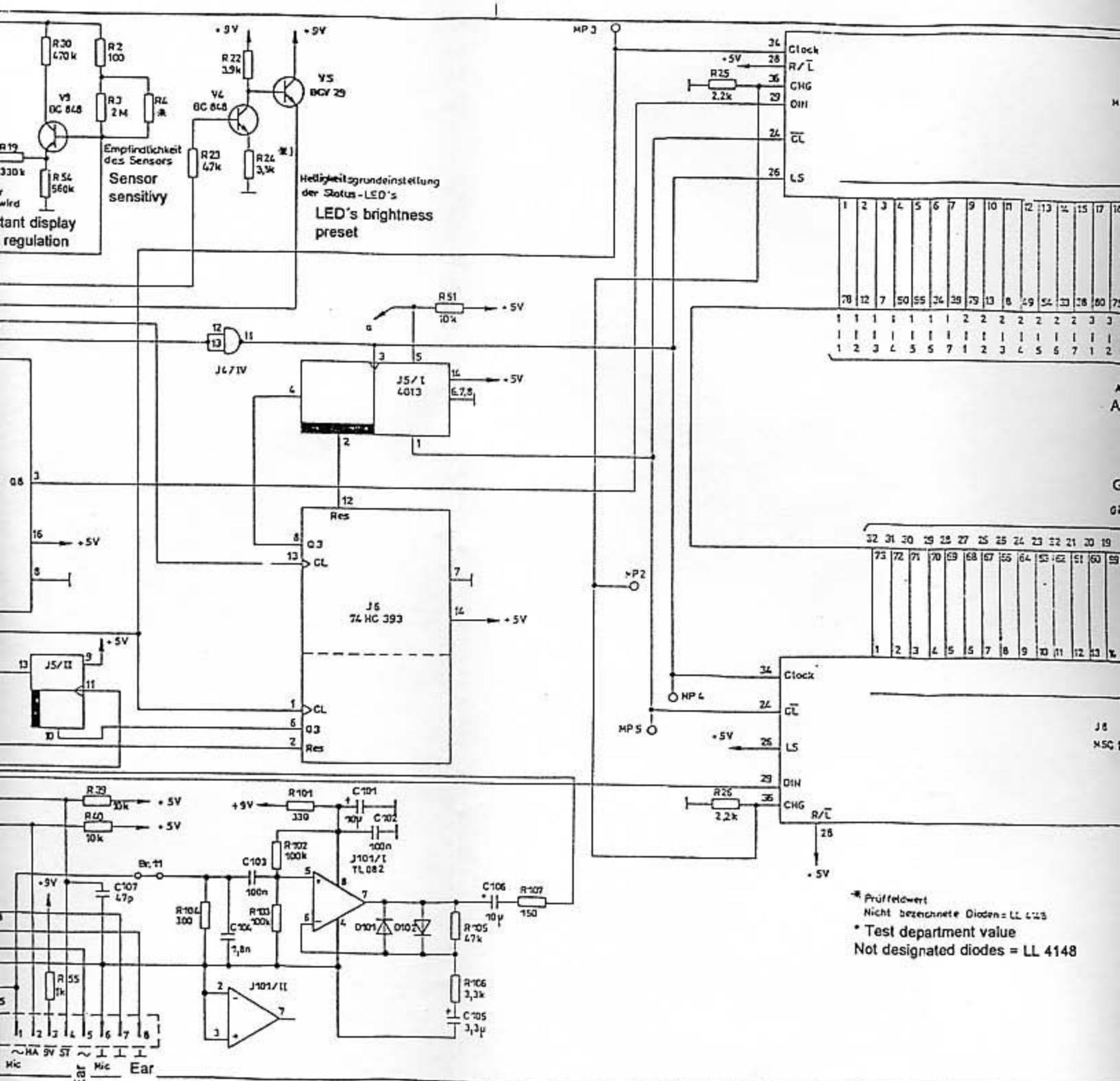
All components SMD, without: R25 to R28

alle Bauteile SMD, außer: R25 (NTC)
R26 (PTC)
R27 (PTC)
R28 (PTC)

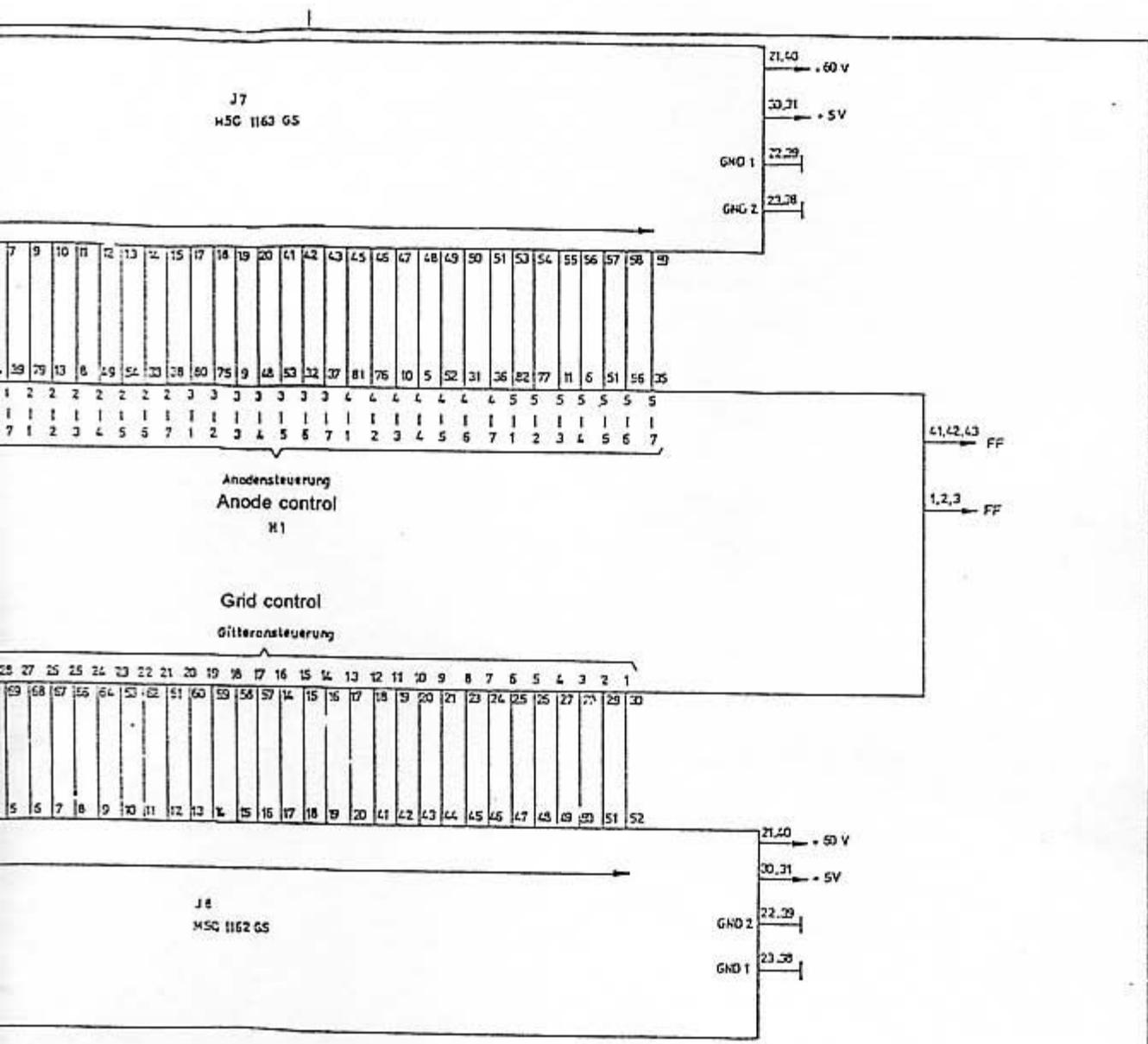
*...Prüffeldwert

*...Test department value

1992	Tag	Name	TCX0	
Bearb.	13.2.	Berghammer		
Gepr.		<i>[Signature]</i>		
ASCOM - Teletron GmbH			SE558	0833.560.410.001
Eugen-Müller-Straße 14 A-5820 SALZBURG				



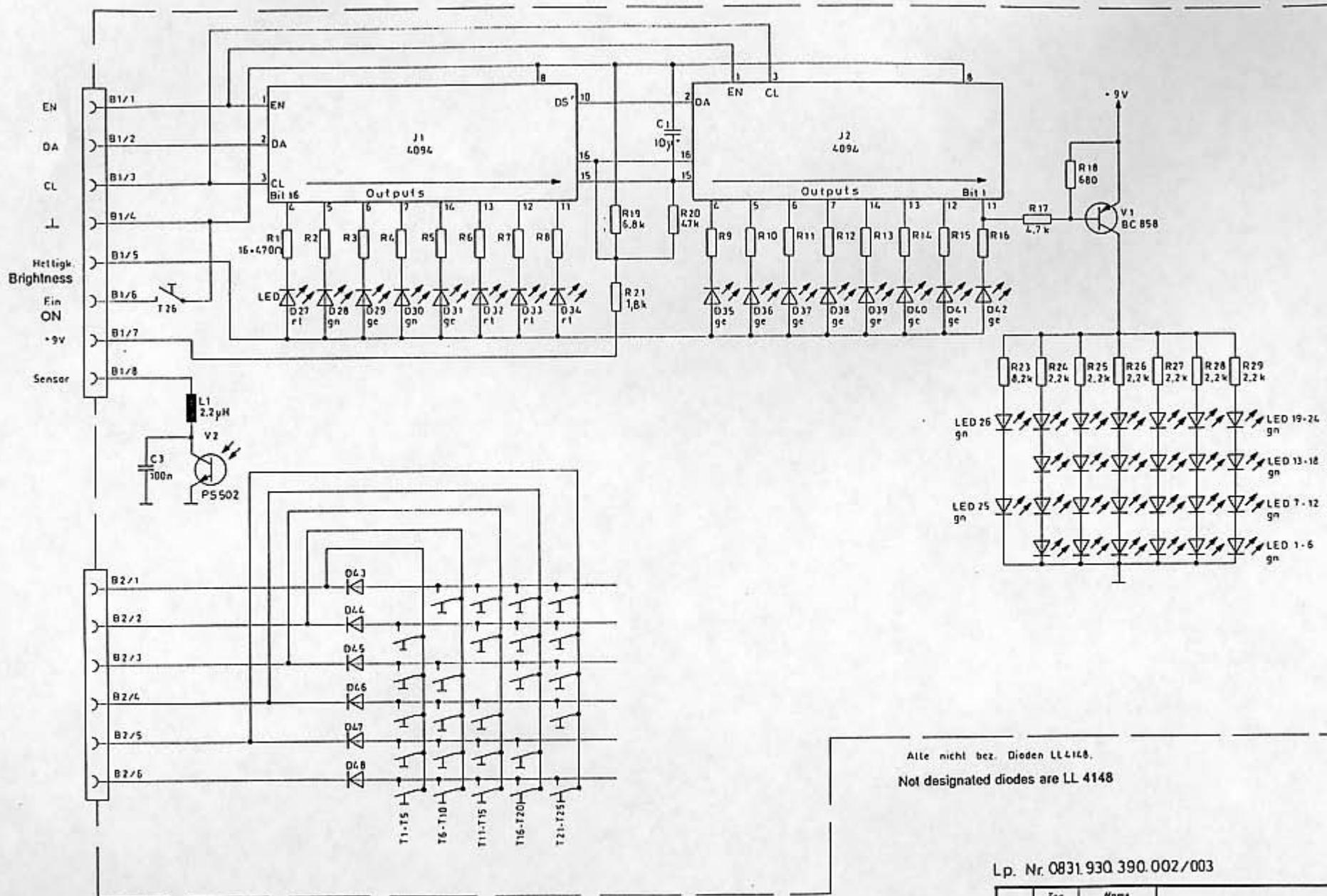
* Prüffeldwert
 Nicht bezeichnete Dioden = LL 4148
 * Test department value
 Not designated diodes = LL 4148



Alle Dioden = LL 4148
 Wertwert
 Alle Dioden = LL 4148

Lp. Nr. 0831.920.390.006

	Tag	Name		
Bearb.	11.9.31	JGH	Anzeigeplatine (2kB) Display Board (2 KB)	
Gepr.				
Heinrich Pflitzner GmbH Nachrichten-Systeme u. Elektronik Frankfurt/Main 60			SE 550	0831.920.110.005
Änderungen vorbehalten				05



Alle nicht bez. Dioden LL4148.
 Not designated diodes are LL 4148

Lp. Nr. 0831.930.390.002/003

Tag	Name	Tastenplatte Key Board	
Bearb.	1101 P3 Wagner	SE 550	0831.930.310.001
Gedr.	9.03.85		
Heinrich Pflitzner GmbH Nachrichten-Systeme u. Elektronik Frankfurt/Main 60			03

Änderungen vorbehalten