



skanti

INSTRUCTION MANUAL

SSB TRANSMITTER
Type T400

PROVISIONAL INSTRUCTION MANUAL

GORM HOLT-HANSEN

AERIAL SHORTENING
1
2
CAPACITOR

A

HF π -FILTER
OUTPUT
CAPACITOR
y
4
3

z
6
5

BAND MHz: 6
0
1
2

x
2
1

HF AERIAL
CAPACITOR
CT-4 MHz
 π -FILTER

0
3
4
5
6
7

OUTPUT

CAPACITOR

4 MHz π -FILTER INPUT CAPACITOR

5
4
3
2
1

6
8
12
16
22
25

4
3
2
1

HF AERIAL
COIL

VARIOMETER CT-4MHz

1 3 5 7 9 11 13 15 17

2 4 6 8 10 12 14 16 18

FOR UNUSED PLUGS

D F G H J K L M N O P/4

1 2 3

11 12

10 9 8 7

FINE TUNING
COIL
FOR
2182 kHz

SHIP

T400 no.

MARKER MED ☒ OG TEGN EN STREG FRA ☒ NÅR ANTENNETILPASNING ER OPNÅET

MARK WITH ☒ AND DRAW A LINE FROM ☒ WHEN ADJUSTMENT OF AERIAL TUNING IS COMPLETED

skanti

ADJUSTMENT OF AERIAL TUNING

Carried out by: date:

Tegn. JD

Kont.

T - 0294 - 2

17 - 1 - 72



CHANNEL OSCILLATOR

skanti

P 1063E



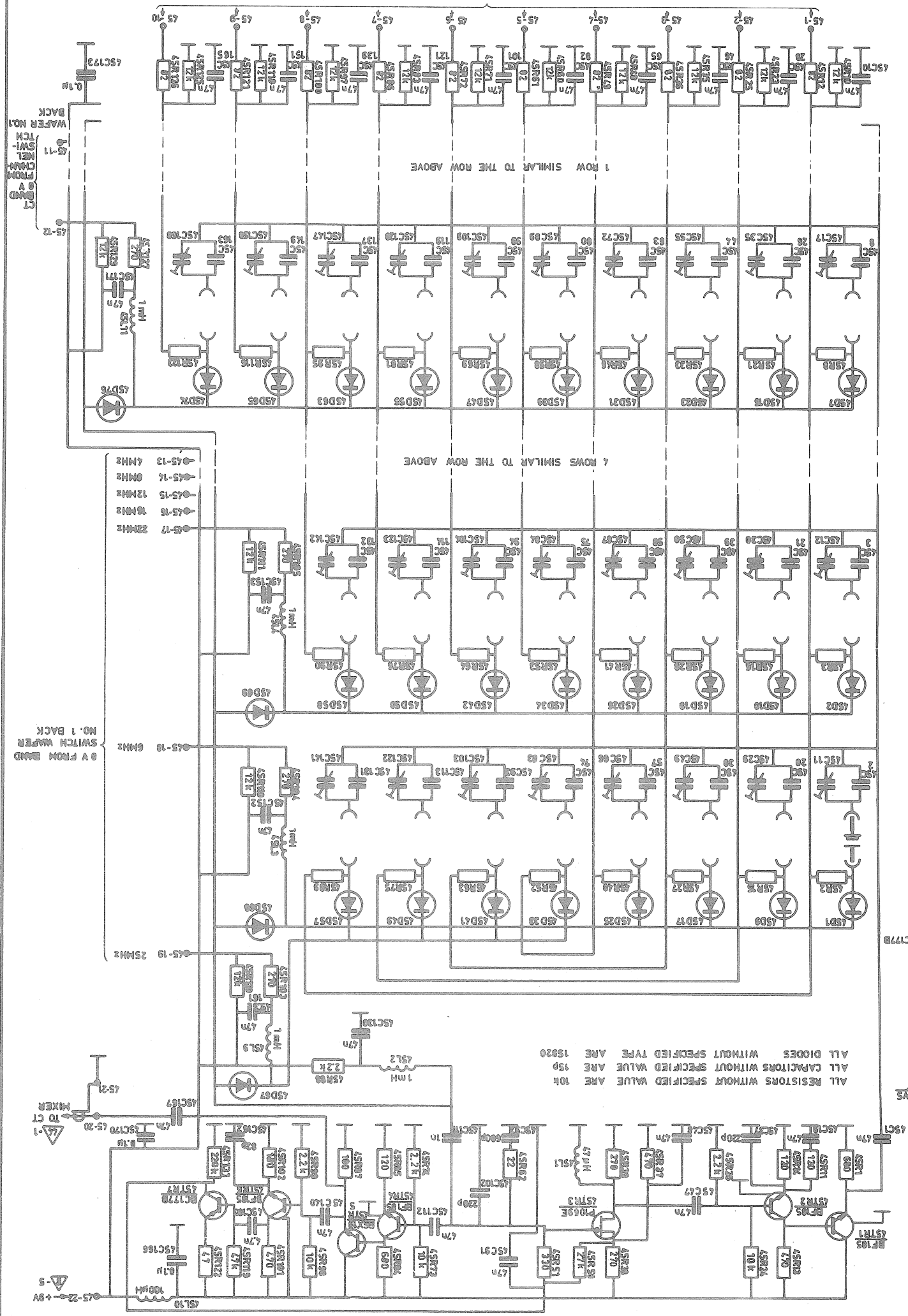
BSX 19 AND BC177B

BF 105

ALL RESISTORS WITHOUT SPECIFIED VALUE ARE 10K
ALL CAPACITORS WITHOUT SPECIFIED VALUE ARE 15P
ALL DIODES WITHOUT SPECIFIED TYPE ARE 15920

BOTTOM VIEWS

+9V FROM CHANNEL SWITCH WAFER NO.1 FRONT



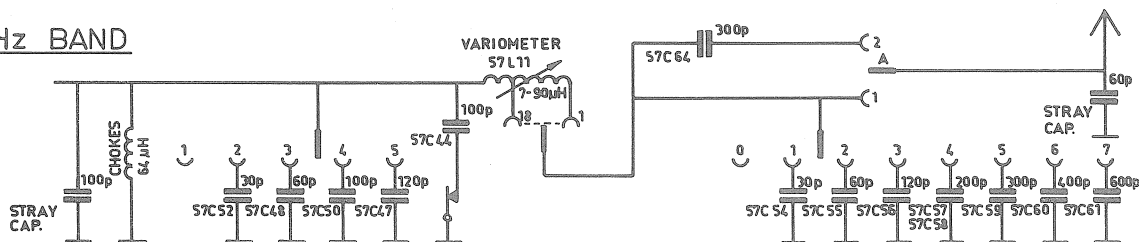
BACK
WAFER NO.1
SW-1
CH-1
FROM
0 V
CT

0 V FROM BWND
SWITCH WAFER
NO.1 BACK

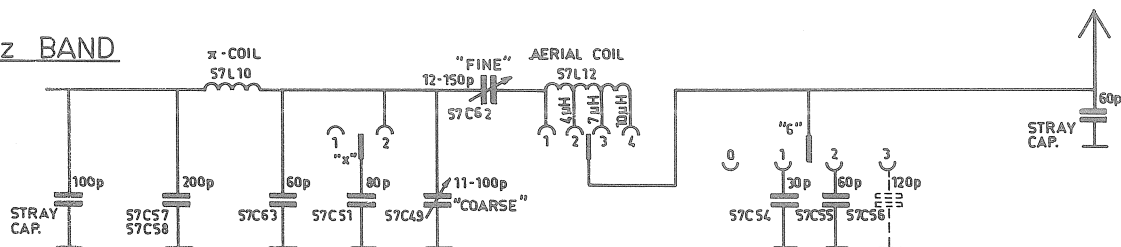
45-21
45-20
45-19
45-18
45-17
45-16
45-15
45-14
45-13

45-22
45-21
45-20
45-19
45-18
45-17
45-16
45-15
45-14
45-13

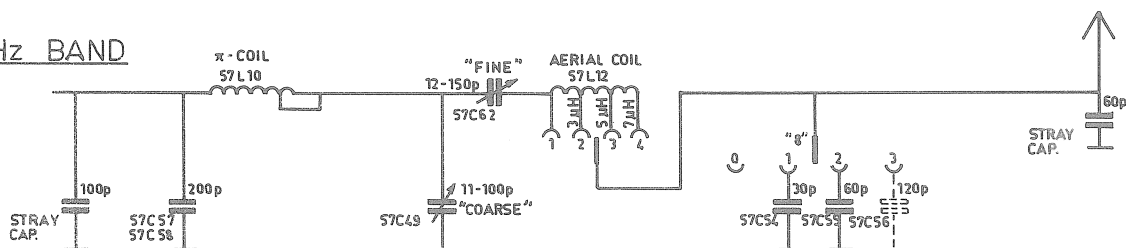
4 MHz BAND



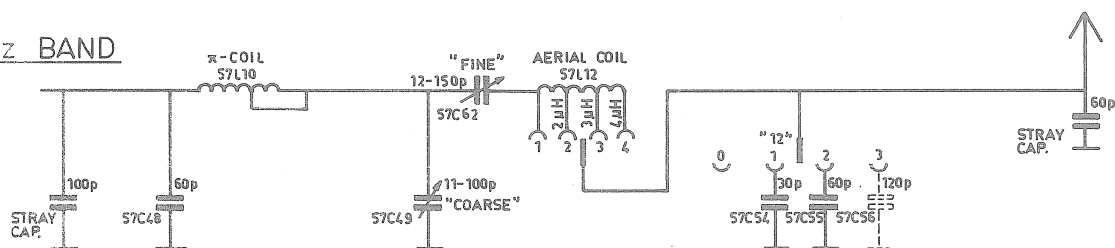
6 MHz BAND



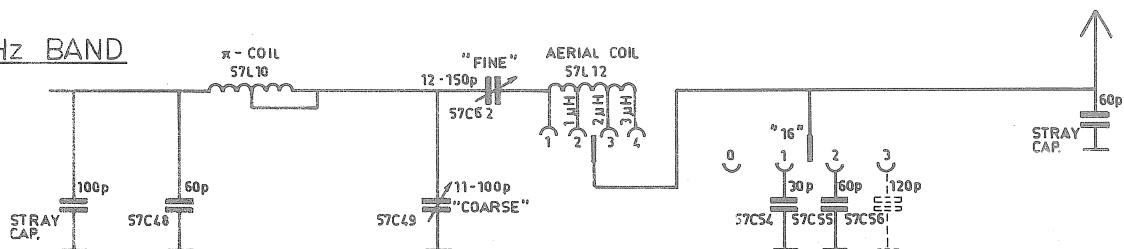
8 MHz BAND



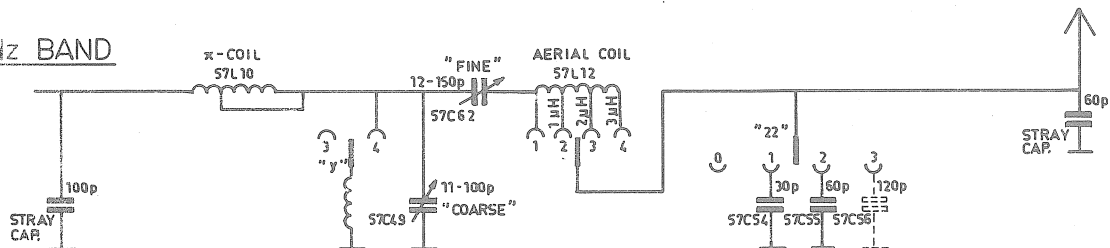
12 MHz BAND



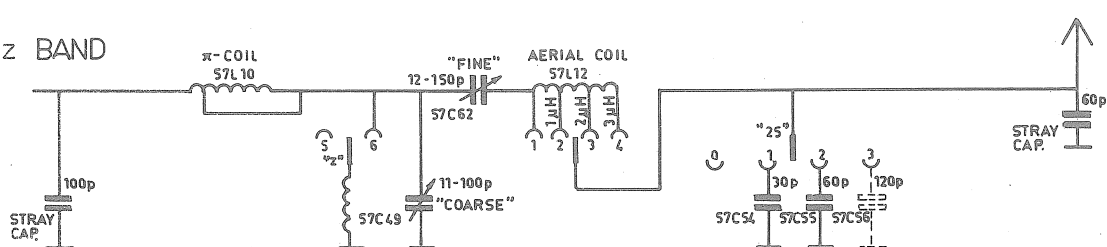
16 MHz BAND



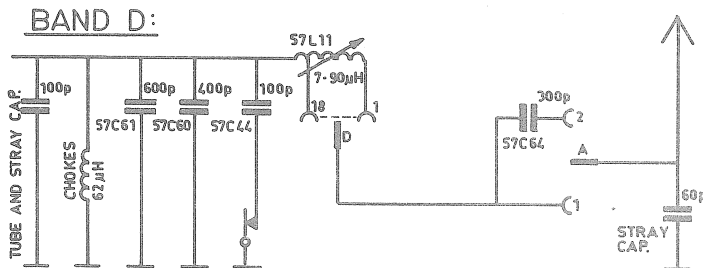
22 MHz BAND



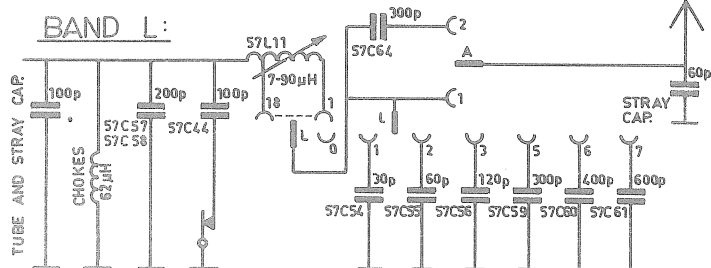
25 MHz BAND



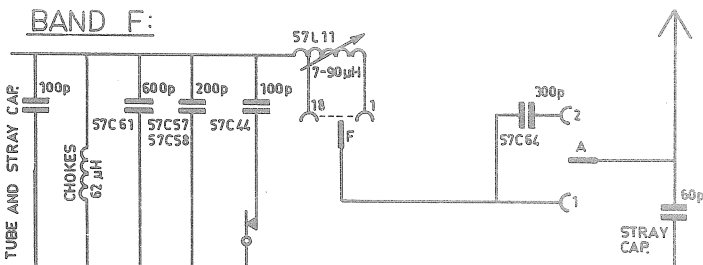
BAND D:



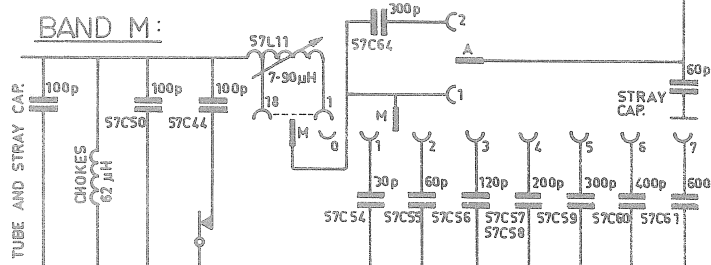
BAND L:



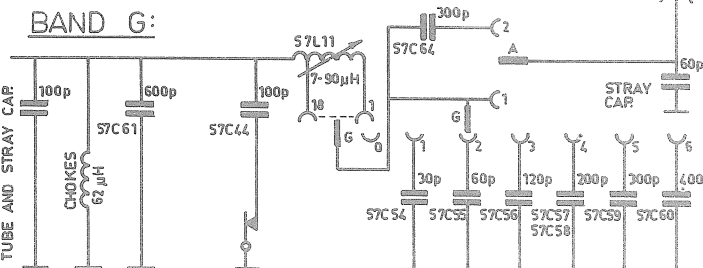
BAND F:



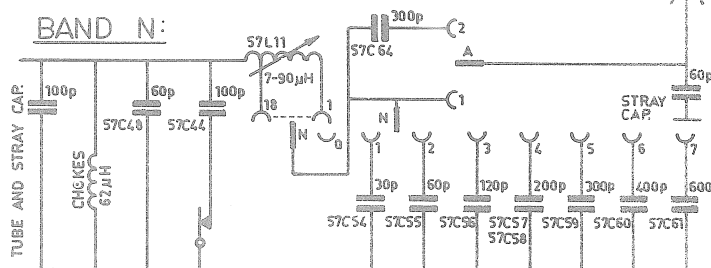
BAND M:



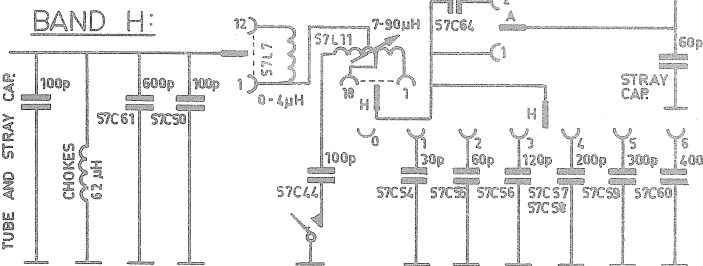
BAND G:



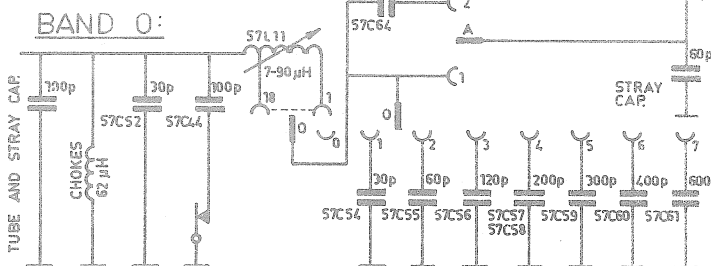
BAND N:



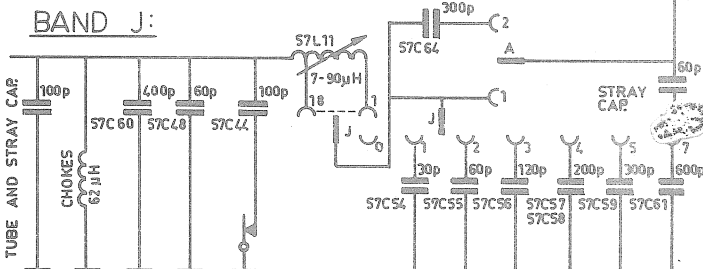
BAND H:



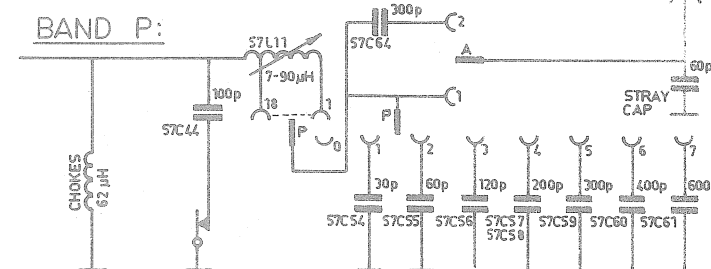
BAND O:



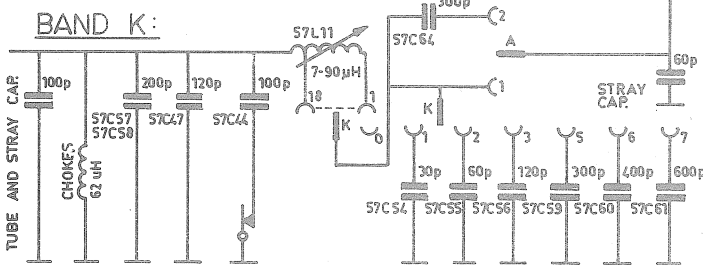
BAND J:



BAND P:



BAND K:



skanti

AERIAL TUNING CIRCUITS FOR CT-BANDS

Tegn. JD Konf.

T-0605 - 1

10 - 3 - 72

T 400

INSTRUCTION MANUAL

CONTENTS

Data Sheet

1. Introduction
2. Technical Description
3. Installation
4. Operating Instructions
5. Simple Service
6. Circuit Diagrams, Parts Lists

Type T 400

SSB Maritime Radiotelephone Transmitter

Data Sheet

Emission Modes

A3H, A3J and A3A all upper sideband.
At 2182 kHz A3H only.

Operating Frequencies

20 frequencies in the coastal telephony band (CT) 1605-4000 kHz.
8 frequencies in each of the 7 HF bands between 4 and 27.5 MHz allocated to the Maritime Radiotelephony Service, except the 6 MHz and the 25 MHz bands where 4 frequencies are provided.

Frequency Accuracy

± 100 Hz.

Frequency Stability

± 20 Hz in any 15-minute period.

Power Output

Nominal 400 W PEP (Peak Envelope Power), with reduction to less than 60 W PEP. At all power levels the intermodulation level is below -25 dB according to CCIR specifications.

Aerial

Correct matching at all frequencies to normal ship - aerials with good efficiency.

Unwanted Radiation

According to Radio Regulations.

Overload Protection

The transmitter is capable of with standing open - circuited or short - circuited aerial terminals for 5-minutes without damage.

Modulation

Modulation characteristic within 6 dB from 350 Hz to 2700 Hz.

Speech Compression

More than 20 dB linear volume compression for normal speech level.

Noise and Hum Power

More than 40 dB below PEP.

Alarm Generator

A two-tone alarm generator is incorporated.

Temperature and Supply Voltage Variations

The above data are valid at

- ambient temperature : 0 - 40° C
- supply voltage variations, AC : $\pm 10\%$
26.4 V DC : -10% to +25%
- vibration test (GPO)

The transmitter will not be damaged under the following conditions.

- an increase in supply voltage to AC : +30% above nominal voltage (2 seconds)
DC : 34 V (sustained)

Controls

POWER switch (MAINS OFF - STAND-BY - FULL - MEDIUM - LOW)
TWO-TONE ALARM switch (TEST - NORMAL - ALARM)
TWO-TONE ALARM push button
MODE switch (A3H - A3J - A3A)
CHECK switch
BAND switch
CHANNEL switch
AERIAL TUNING, HF COARSE switch
AERIAL TUNING HF/CT FINE control

Supply Voltage

24 V battery (26.4 V nominal) with Power Pack P 400 or
110/220/380/440 single phase AC with Power Pack P 401

Power Consumption

DC : approximately 750 W
AC : approximately 750 VA

Dimensions

T 400 Transmitter

Rack-mounted	: height	: 354.8 mm
	width	: 482 mm
	depth - into rack	: 380 mm
	depth - overall	: 425 mm
	weight	: 19 kg

TRP 400 Radiotelephone

Rack-dimensions	: height	: 768 mm (aerial insulator incl.)
	width	: 490 mm
	depth	: 463 mm
	weight (battery operation)	: 73 kg
	weight (AC mains operation)	: 88 kg

TELEPHONY TRANSMITTER TYPE T400.

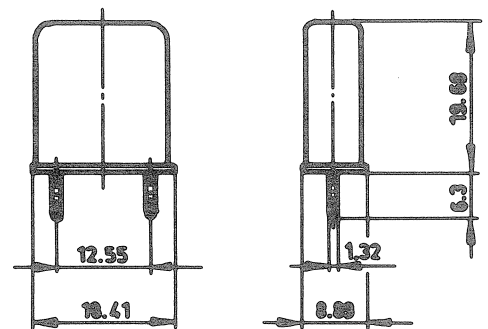
Calculation of channel crystal frequency f_x from transmitting frequency f_t .

Observe that the transmitting frequency always is the carrier frequency.

All frequencies are in kHz.

Band	f_x Channel crystal frequency
1605-4000 kHz	$f_t + 1400$ kHz
4 MHz	$f_t + 1400$ kHz
6 MHz	$f_t - 2800$ kHz
8 MHz	$f_t - 4200$ kHz
12 MHz	$f_t - 8400$ kHz
16 MHz	$f_t - 12600$ kHz
22 MHz	$f_t - 18200$ kHz
25 MHz	$f_t - 21000$ kHz

Channel crystals with specification according to SKANTI specification R-0328 are marked with f_t on the case top and with f_x on the case side.



Holder: HC-6/U
 Frequency: 1.6-6 MHz
 Tolerance: a) $\pm 0.002\%$ at 24°C
 b) $\pm 0.001\%$ variation from 24°C
 over temperature range
 Temp. range: -20 to +70°C
 Circuit: Parallel resonance, 30 pF
 Drive: 1 mW
 Activity: DEF 5271 - A
 Operation-mode: Fundamental
 Marking: Case top: to be specified in the order
 Case side: R-0328 and nominal crystal frequency.

Materiale:	Overfladebeh.:	Tolerancer hvor intet andet er anført \pm mm	Målforhold: 1:1	
<div>skanti</div>	Channel crystal specification		Tegn.JD	Konf.
			R - 0328 - 2	
			1 - 12 - 70	

1. INTRODUCTION

- 1.1. The T 400 is a single-sideband radio Telephone transmitter for telephone traffic in the 1.6-4 MHz coastal telephone band and in the maritime shortwave telephone bands between 4 and 27.5 MHz. The transmitter is crystal controlled and has a total of 68 channel facilities which are distributed as follows: 20 channels in the coastal telephone band and 8 channels in each of the shortwave bands except for the 6 MHz and 25 MHz bands, which have 4 channels each.

The transmitter has provision for emission of wavetype A3H, A3J, and A3A, the upper sideband being used in all cases. Except for the driver and power amplifier stages, solid-state circuitry is employed throughout, and widespread use is made of integrated circuits. This, coupled with the fact that no crystal ovens are used, causes the transmitter to be ready for operation within one minute after having been started up.

Depending on the type of power pack with which it is used, the transmitter may be powered either from a 24 V battery or from the AC voltages occurring in normal practice.

It is easy to install new channels in the transmitter. The only adjustments to be made consist in aligning the crystal frequency and, in the coastal telephone band, adjusting two tuned circuits. The crystals and tuned circuits become accessible after removal of the cover plate on the left side wall of the transmitter. The crystal trimmers make it possible to correct the drift caused by natural crystal ageing, which may otherwise in the course of some years bring the frequencies outside the specification limits.

The dimensions of the transmitter match the 19-inch standard, and the transmitter is intended for being mounted in the same cabinet with its P 400 or P 401 power pack and the R 400 receiver. When so mounted, these three units constitute the TRP 400 transmitter/receiver combination.

Because we at SKANTI are constantly processing the experience gained during the production and operation of our equipment, it is possible for minor modifications to occur relative to the information given in this instruction manual. If practically possible, however, any corrections will be listed on a correction sheet at the back of the front cover of this manual.

2. TECHNICAL DESCRIPTION

2.1. For technical data see Data Sheet (first page of this manual).

2.2. Mechanical

The transmitter is built on a rugged alodine-treated aluminium chassis which is shaped in such a manner that it also provides RF screening between the individual sections of the transmitter. The chassis has two outside cover plates; they complete the internal screening system and protect against direct signal pickup.

The transmitter is composed of 18 modules most of which are built on printed circuit boards. All of these become accessible on removal of the cover plates. The number of connecting wires to individual modules has been minimized, in part due to extensive use of diode switches.

The chassis divides the transmitter into five sections. In the front compartment behind the front panel are switches, meters, and chain drives for aerial tuning components, placed so as to be easily accessible on removal of the front panel. The top compartment houses the power amplifier stage and its associated aerial tuning circuit. The left side compartment contains the channel oscillator module, 45, which accommodates 68 crystals. Here, too, are the driver stage, 48, 52 and 53. In the bottom compartment are the driver valves and their associated output circuits, 51, 54, 58, a meter circuit 49 and the power amplifier valve sockets. Lastly, the right side compartment houses modules 40 to 47 (except 45), which contain circuits which convert the incoming microphone signal to a single-sideband signal of the desired frequency. Also housed in the right side compartment is module 8, a 9 V voltage regulator.

2.3. Circuit Description, General

2.3.1. The circuit diagram is divided into wiring diagrams T-0181 and T-0182 which show interconnections between the modules of which the transmitter is composed, and circuit diagrams of individual modules. Lastly, in the interest of clearness, diagrams of the integrated circuits employed have been included. Block diagram T-0121 illustrates the operation of the transmitter.

2.3.2. The microphone signal is fed via the "NORMAL" position of the "TWO-TONE ALARM" switch to the AF amplifier, 42. In the "ALARM" position of the same switch, the microphone circuit is disabled and the alarm signal, generated in module 40, applied to the AF amplifier instead.

The amplified signals are fed to a balanced mixer, 43, in which they are converted to a 1.4 MHz double sideband signal. The upper sideband is removed in a crystal filter, and the lower sideband is applied to the coastal telephony mixer, 44.

The coastal telephony mixer converts the signal directly to the desired frequency in the range 1.6-4.2 MHz as an upper side-band signal. Carrier re-insertion, if desired, is also carried out in this mixer, controlled from the "MODE" switch.

The signal, now ready for use, is thereafter fed through the "POWER" switch which permits reducing the power level in two steps of approx. 5 dB each.

The driver amplifier, composed of modules $\triangle 48$, $\triangle 51$, $\triangle 52$, $\triangle 53$, $\triangle 54$, and $\triangle 58$ and controlled from the "BAND" and "CHANNEL" switches, amplifies and filters the signal, which is thereafter stepped up to the desired level in the power amplifier stage.

Aerial tuning is preselected with the "BAND" switch, and fine tuning is performed with "AERIAL TUNING, HF/CT FINE".

The "LEVEL METER" indicates AC voltage swing at the power amplifier anodes. Aerial current is read on the "AERIAL CURRENT" meter.

Aerial current metering is handled by module $\triangle 50$.

Generation of signals in the HF bands between 6 and 25 MHz is carried out by the HF mixer $\triangle 46$, in which a signal from the coastal telephony mixer is combined with a suitable injection signal to produce a signal in the desired HF band. The signal is thereafter filtered and amplified in the driver and power stages, and aerial tuning is performed with "AERIAL TUNING, HF COARSE" and "AERIAL TUNING, HF/CT FINE".

- 2.3.3. All injection signals required for the 1.4 MHz, coastal telephony, and HF mixers are derived from a master oscillator which is usually located in the associated R 400 receiver.

From the R 400, a coaxial cable feeds a 1.4 MHz square-wave signal via module $\triangle 47$ to the coastal telephony and 1.4 MHz mixers whereas a selected harmonic of 1.4 MHz is employed in the HF mixer. The desired harmonic is selected in module $\triangle 47$, controlled by the "BAND" switch.

Channel information is generated in module $\triangle 45$, controlled by the "BAND" and "CHANNEL" switches, and is used as injection signal in the coastal telephony mixer.

- 2.3.4. All transistor circuits are powered from voltage regulator $\triangle 8$ whilst the associated power pack and receiver are controlled from the control circuit, module $\triangle 41$.

The P 400 or P 401 power pack used with the transmitter is started with the "POWER" switch. The "CHECK" switch permits measuring the output voltages and checking all valve currents.

2.4. Circuit Description of Individual Modules

△ 9 V Voltage Regulator

This module contains voltage regulator and excess-current protection circuits. By means of resistors 8R7 and 8R8, a fraction (fine adjustment with 8R8) of the output voltage is taken off and compared, in 8TR2, with the reference voltage across 8D8. The collector of 8TR2 is connected to the series regulator composed of 57TR1 and 8TR1, a so-called PNP super Darlington stage.

In order to start the regulator, the base of 8TR2 must receive starting current through capacitor 8C1. When the transmitter is switched off, the capacitor discharges through a resistor in the power pack.

The current-limiting properties of the circuit are due to the fact that emitter resistors 8R5 and 8R6 determine how much current can be drawn by 8TR2 before the zener voltage across 8D8 collapses. When the zener voltage collapses, the regulator will reduce the output voltage, thus further reducing the voltage drop across the zener diode. In other words: the circuit is regenerative, and the output voltage quickly drops to zero. If the current limiter has been in operation it is necessary to switch off the supply voltage for approx. 3 seconds so that 8C1 will have time to discharge. The current at which the limiter operates can be adjusted with the variable emitter resistor 8R6, which is factory preadjusted so that limiting will occur at a load of approx. 3 A.

△ 40 Two-tone Generator

This circuit is composed of two tone oscillators, 40TR4 and 40TR7, which are tuned to 2.2 kHz and 1.3 kHz, respectively. The oscillators are started and stopped alternately for periods of nominally 250 msec by an astable multivibrator, 40TR5 and 40TR6.

The period time of the multivibrator is determined mainly by resistors 40R18 and 40R19 and by capacitors 40C5 and 40C6.

The operating period of the alarm generator, nominally 45 seconds, is measured by by a Miller integrator combined with a trigger circuit composed of 40TR1, 40TR2, and 40TR3. Here, the period time is determined by resistor 40R4 and capacitor 40C2, and the circuit is temperature compensated by diodes 40D1 and 40D2.

△ 41 Control Circuit

The transmitter, power pack, and associated receiver are controlled by transmit relay 41RL1.

A voltage for remote indication of the "transmit" condition is likewise controlled by the transmit relay.

The relay-coil current is controlled either from the handset key (simplex-semiduplex) or from the "SERVICE" switch of the receiver (duplex). In this connection reference is made to drawing No. T-0183, showing interconnections between transmitter and receiver.

42 AF Amplifier

The microphone signal first passes through an active bandpass filter employing transistors 42TR1, 42TR2, 42TR3 and 42TR4. The filter removes signals outside the desired passband so as to eliminate any risk that the following compressor might be operated background noise.

The compressor is composed of transistor 42TR5 and integrated amplifier 42IC1. In it, part of the output signal is taken off and rectified to provide control voltage for transistor 42TR5, which functions as a variable attenuation network.

43 1.4 MHz Mixer

The modulating signal from 42 is fed to amplifier stage 43TR2, 43TR3 whose collector circuit incorporates three series-connected resistors. By means of the "MODE" switch one, two, or all three resistors may be selected as collector resistor, thus determining the amplitude of the signal applied to the balanced mixer 43IC1. Automatic selection of A3H on the frequency 2182 kHz is carried out by means of transistor 43TR1 which is controlled from the "BAND" and "CHANNEL" switches.

The balanced mixer also receives a 1.4 MHz signal, and a 1.4 MHz double sideband signal with suppressed carrier is therefore present across the secondary of transformer 43T2. The signal is amplified in 43TR5 and fed through crystal filter 43X1 which removes the upper sideband and attenuates the carrier still further.

44 CT Mixer

The 1.4 MHz single-sideband signal generated in module 43 is now fed to module 44 via terminal 44-10. The signal passes through hybrid transformer 44T1 and is applied to mixer 44IC2. A signal in the frequency range 3-5.6 MHz is generated in channel oscillator 45 and amplified by 44IC3 and 44TR3, whereafter it is employed as injection signal for mixer 44IC2.

If, by mistake, a channel is selected for which no crystal is installed, channel-oscillator self-noise in conjunction with the very high gain provided by 44IC3 may cause 44TR3 to be driven on a random frequency. To prevent this, part of the channel oscillator signal is taken off via 44C29, amplified in 44TR5, and rectified in 44TR5. 44TR4 controls the gain in 44IC3 so that the amplifier will be operative only if the signal at terminal 44-1 exceeds a level corresponding to a crystal being installed in the crystal socket selected.

Carrier reinsertion is performed by applying a 1.4 MHz signal to 44IC1. After amplification in 44TR1 and 44TR2 the signal is fed via a diode switching system to hybrid transformer 44T1. The desired carrier level is adjustable with 44R10. The diode switch is controlled both from the "MODE" switch and from module 43, where A3H will automatically be selected when the "BAND" and "CHANNEL" switches are set at "H" and "I", respectively.

The difference frequency from mixer 44IC2 is taken off across the secondary of transformer 44T3. It is an upper sideband signal in the frequency range 1.6-4.2 Mhz. The signal is amplified in 44TR7 from whose collector two paths go to module 46. Terminal 44-17 is used when the transmitter is working in the range 1.6-4.2 MHz whereas terminal 44-15 is used in the bands between 6 and 25 Mhz.

45 Channel Oscillator

Crystals are switched in a diode matrix. To select a particular crystal, +9 V is fed by the "CHANNEL" switch to the appropriate column terminal, and the "BAND" switch applies 0 V to the row terminal.

The oscillator employs transistor 45TR1. The oscillator output signal is applied to a buffer stage, 45TR2, followed by an emitter follower, 45TR3. From the emitter follower, the signal is fed to the output terminal and to an amplifier stage, 45TR4. The output of this amplifier stage is rectified by 45TR5, and the amplified DC signal is fed back to the base of 45TR1, which controls the gain in the oscillator. This control system means that the level is kept constant and that the content of harmonics of the crystal frequency will be low.

46 HF Mixer

When the transmitter is switched for operation in the range 1.6-4.2 Mhz the signal from the CT mixer passes to terminal 46-7 and on through diode 46D3 to terminal 46-8 from where it is fed through a coaxial cable to the "POWER" switch.

When the transmitter is switched for the HF bands, terminal 46-1 receives +9 V so that 46D3 blocks whilst 46D1 conducts. A single-sideband signal in the frequency range 2-3.2 Mhz, generated in module 44, is fed to terminal 46-5. The signal passes through a 7th-order lowpass filter and is applied to balanced mixer 46IC1. The injection signal used for the mixer is a harmonic of 1.4 Mhz, selected in module 47. The harmonic selected is amplified in 46IC2 and in transistors 46TR1 and 46TR2.

The sum frequency from 46IC1 is taken off across the secondary of transformer 46T1 and amplified in transistor 46TR3, the output signal of which is fed to output terminal 46-8.

47 HF Harmonic Filter

A crystal-controlled oscillator is composed of two NAND circuits in integrated circuit 47IC5. Crystal selection is performed by means of diodes controlled from the "BAND" switch. In order to accomplish the required degree of frequency stability, the oscillator is phase-locked to the master oscillator. The oscillator output signal is fed to a variable divider, composed of circuits 47IC2 and 47IC3. The divider is controlled from the "BAND" switch in such a manner that the output signal at terminal 15 of 47IC3 is always at 1.4 MHz, following which the signal in 47IC6 is divided down so that the output signals at terminals 12 and 13 of 47IC6 are at 700 kHz.

The 1.4 MHz master oscillator signal is fed through 47IC1 in order to produce a sufficiently steep-sided square-wave signal, whereupon the signal is divided in 47IC6 so that the output signals at terminals 8 and 9 of 47IC6 are at 700 kHz.

The two 700 kHz signals are compared in phase detector 47IC4, and the resulting DC voltage controls capacitance diodes 47D21, 47D22 and 47D23, which are in series with the oscillator crystals. The resulting signal is taken off across transformer 47T1 and fed to the HF mixer. A locking detector composed of 47IC7 and 47TR1 cuts off transistor 47TR1 when phase-locking conditions have been established. If phase locking is not accomplished or the master oscillator signal is missing, 47TR1 will be saturated. Through terminal 47-9 the locking detector is connected to amplifier 46IC2, with the result that the transmitter output signal in the 6 to 25 MHz shortwave bands can be transmitted only when phase locking has been established.

48 Driver Amplifier

After having been adequately filtered in modules 52 and 53 the signal is applied to the control grid of valve 48V1. The operating point of the valve is controlled by transistor 48TR1. Untuned coupling is used between the anode of 48V1 and the grid of 57V2. The components associated with 57V2 are accommodated in module 48 which also includes eight gain-control potentiometers. The "BAND" switch selects a potentiometer for each band, which feature makes it possible to keep the gain within very narrow limits throughout the frequency range covered by the transmitter.

49 Grid-Voltage Stabilizer

The circuit which stabilizes the grid bias for the driver and power amplifier valves is composed of zener diode 49D1, diode 49D2 and the integrated circuit 49IC1, the last-mentioned operating as a zener diode having a very low temperature coefficient.

Three potentiometers - 49R4, 49R5, and 49R6 - are used for adjusting the no-signal current of the power amplifier valves.

This module also incorporates dropping resistors for the circuits employed for metering the power pack output voltages.

50 Aerial Current Metering Circuit

From the output of the aerial tuning circuit, the aerial wire passes through current transformer 50T1. Three resistors in parallel are connected across the transformer secondary. The AC voltage across the resistors is rectified in diode 50D1.

In order to make it possible to read even low aerial currents the metering circuit is designed so that the scale of the AERIAL CURRENT meter is logarithmic. This is accomplished by means of the nonlinear resistor 50R5 whilst resistor 50R7 serves the purpose of compensating the temperature dependence of 50R5.

51 Driver Anode Circuit HF

Module 51 carries separate driver anode circuits for each of the seven HF bands. The circuits are selected by diodes controlled from the "BAND" switch. The module also incorporates three choke coils through which the power amplifier control grids are connected to the negative bias source.

52 Driver Grid Circuits CT

Module 52 includes a total of twenty tuned circuits, one for each channel facility in the CT range. Each coil covers the entire range by adjustment of its dust iron core, thus permitting arbitrary placement of all channels. Coil switching is performed with diodes controlled from the "CHANNEL" switch.

53 HF Bandpass Filters

The signal from the "POWER" switch is fed to terminal 53-4. The "BAND" switch selects, in the HF ranges, a bandpass filter which will permit the desired signal to pass through, whereupon the signal is applied to the grid of the first driver valve via terminal 53-8.

In the coastal telephone range, the input and output terminals are short-circuited together by diodes 53D1 and 53D2.

54 Driver Anode Circuits CT

Module 54 has a tuned circuit for each of the twenty channels in the CT range. Each coil covers the entire range by adjustment of its dust iron core, thus permitting arbitrary placement of all channels. Coil switching is performed with diodes controlled from the "CHANNEL" switch.

57 Power Amplifier Stage and Aerial Tuning

The power amplifier employs three parallel-connected type YL1070 valves operating in Class AB1.

A π -network performs aerial tuning and matching. When using short aerials in the CT band, the π -network is reduced to an inverted L-network.

Tuning the CT and 4 MHz bands

With the "BAND" switch in the A to P inclusive and 4 MHz positions, a suitable amount of anode capacitance is selected in the π -network. When a long aerial is used, a series capacitor as well as capacitors on the output side of the π -network may be switched in. Tuning is performed by first selecting a suitable tap on the π -network variometer and thereafter tuning to resonance with the "AERIAL TUNING HF/CT" control on the front panel.

Tuning on 2182 kHz

is carried out with the "BAND" switch at "H". Aerial matching is carried out with the π -network output capacitor and, if required, the series capacitor. Tuning to resonance is performed by selecting a suitable tap on the variometer (in this setting of the "BAND" switch, the control range of the variometer is restricted) and by selecting a tap on a vernier adjustment coil. Exact tuning to resonance is obtained with the "AERIAL TUNING HF/CT FINE" control on the front panel.

In the HF bands, the anode capacitor and coil of the π -network are fixed-tuned. Coarse adjustment of the aerial is performed with a series coil shunted by a capacitor. Coarse adjustment of the π -network output capacitance is performed with a variable capacitor with indexing, operated by the "AERIAL TUNING HF COARSE" control on the front panel. A variable capacitor operated by the "AERIAL TUNING HF/CT FINE" control on the front panel performs fine adjustment of the π -network and aerial.

All capacitors and coil taps are selected by means of easily accessible plugs and sockets.

Overload Protection

To avoid serve overloading of the three output valves two PTC-resistors are placed between the valves. If the valves are overloaded the anode dissipation will increase which means that the temperature of the PTC-resistors will start rising.

When the temperature rises above a certain limit the resistance of the PTC-resistors will increase very rapidly, whereby transistor 57TR2 leaves the state of saturation and decreases the screen grid voltage for the output valves.

If for some reason the 1000 V anode supply voltage should disappear, transistor 57TR2 will be cut off and thereby protect the screen grids of the output valves.

3 INSTALLATION

Correct installation of the equipment is important for good results. Aerials and earth connections must be installed with the greatest care, especially where duplex telephony is desired.

3.1. Types of Installation

The TRP 400 radiotelephone may be powered either from a 24 V battery or from 110/220/380/440 V AC mains.

The TRP 400 is composed of the following units:

For 24 V battery operation:

Type T 400 transmitter.

Type R 400 receiver (with built-in type R-0290 power pack).

Type P 400 power pack for transmitter.

For AC mains operation (single-phase or two-phase):

Type T 400 transmitter.

Type R 400 receiver (with built-in type R-0289 power pack).

Type P 401 power pack for transmitter.

The units are connected together in the type T-0341 cabinet, in which also the connection to the permanent installation is made.

3.2. Removal of Units

The units are mounted on ball tracks and, after removal of the front-panel screws, may be pulled as far out as the built-in stop permits. Then the cables may be unplugged, and the individual units may be removed entirely from the cabinet by lifting the handles slightly while pulling the units out.

When putting a unit back in place care should be taken that the stop screw of each ball track will be positioned in the chassis cut-out provided for the purpose.

3.3. Mounting the Cabinet

The equipment is intended for mounting on a table or directly on a bulkhead. In the latter case, a type T-0351 bracket with accessories is required.

Drawing T-0352 shows drilling plans for both types of mounting.

3.4. Connection to the Permanent Installation

Check that the correct power packs are installed in the equipment and, in the case of AC operation, switched for the correct mains voltage. The cabinet cabling diagram, Drawing T-0346, shows that the terminals to be used for the installation are marked with the letters A-F. Necessary cable cross sections are also indicated.

Drawing T-0354 shows, in clearer form, only those leads which are to be connected in making the installation. All cables except the transmitter aerial and earth lead should be stripped of insulation behind the transmitter and the individual conductors brought in through the cutout at the bottom of the cabinet rear wall in a loop that is large enough to take up any play between the equipment and the bulkhead.

3.5. Earth Connections

The transmitter earth terminal is located on the top of the transmitter, behind the aerial insulator. From this earth point a 50 x 0.5 mm copper strap should be connected to the hull. The connection should be as short and straight as possible.

The receiver should be connected to the hull through a length of 2.5 sq.mm lead. This lead should have a separate earth screw, which must not be shared by other equipment. The lead should be run as far from the transmitter copper strap as is practicable.

Other cables should be placed as far away as possible from the transmitter and receiver earth leads and under no circumstances parallel with the transmitter copper strap closer than 0.7 m and, for the receiver earth lead, closer than 0.2 m. RF earth connections will cause neither battery nor mains leads to be connected to the hull. If it is desired to connect the battery to the hull it is important to make the connection right at the battery, never in the transmitter. In cases where the installation is carried out so as to include facility for charging during operation through a dropping resistor from a balanced ship's mains (110/220 V DC), the battery must not be earthed.

3.6. Aerials

In order to minimize duplex noise, the transmitting and receiving aerials should be kept as far away from each other as possible. Stays, wires, steel masts etc. should either be earthed effectively or insulated.

Likewise in order to minimize duplex noise, every other electric installation such as cable braiding (screens) and instruments should be earthed effectively, and the instruments in question should be fitted with noise-interference suppression devices.

The aerials should be suspended well in the clear, away from objects whose influence on the aerials may vary, such as derricks etc. Insulators should be of the best type having low leakage even when wet.

3.6.1. Receiving Aerial

Length: 6-30 meters. Is to be brought in through a length of 50-ohm coaxial cable, which should be as short as possible, especially in the case of short aerials.

3.6.2. Transmitting Aerial

Length: 15-30 meters inclusive of lead-in. The aerial should be terminated in a feed-through insulator in the roof or side wall of the radio room. The aerial is to be brought in to the transmitter through a length of copper tubing mounted on stand-off insulators. A length of carbon brush cable or some similar flexible bare conductor should be inserted between the last stand-off and the transmitter aerial insulator; any play between the transmitter and bulkhead will then be taken up by the cable.

3.6.3. Built-in Aerial Relay

As shown in Drawing T-0346, an aerial relay may be installed in the cabinet. The relay may be installed if the transmitting aerial is to be used for other purposes, for instance for an extra receiver, or if it is desired to perform the installation as a simplex installation with only one aerial.

However, when using short aerials - that is aerials under approx. 20 meters long - excessive voltage will be present across the relay contacts when the transmitter is working on channels in the range 1.6-2.0 MHz.

The built-in aerial relay may therefore be used only if the aerial is longer than approx. 20 meters or if the transmitter is not equipped with channels in the range 1.6-2.0 MHz.

If it is desired to use an aerial relay after all, even if these conditions are not met, it will be necessary to install an external aerial relay. The relay coil should be rated for 24 V DC. It should be connected to terminals E and F or to terminals 205 and 210 in the cabinet.

3.7. Extension Speaker

If an extension speaker is to be installed it should have 4 ohms impedance and a power handling capacity of 1 watt or more.

Note that the extension speaker will be connected to the receiver only when the "POWER" switch of the transmitter is at "MAINS OFF" and "STAND-BY".

In the other positions of the "POWER" switch the extension speaker is replaced by a load resistor incorporated in the transmitter.

If no extension speaker is used, the AF level in the handset ear-piece may be retained if a 4-ohm 3-watt resistor is connected between terminals C and D.

3.8. Transmitter-On Indication

Indication of the transmitter-on condition can be obtained by means of a voltage (24 V at max. 0.2 A) which is controlled by the transmit relay and can be taken off between terminals E(-) and F(+).

3.9. Replacement of Power Packs

For replacement of the receiver power pack reference is made to section 3.9 of Instruction Manual for R 400 Receiver.

Two different power packs are available for operation of the transmitter. Either power pack can be placed as the bottom unit of the cabinet.

The P 400 is used for 24 V battery operation whilst the P 401 is used for operation from AC mains.

For a complete description of the power packs reference is made to Instruction Manual for P 400 and P 401 Power Packs.

The cabinet cabling is dependent of the type of power pack used. The P400 24V power pack requires the installation of two plates on which a total of 10 resistors are mounted. These two plates should be mounted inside the TRP400 cabinet near its top and wired in accordance with Drawing T-0346. Further-more the safety switch arrangement is dependent of the power pack in use.

The transmitter filament voltage delivered by the power packs depends on the type of power pack used.

The P 400 delivers 21.5 V whereas the P 401 delivers 12.6 V filament voltage. Five filament dropping resistors are therefore provided in the T 400 transmitter.

The resistors are numbered 57R7, 57R8, 57R10, 57R12 and 57R14, and are located in the front compartment directly behind the front panel.

When using the P 400 power pack (24 V battery operation) these resistors must be inserted in the filament circuits. When using the P 401 power pack (AC operation), the resistors are to be short-circuited.

Check if these resistors are correctly wired before connecting the equipment to the permanent installation.

3.10. Installing Channel Crystals

Channel crystals should meet SKANTI Specification R-0328. Calculation of crystal frequency f_x from transmitting frequency f_t appears from chart T-0069.

The channel crystals become accessible on removal of the cover plate in the left side wall of the transmitter. To install a new crystal, proceed as follows:

3.10.1. Locate the crystal socket corresponding to the desired band and channel number and plug in the crystal.


3.10.2. Connect a frequency counter (resolution 1 Hz, accuracy 10^{-7}) to the crystal oscillator output, terminals 45-20 and 45-21 (common).

NOTE: It is possible for a voltage difference to be present between common and chassis in DC operation.

- 3.10.3. Set the "BAND" and "CHANNEL" switches to the new channel and adjust, if necessary, the trimmer capacitor associated with the crystal socket so that the oscillator frequency will equal the frequency given on the side of the crystal holder (-0/+5Hz).
- 3.10.4. Remove the frequency chart from the front panel by tipping the Plexiglas plate out. Note the new transmitter frequency - stated on the top of the crystal holder - in the frequency chart.

For shortwave channels: Write an "S" before the frequency if it is in the simplex band, and a "D" if it is in the duplex band.

3.11. Adjustment of Driver Grid Circuits in the Coastal Telephone Range (1.6-4 MHz).


Module , adjacent to the channel oscillator, contains twenty tuned circuits, one for each channel facility in the coastal telephone range. After a crystal for a new channel in the coastal telephone range has been plugged in, the associated tuned circuit should be located. Turn the "CHECK SWITCH" to the undesignated position adjacent to the "26V" position; set the "MODE" switch to "A3H" and the "POWER" switch to "FULL".

The iron dust core of the coil you have located should now be turned carefully all the way into the coil former. Three interlock switches near the right-hand edge of the cabinet prevent high tension from being present in the transmitter when a unit is pulled out. To permit adjustment, however, the interlock switches can be closed by pulling their pistons down and outwards to locked positions.

Before beginning adjustment of the driver circuits the 1000 V high-tension lead should be disconnected by removing the high-tension plug from its socket in the power pack section.

Turn on the transmitter by turning the receiver "SERVICE" switch to "duplex"; pull out the knob of the "CHECK SWITCH" and turn the iron dust core of the coil referred to out of the coil former until the first maximum reading is observed on the "LEVEL METER".

3.12. Adjustment of Driver Anode Circuits in the Coastal Telephone Range (1.6-4 MHz).

Module  below the chassis also has twenty tuned circuits for use in the coastal telephone range. The procedure in adjusting these circuits is identical with that described in section 3.11. except that the "CHECK SWITCH" should be set the undesignated position adjacent to the "-36V" position. Note that the circuit associated with channel 1 (2182 kHz) is factory pre-adjusted.

When the circuits for the channels in use have been adjusted for maximum "LEVEL METER" reading, the readings obtained should be compared with the reading obtained for channel 1. If one or more channels show higher "LEVEL METER" readings than that obtained for channel 1, the iron dust core(s) of the channel(s) should be re-adjusted so that all channels show readings lower than, or equal to, the channel 1 reading.

3.13. Driver Circuits for the Shortwave Bands (4-25 MHz).

The driver circuits for the shortwave bands are located in modules 51 and 53. Because the placement of the shortwave bands is known, all driver circuits for these bands are factory pre-adjusted.

3.14. Adjustment of Aerial Tuning.

NOTE: In order to obtain the highest degree of accuracy, the adjustment procedure stated below is carried out with the "POWER"-switch set to "FULL".

To avoid excessive voltages in the coupling field it is, however, recommended that initial setting up is made with the "POWER"-switch set to "MEDIUM" which implies that the "LEVEL METER" reading should be approximately 15 at resonance.

Final adjustment should then be made with the "POWER"-switch set to "FULL" and the "LEVEL METER" reading should be within the red scale sector.

3.15. Adjustment of Aerial Tuning in the Coastal Telephone and 4MHz Bands.

This adjustment should first be performed on the lowest-frequency channel. Insert plug "A" of "AERIAL SHORTENING CAPACITOR" coupling field in socket "2". Set "POWER" switch to "FULL". Set "MODE" switch to "A3H". Set "BAND" switch to "D". This will connect the largest possible capacitor on the input side of the π -circuit.

All plugs in the "CT-4 MHz π -FILTER OUTPUT CAPACITOR" coupling field should now be inserted in the sockets designated "0". The π -filter circuit output capacitor will then have its minimum value. Thereafter select, with the plug of the band in question on the variometer coupling panel, at all the following resonance settings, that tap with the lowest number on the "VARIOMETER CT-4 MHz" coupling field which, with the transmitter turned on, provides a possibility of tuning to resonance by turning the "AERIAL TUNING HF/CT FINE" knob. In other words, maximum reading on the "AERIAL CURRENT" meter should be obtained at a setting of the "AERIAL TUNING HF/CT FINE" knob which is not one of its extreme positions.

If resonance cannot be obtained in band "D", try with the "BAND" switch set to next permitted band ("F"), continuing as described until resonance is obtained or the last permitted band has been reached; see Table I.

Table I:

Channel Frequency, MHz

Permitted Band Switch Settings

1.60	-	1.85	D, F, G and J
1.85	-	2.10	D, F, G, J and K
2.10	-	2.40	D, F, G, J, K and L
2.40	-	2.70	D, F, G, J, K, L, M and N
2.70	-	3.10	D, F, G, J, K, L, M, N and O
3.10	-	4.00	D, F, G, J, K, L, M, N, O and P

If resonance cannot be obtained, insert plug "A" in socket 1 of the "AERIAL SHORTENING CAPACITOR" coupling field.

Now again attempt to tune to resonance, first in band "D" and thereafter in the following permitted bands until resonance can be obtained.

If resonance can be obtained and the "LEVEL METER" deflects to above the red scale sector, or if resonance cannot be obtained, your aerial is too short!!! It will then be necessary to increase its physical length.

However, if the "LEVEL METER" reading at resonance at the first possible resonance setting is below the red scale sector, the amount of coupling presents a too low value of anode load impedance. Then set the "BAND" switch to the next permitted setting (see Table I) and again tune to resonance.

Continue changing the band setting as described until the "LEVEL METER" reading at resonance is inside the red scale sector or until you reach the last permitted band for the channel frequency employed.

If correct meter reading cannot be accomplished with the "BAND" switch set for the last of the permitted bands, you can add capacitors on the output side of the π -filter by means of the plugs in the "CT-4 MHz π -FILTER OUTPUT CAPACITOR" coupling field, from band "G" and onward. Thereafter start in the first band on which resonance was possible. The plug for the band in question should successively be inserted in the sockets 1, 2.....7 until the "LEVEL METER" reading is inside the red scale sector at resonance.

If correct coupling cannot be obtained in the first band, or if the possibility of obtaining resonance ceases before or in socket 7, an attempt should be made with the next permitted band. If correct coupling cannot be obtained in the last permitted band, your aerial is too long and must therefore be shortened physically!!!

After correct coupling in a band has been obtained, the plugs used for that purpose are not to be touched again.

Tuning on 2182 kHz is performed with the "BAND" switch at "H". If a lower channel frequency than 2182 kHz is provided, the place of plug "A" in the "AERIAL SHORTENING CAPACITOR" coupling field is already determined.

However, if 2182 kHz is the lowest channel frequency, the place of plug "A" should be determined at that frequency. Start with plug "A" in socket "2". If resonance cannot be obtained, try with plug "A" in socket "1". If resonance can be obtained and the "LEVEL METER" deflects to above the red scale sector, or if resonance cannot be obtained, your aerial is too short. Resonance adjustments are performed on 2182 kHz by first setting the "AERIAL TUNING HF/CT FINE" knob in the middle of its range - that is, 3/4 turn from one end. Insert the plug in the "FINE TUNING COIL FOR 2182 kHz" coupling field in socket "6". Using plug "H" in the "VARIOMETER CT-4 MHz" coupling field, find the socket that provides maximum "AERIAL CURRENT" meter reading.

Next, using the plug in the "FINE TUNING COIL FOR 2182 kHz" coupling field, find the socket that provides maximum "AERIAL CURRENT" meter reading. Lastly, tuning to exact resonance is carried out with the "AERIAL TUNING HF/CT FINE" knob.

If resonance has been accomplished and the place of plug "A" determined, the reading of the "LEVEL METER" should thereafter be brought into the red scale sector. If the "LEVEL METER" reading is below the red scale sector it is necessary to cut in capacitors on the output side of the π -filter, using plug "H" in the "CT-4 MHz π -FILTER OUTPUT CAPACITOR" coupling field. Successively insert plug "H" in the sockets 1, 27 until the "LEVEL METER" reading is inside the red scale sector at resonance.

If correct reading has not been obtained when socket 7 has been reached, your aerial is too long.

Coupling on the 4 MHz band is adjusted with the "BAND" switch at "4". The π -filter ~~input capacitor~~ can be selected with the plug in the "4MHz π -FILTER INPUT CAPACITOR". The five sockets in this coupling field therefor perform the same function as the settings of the "BAND" switch in the CT band.

The procedure is as described above. Instead of altering the setting of the "BAND" switch, the place of the plug in the "4 MHz π -FILTER INPUT CAPACITOR" coupling field is changed, starting with the plug in socket "1".

3.16. Aerial Tuning in the 6, 8, 12, 16, 22 and 25 MHz Short-wave Bands.

Set the "BAND" switch to the desired band. This will cause a fixed capacitor to be connected across the π -filter input, also a fixed π -filter coil.

In the "HF AERIAL COIL" coupling field, insert the plug for the desired band in socket "1".

In the "HF AERIAL CAPACITORS" coupling field, insert the plug for the desired band in socket "0".

The "HF π -FILTER OUTPUT CAPACITOR" coupling field is used only for the 6, 22 and 25 MHz bands. Insert plug "x" for the 6 MHz band in socket "1", plug "y" for the 22 MHz band in socket "3", and plug "z" for the 25 MHz band in socket "5".

Set "POWER" switch on front panel to "FULL".

Set "MODE" switch on front panel to "A3H".

Turn the transmitter on and, with the "AERIAL TUNING HF COARSE" switch on the front panel first set at "1", attempt tuning to resonance with the "AERIAL TUNING HF/CT FINE" knob on the front panel - in other words, tune for maximum reading on the "AERIAL CURRENT" front-panel meter. If this cannot be accomplished or can only be accomplished with the "AERIAL TUNING HF/CT FINE" knob in one of its extreme positions, try with the "AERIAL TUNING HF COARSE" switch at "2", "3" etc. until resonance is obtained.

If the "LEVEL METER" needle is outside the red scale sector, the "AERIAL TUNING HF COARSE" switch should be set to a higher number until the meter reading is inside the red scale sector at resonance.

For the 6, 22 and 25 MHz bands, the range of the "AERIAL TUNING HF COARSE" switch can be increased by means of the "HF π -FILTER OUTPUT CAPACITOR" coupling field.

If correct resonance setting and "LEVEL METER" reading cannot be obtained in these three HF bands by means of the preceding adjustments, plug "x" for the 6 MHz band may be inserted in socket "2", plug "y" for the 22 MHz band in socket "4", and plug "z" for the 25 MHz band in socket "6", thereafter again trying with the "AERIAL TUNING HF COARSE" switch at "1", "2" etc. until resonance setting and correct meter reading are obtained.

If it continues to be impossible to obtain resonance and/or correct meter reading, try to insert the plug of the "HF AERIAL COIL" coupling field for the question in sockets "2", "3" or "4" until resonance is obtained and the "LEVEL METER" needle is inside the red scale sector.

If it continues to be impossible to obtain resonance and/or correct meter reading, try to insert the plug of the "HF AERIAL CAPACITORS" coupling field for the band in question in sockets "1" or "2" and thereafter attempt to obtain resonance and correct meter reading by means of the "AERIAL TUNING HF COARSE" and "AERIAL TUNING HF/CT FINE" knobs and the plug of the "HF AERIAL COIL" coupling field.

AERIAL SHORTENING CAPACITOR 1 2 A		6 8 12 16 22 25		25	
HF π -FILTER OUTPUT CAPACITOR y 4 3		4 3 2 1		25	
z 6 5		BAND MHz: 6 8 12 16 22 25		25	
x 2 1		0 1 2		25	
HF AERIAL CAPACITOR CT-4 MHz π -FILTER		0 1 2 3 4 5 6 7		25	
OUTPUT		G H J K L M N O P 4		25	
CAPACITOR		0 1 2 3 4 5 6 7		25	
4 MHz π -FILTER INPUT CAPACITOR		5 4 3 2 1		25	

VARIOMETER CT-4MHz

1 3 5 7 9 11 13 15 17

2 4 6 8 10 12 14 16 18

FOR UNUSED PLUGS

D F G H J K L M N O P/4

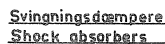
1 2 3 4 5 6 7 8 9 10 11 12

FINE TUNING COIL FOR 2182 kHz

SHIP	T400 no.
MARKER MED \otimes OG TEGN EN STREG FRA \bullet NÅR ANTENNETILPASNING ER OPNÅET	
MARK WITH \otimes AND DRAW A LINE FROM \bullet WHEN ADJUSTMENT OF AERIAL TUNING IS COMPLETED	
skanti [®] ADJUSTMENT OF AERIAL TUNING	
Carried out by: date:	
Tegn. ID	
Konf.	
T-0294 - 2	
17 - 1 - 72	

Lodret boreplan for konsolmontag

Vertical drilling plan for mounting on console



Topbeslag
Top fitting

Svingningsdæmpere
Shock absorbers

Jordklemme
Earth connection

Antenne isolator
Aerial insulator

ENHED MONTERET PÅ SKOT
UNIT MOUNTED ON BULKHEAD

Højre og venstre konsol
Right and left bracket

Konsol T-0351 med tilbehør
Bracket T-0351 with accessories

Lodret boreplan for bordmontage

Vertical drilling plan for mounting on tabletop



Vandret boreplan for bordmontage

Horizontal drilling plan for mounting on tabletop.



Enhed: Unit:	Ca. vægt: Appr. weight:
TRP400/DC	73 Kg
TRP400/AC	88 Kg

Dimensions are in mm. Tolerances $\pm 0.5\text{mm}$ Tolerances $\pm 0.5\text{mm}$

skanta

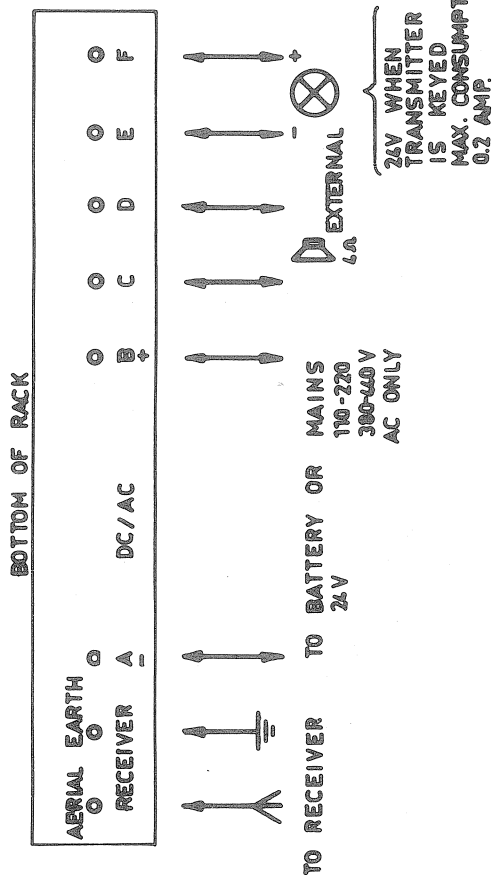
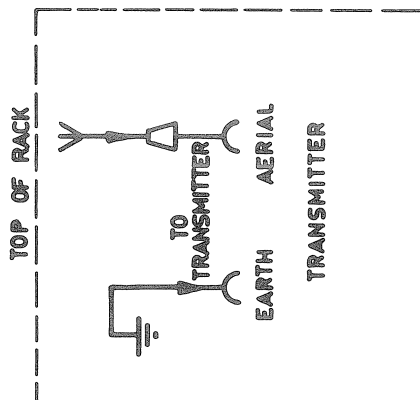
• Montering af TRP400 på skot eller bord
Mounting of TRP400 on bulkhead or tabletop

Tegn.JD	Konf.
---------	-------

T - 0352 - 1

1 - 0336 - 1

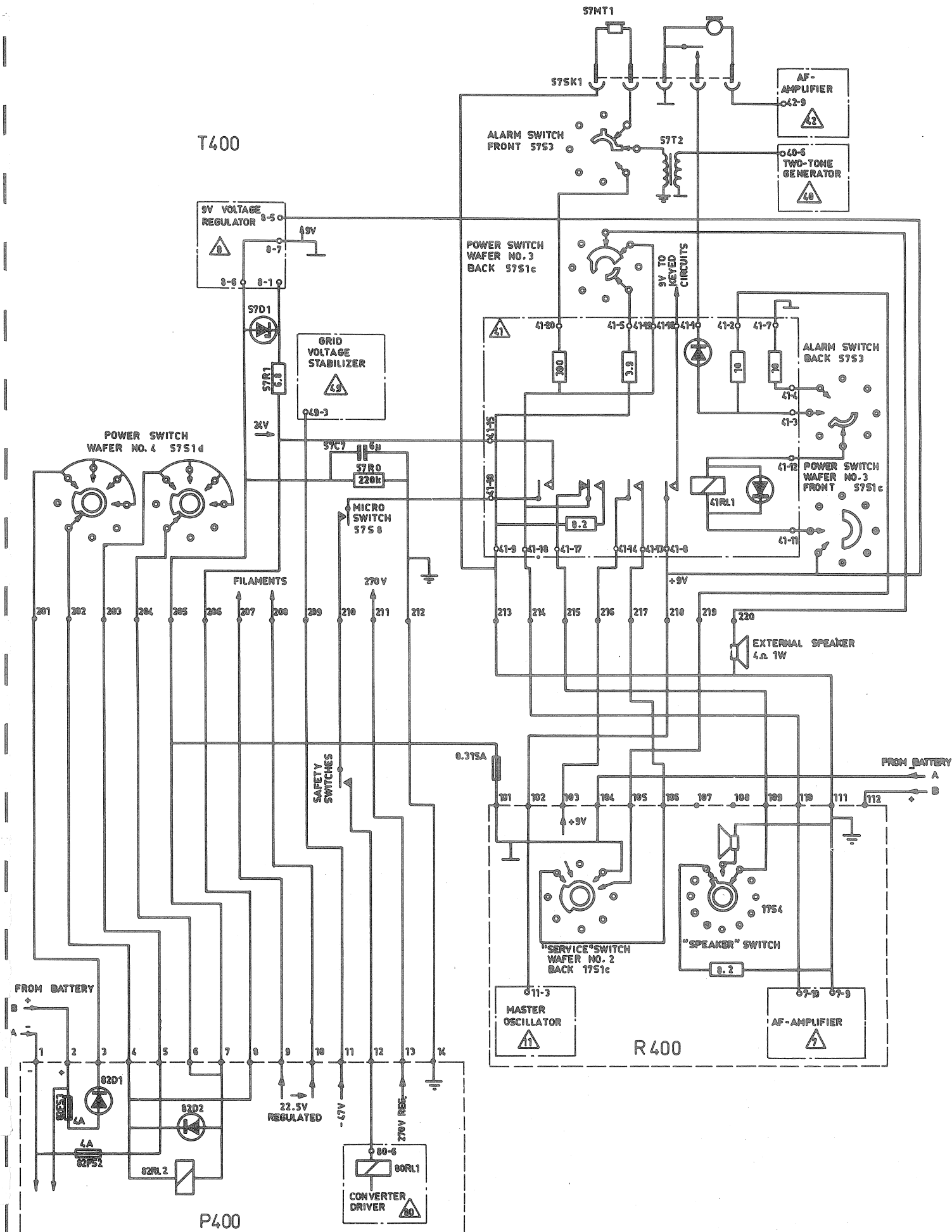
CAUTION: IN INSTALLATIONS FOR DUPLEX OPERATION IT IS NECESSARY TO USE SEPARATE EARTH CONNECTIONS FOR RECEIVER AND TRANSMITTER



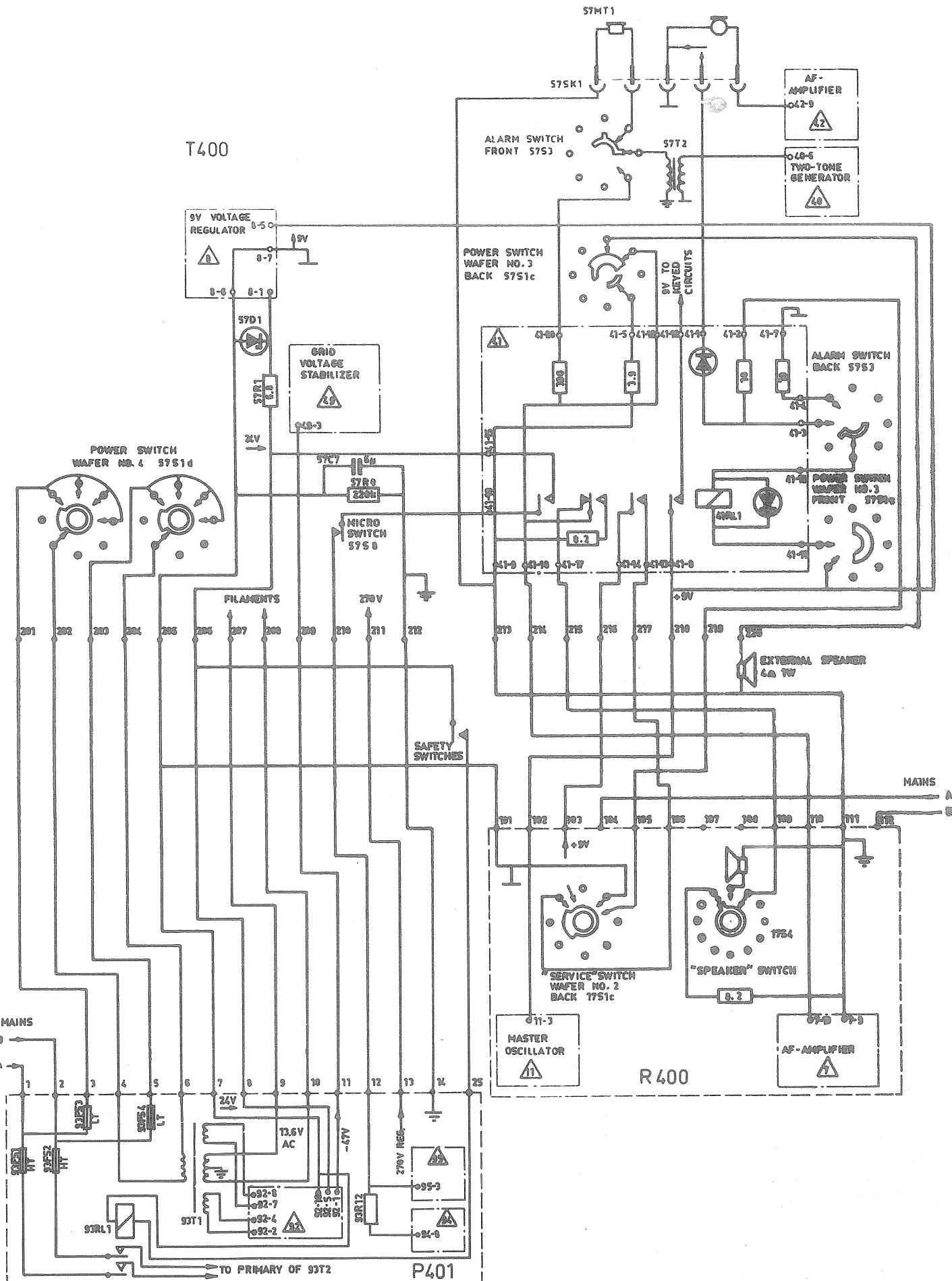
FOR BATTERY OPERATION USE PLASTIC CABLE MIN. $2 \times 16\text{mm}^2$
 FOR MAINS OPERATION USE PLASTIC CABLE MIN. $2 \times 2.5\text{mm}^2$
 FOR EXTERNAL CABLE USE PLASTIC CABLE MIN. $2 \times 1.5\text{mm}^2$
 EARTH CABLE FOR RECEIVER PLASTIC CABLE MIN. 2.5mm^2
 EARTH FOR TRANSMITTER $100 \pm 0.5\text{mm}$ COPPER STRIP
 AERIAL CABLE FOR RECEIVER COAXIALCABLE TYPE T3234 (A593M) 50A OR R6 212 U

Materiale	Overfladebeh	Tolerancer hvor intet andet er anført ±	mm	Målforhold:
<div>skanti</div> <div>INSTALLATION INSTRUCTION</div>				Tegn. JD
				Konf.
				T - 0261 - 1
				10 - 6 - 71

T400



T400



skanti

SIMPLIFIED DIAGRAM

Interconnection of units TRP400 AC-version

Tecn. Jd	Kowl.
T-0104-1	
7-2-72	

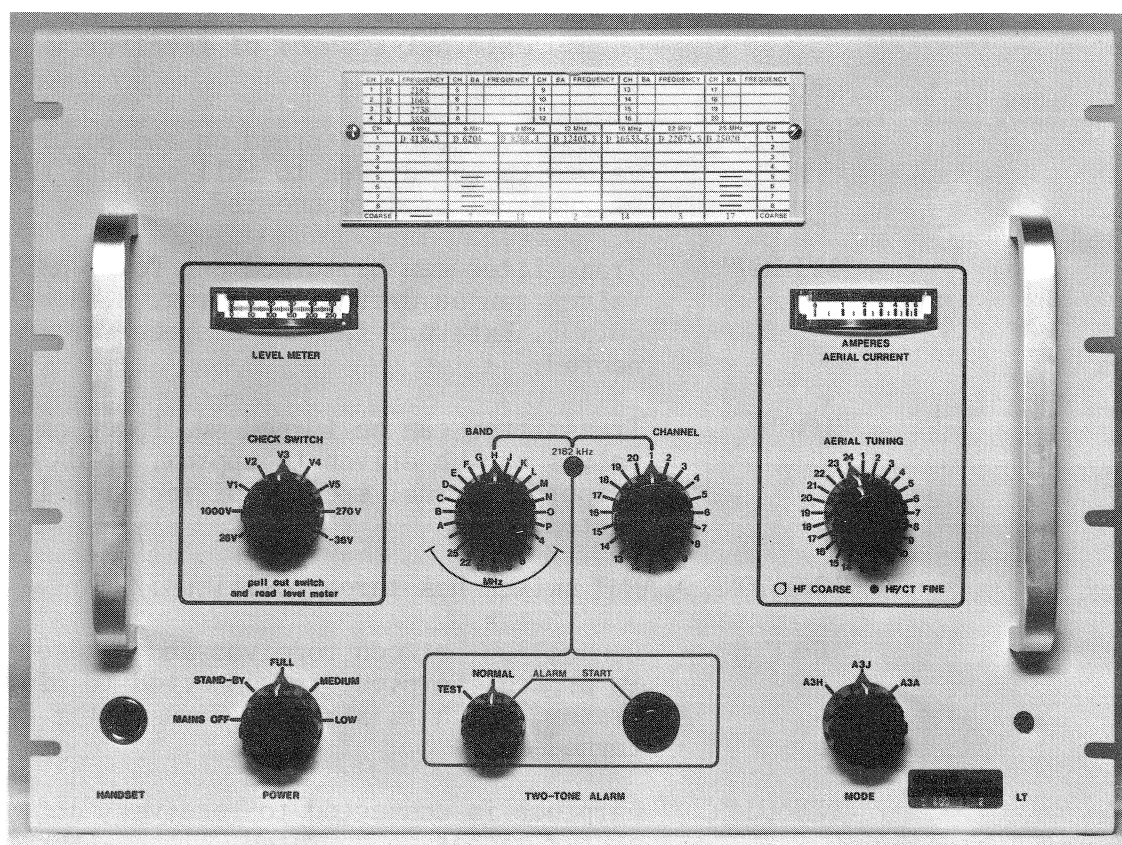


Fig. 4.1 Front panel and operating controls.

4. OPERATING INSTRUCTIONS

4.1. Controls and Their Functions

The "POWER" switch has five positions:

- "MAINS OFF": Transmitter is switched off. External speaker of receiver is connected to receiver output.
- "STAND-BY": Power pack is started up and supplies transmitter valves with filament power and grid bias. Power is applied to transmitter oscillators but transmitter cannot be turned on. "LT" lamp comes on and external speaker of receiver is connected to receiver output.
- "FULL": Transmitter can be turned on and power amplifier valves can be driven to full output. External speaker of receiver is disconnected.
- "MEDIUM": Transmitter can be turned on. Power amplifier valves can be driven to approx. 5 dB below full output. External speaker of receiver is disconnected.
- "LOW": Transmitter can be turned on. Power amplifier valves can be driven to approx. 10 dB below full output. External speaker of receiver is disconnected.

The "TWO-TONE ALARM" switch has three positions:

- "TEST": Connection between receiver and handset earpiece is broken. Earpiece is connected to alarm generator, which is started. Transmitter cannot be turned on.
- "NORMAL": Earpiece is connected to receiver, and alarm generator cannot be operated. Transmitter can be turned on.
- "ALARM": Earpiece is connected to alarm generator and transmitter is turned on. Alarm generator is ready for transmission of alarm signal.

The "TWO-TONE ALARM START" pushbutton is used to start the alarm generator after the "TWO-TONE ALARM" switch has been turned to the "ALARM" position. The pushbutton is depressed and released, and alarm signal will be transmitted for approx. 45 seconds.

The "MODE" switch has three positions:

- "A3H": Transmission of single-sideband signal with full carrier.
- "A3J": Transmission of single-sideband signal with suppressed carrier.

"A3A": Transmission of single-sideband signal with reduced carrier.

The "LEVEL METER" indicates anode AC voltage swing at the power amplifier anodes.

The "CHECK SWITCH" is not normally operative. Pulling the switch knob out will switch the "LEVEL METER" to read the voltage or current selected with the switch. When released, the knob will return to its original position.

This switch has nine positions marked as follows:

"26V":	Check of low voltage delivered by power pack.
"1000V":	Check of high voltage delivered by power pack.
"V1":	Check of cathode current of first driver valve.
"V2":	Check of cathode current of second driver valve.
"V3":	Check of cathode current of first output valve.
"V4":	Check of cathode current of second output valve.
"V5":	Check of cathode current of third output valve.
"270V":	Check of screen grid voltage delivered by power pack.
"-36V":	Check of grid bias delivered by power pack.

The "BAND" switch has a total of 24 positions designated A to P which are used in the coastal telephone range and in the shortwave bands 4, 6, 8, 12, 16, 22, and 25 MHz.

The "CHANNEL" switch has 20 positions.

"2182 kHz" pilot lamp. Shows light when power is applied to transmitter, "BAND" switch at "H" and "CHANNEL" switch at "1". This setting corresponds to 2182 kHz.

The "AERIAL CURRENT" meter reads the aerial current. The scale is logarithmic.

The "AERIAL TUNING, HF COARSE" switch is used for coarse aerial tuning in the shortwave bands. The correct setting to use may be read on the frequency chart on the front panel.

"AERIAL TUNING, HF/CT FINE" is used for fine adjustment of aerial tuning.

NOTE: The "SERVICE" switch of the receiver is also used for controlling the transmitter.

The "SERVICE" switch has four positions:

"MAINS OFF": Receiver is switched off. Transmitter can be turned on by pressing handset key.

"simplex": Simplex service. Transmitter can be turned on by pressing handset key. Receiver is muted while transmitter is on.

"semi-duplex": Semi-duplex service. Transmitter can be turned on by pressing handset key.

"duplex": Duplex service. Transmitter is on constantly except that microphone circuit is not closed until handset key is pressed. Receiver is on but built-in speaker is disconnected and only the earpiece is connected to receiver output.

4.2. Tuning to 2182 kHz

- (1) Set "POWER" switch to "STAND-BY". "LT" lamp will show light.
- (2) Set "TWO-TONE ALARM" switch to "NORMAL".
- (3) Set "BAND" switch to "I".
- (4) Set "CHANNEL" switch to "1". "2182 kHz" lamp will show light.
- (5) Set "POWER" switch to "FULL".
- (6) Set "SERVICE" switch of receiver to "semi-duplex".
- (7) Press handset key. "AERIAL CURRENT" meter will show reading not later than one minute after operation (1) has been performed.
- (8) Adjust "AERIAL TUNING, HF/CT FINE" for maximum reading on "AERIAL CURRENT" meter.
- (9) Release handset key.

Transmitter is now ready for operation.

NOTE: The type of service normally used on 2182 kHz is A3H, simplex. When the transmitter is tuned to 2182 kHz, the "MODE" switch is inoperative and its setting therefore unimportant.

4.2.1. Transmitting an Alarm Signal on 2182 kHz

Tune the transmitter as described under 4.2 above and continue as follows:

- (1) Set "TWO-TONE ALARM" switch to "ALARM".
- (2) Press "TWO-TONE ALARM START" knob and thereafter release it. The alarm signal transmitted may now be monitored in the handset earpiece. After approx. 45 seconds the alarm generator stops. Thereafter return the "TWO-TONE ALARM" switch to "NORMAL". An alarm signal transmission may be interrupted at any time by returning the "TWO-TONE ALARM" switch to "NORMAL".

4.3. Tuning to a Channel in the Coastal Telephony Range

- (1) Set "POWER" switch to "STAND BY". "LT" lamp will show light.
- (2) Set "TWO-TONE ALARM" switch to "NORMAL".
- (3) Look up desired frequency in frequency chart.
- (4) Read channel number under "CH" in frequency chart and set "CHANNEL" switch to that number.
- (5) Read letter under "BA" in frequency chart and set "BAND" switch to that letter.
- (6) Set "MODE" switch to "A3H".
- (7) Set "POWER" switch to "FULL".
- (8) Set "SERVICE" switch of receiver to "semi-duplex".
- (9) Press handset key.

- (10) Turn "AERIAL TUNING, HF/CT FINE" for maximum "AERIAL CURRENT" meter reading.
 - (11) Release handset key.
 - (12) Select desired type of service with "MODE" switch and "SERVICE" switch of receiver, and desired power level with "POWER" switch.
- Transmitter is now ready for operation.

4.4. Tuning to a Channel in the HF Range

- (1) Set "POWER" switch to "STAND-BY". "LT" lamp will show light.
- (2) Set "TWO-TONE ALARM" switch to "NORMAL".
- (3) Set "BAND" switch to desired band.
- (4) Look up desired frequency in frequency chart.
- (5) Read channel number under "CH" in frequency chart and set "CHANNEL" switch to that number.
- (6) Read number under "COARSE" in selected band in frequency chart and set "AERIAL TUNING, HF COARSE" to that number.
- (7) Set "MODE" switch to "A3H".
- (8) Set "POWER" switch to "FULL".
- (9) Set "SERVICE" switch of receiver to "simplex" or "semi-duplex".
- (10) Press handset key.
- (11) Turn "AERIAL TUNING, HF/CT FINE" for maximum "AERIAL CURRENT" meter-reading.
- (12) Release handset key.
- (13) Select desired type of service with "MODE" switch and "SERVICE" switch of receiver, and desired power level with "POWER" switch.

Transmitter is now ready for operation.

5 SIMPLE SERVICE

5.1. Incorrect Operation

If the transmitter is not functioning the way it should a check should be made whether it is being operated correctly. Go through adjustment procedures 4.2, 4.3, or 4.4 if necessary.

5.2. Checking the Aerial Tuning

Aerial tuning may be checked by adjusting the transmitter as described in section 4.2.

Turn the transmitter on but do not speak into the microphone. With the "AERIAL TUNING, HF/CT FINE" control turned for maximum reading on the "AERIAL CURRENT" meter, the needle of the "LEVEL METER" should be inside the red scale sector. If the needle is outside the red scale sector and the transmitter is otherwise functioning normally, the fault should be looked for in the aerial or earth strap of the transmitter.

Accordingly, the following checks should be made:

Have any changes been made in aerial or earth connections since the installation was made?

Have any changes been made in the rigging of the vessel, or in the placement of derricks etc.?

Is leakage present on the aerial, possibly caused by moisture or dirt on the aerial insulators?

5.3. Replacement of Pilot Lamps

The pilot lamps may be replaced without opening the transmitter cabinet. The "LT" lamp is defective if the transmitter is functioning normally and the lamp shows no light. The "2182 kHz" lamp is defective if the lamp shows no light with power applied to the transmitter and the "BAND" and "CHANNEL" switches set at "H" and "1", respectively. To replace a pilot lamp, screw off the cover; the lamp will come out with the cover and a new one may be inserted.

5.4. Voltage Checking

The voltages delivered by the power pack may be checked with the "CHECK SWITCH" incorporated in the transmitter. The switch is operated by setting it to the desired position and thereafter pulling the knob out. Readings are made on the "LEVEL METER" while keeping the switch knob pulled out.

5.4.1. Low-tension Checking

With the "POWER" switch at "STAND-BY" and the "CHECK SWITCH" at "26V" the meter should read between 23 V and 33 V if the equipment is operated from a P 400 power pack (24 V battery operation), and between 23 V and 29 V if the equipment is operated from a P 401

power pack (AC operation). In this position of the "CHECK SWITCH", the meter reads full scale at 50 V.

The negative grid bias for the transmitter valves may be checked with the "CHECK SWITCH" set at "36V". The voltage should be 36 V \pm 3 V. In this position, too, the meter reads full scale at 50 V.

If the meter shows no reading in these positions reference is made to section 5.6.

5.4.2. High-tension Checking

With the "POWER" switch at "LOW", the "MODE" switch at "A3H", the "BAND" and "CHANNEL" switches set to a channel equipped with a crystal, and the "CHECK SWITCH" at "1000V", the meter should read between 1000 V and 1100 V with the transmitter turned on. Full-scale meter reading corresponds to 2500 V in this case.

With the "CHECK SWITCH" at "270V" and otherwise the same settings as above, the meter should read 270 V \pm 15 V. Full-scale meter reading corresponds to 500 V.

If the meter shows no reading, reference is made to section 5.6.

5.5. Valve-current Checking

Transmitter-valve cathode current may be checked with the "CHECK" "SWITCH". With the transmitter tuned to 2182 kHz as described in section 4.2., valve current should be within \pm 10% of the values stated in Chart 5.1.

Set the "CHECK SWITCH" to the desired valve (V1-V5) and thereafter pull out the switch knob. Readings are made on the "LEVEL METER" while keeping the switch knob pulled out.

VALVE	V1	V2	V3	V4	V5
CURRENT mA	29	65-140	123	123	123
FULL-SCALE METER READING mA	50	250	250	250	250

CHART 5.1

5.6. Replacement of Fuses

If the "LT" lamp shows no light and no meter reading is obtained when making the low-tension checks specified in section 5.4.1., a check should be made of the fuses marked "LT FUSES" in the power pack.

If no meter reading is obtained when making the high-tension checks specified in section 5.4.2., a check should be made of the fuses marked "HT FUSES" in the power pack.

Fuse ratings depend on the power pack employed.

Reference is made to Instruction Manual for P 400 and P 401 Power Packs.

NOTE: Do not use fuses of higher ratings than those specified.

5.7. Replacement of Valves

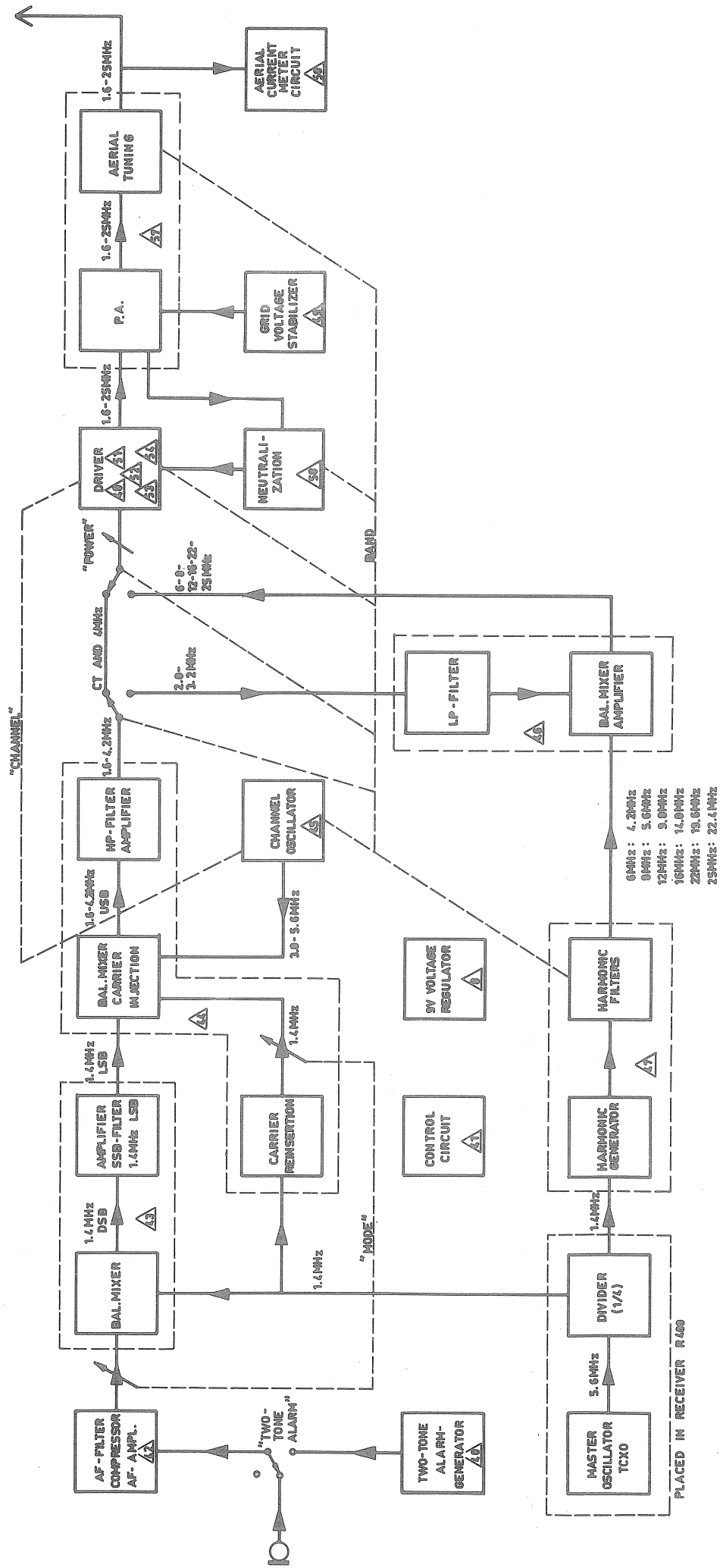
If valve-current measurements afford grounds for suspecting a valve of being defective you may try to replace the valve in question. This requires that the transmitter be opened as described in section 3.2. Highly dangerous voltages are present in the circuits when power is applied to the transmitter.

Set the "POWER" switch to "MAINS OFF" and open external supply-voltage main switch before opening the transmitter.

Driver valves V1 and V2 are placed in a horizontal position below the chassis whilst power amplifier valves V3, V4, and V5 are placed above the chassis near its rear edge.

ABBREVIATIONS

A	= ampere
C	= capacitor
Car.	= carbon
Cer.	= ceramic
D	= diode
F	= farad
FS	= fuse
H	= henry
IC	= integrated circuit
k	= kilo or 10^3
L	= inductor
lin.	= linear
log.	= logarithmic
m	= milli or 10^{-3}
M	= mega or 10^6
Mi	= mica
MP	= metalized paper
μ	= micro or 10^{-6}
n	= nano or 10^{-9}
NTC	= neg. temp. coefficient
p	= pico or 10^{-12}
PL	= plug
polyes.	= polyester
polyst.	= polystyrene
PTC	= pos. temp. coefficient
R	= resistor
RL	= relay
S	= switch
SK	= socket
SL	= lamp
T	= transformer
Tan	= tantal electrolytic
TR	= transistor
V	= working voltage DC
Vl...	= valve
Vac.	= working voltage AC
Var.	= variable
Varicap	= variable capacitance diode
ww	= wire wound
W	= watt
W.alum.	= wet aluminium electrolytic
X	= crystal, crystal osc. or crystal filters



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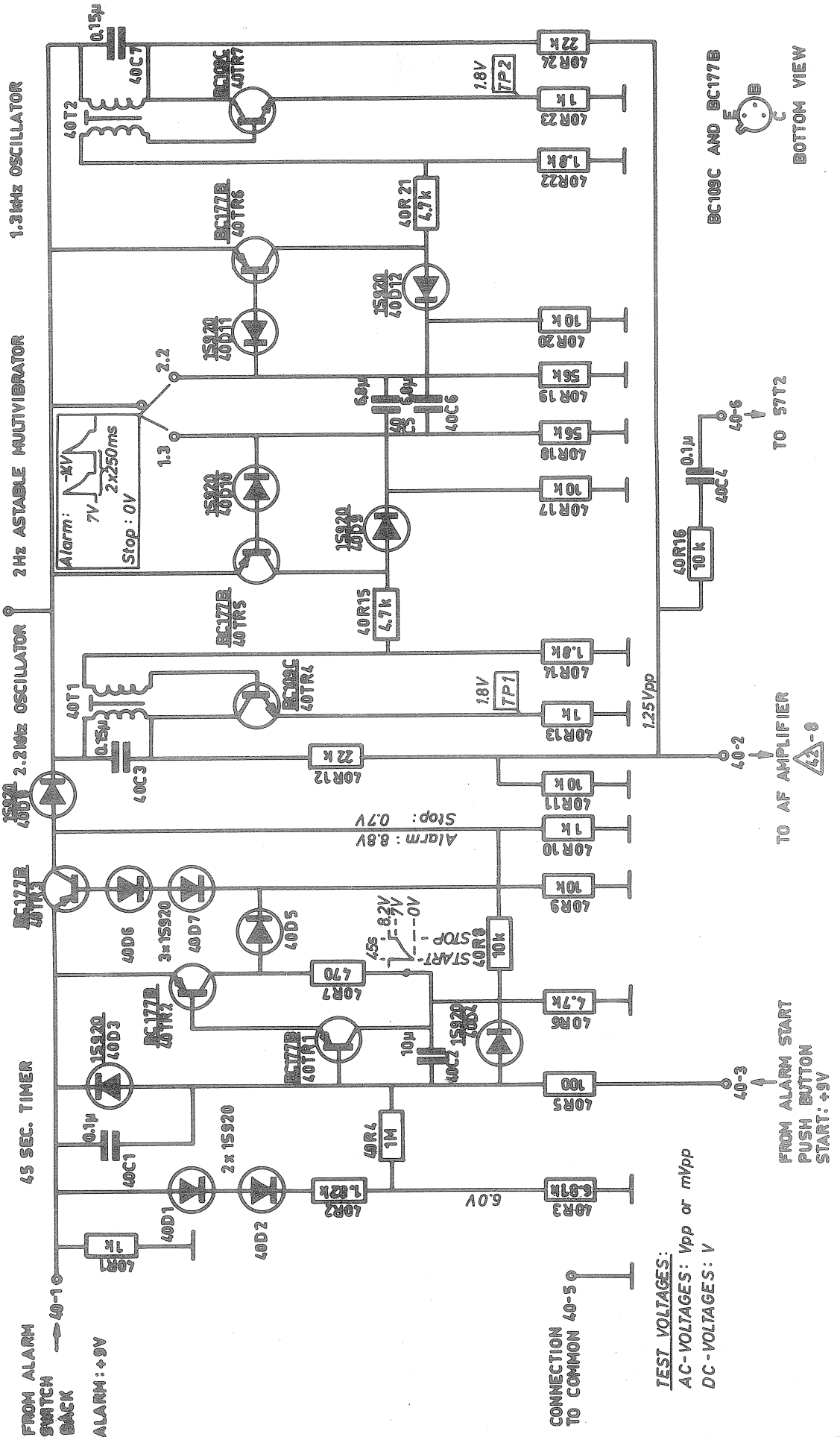
BLOCK DIAGRAM

Page ID | Conf.

T-0121 - 2

21 - 1 - 71

FROM ALARM SWITCH
BACK
TEST: +9V



BOTTOM VIEW

PARTS LIST
FOR
TWO-TONE GENERATOR



40C 1	0.1 μ F	$\pm 10\%$	250V	Polyes.
40C 2	10 μ F	5%	100V	Polyes.
40C 3	0.15 μ F	1%	63V	Polyst.
40C 4	0.1 μ F	$\pm 10\%$	250V	Polyes.
40C 5	6.8 μ F	5%	100V	Polyes.
40C 6	6.8 μ F	5%	100V	Polyes.
40C 7	0.15 μ F	1%	63V	Polyst.

40D 1-12 1S920

40R 1	1 kohm	5%	1/8W	Car.
40R 2	1.82 kohm	5%	1/3W	MR
40R 3	6.81 kohm	5%	1/3W	MR
40R 4	1 Mohm	1%	1W	MR
40R 5	100 ohm	5%	1/8W	Car.
40R 6	4.7 kohm	5%	1/8W	Car.
40R 7	470 ohm	5%	1/8W	Car.
40R 8	10 kohm	5%	1/8W	Car.
40R 9	10 kohm	5%	1/8W	Car.
40R10	1 kohm	5%	1/8W	Car.
40R11	10 kohm	5%	1/8W	Car.
40R12	22 kohm	5%	1/8W	Car.
40R13	1 kohm	5%	1/8W	Car.
40R14	1.8 kohm	5%	1/8W	Car.
40R15	4.7 kohm	5%	1/8W	Car.
40R16	10 kohm	5%	1/8W	Car.
40R17	10 kohm	5%	1/8W	Car.
40R18	56 kohm	5%	1/8W	Car.
40R19	56 kohm	5%	1/8W	Car.
40R20	10 kohm	5%	1/8W	Car.
40R21	4.7 kohm	5%	1/8W	Car.
40R22	1.8 kohm	5%	1/8W	Car.
40R23	1 kohm	5%	1/8W	Car.
40R24	22 kohm	5%	1/8W	Car.

40T 1 TRANSFORMER
40T 2 TRANSFORMER

SKANTI CODE: T-0072
SKANTI CODE: T-0071

40TR 1 BC177B
40TR 2 BC177B
40TR 3 BC177B
40TR 4 BC109C
40TR 5 BC177B
40TR 6 BC177B
40TR 7 BC109C

TO MICRO SWITCH MOUNTED ON
BAND SWITCH S6

57 - PL1 -206

57 - PL1 -215

57 - PL1 -214

TO POWER SWITCH WAFER NO.3
BACK

TO ALARM SWITCH FRONT

57 - PL1 -213

8 -7

TO POWER SWITCH WAFER NO.3
BACK

57 - PL1 -216

57 - PL1 -217

8 -5

TO BAND SWITCH WAFER NO.2
BACK

TO POWER SWITCH WAFER NO.3
FRONT

TO ALARM SWITCH BACK

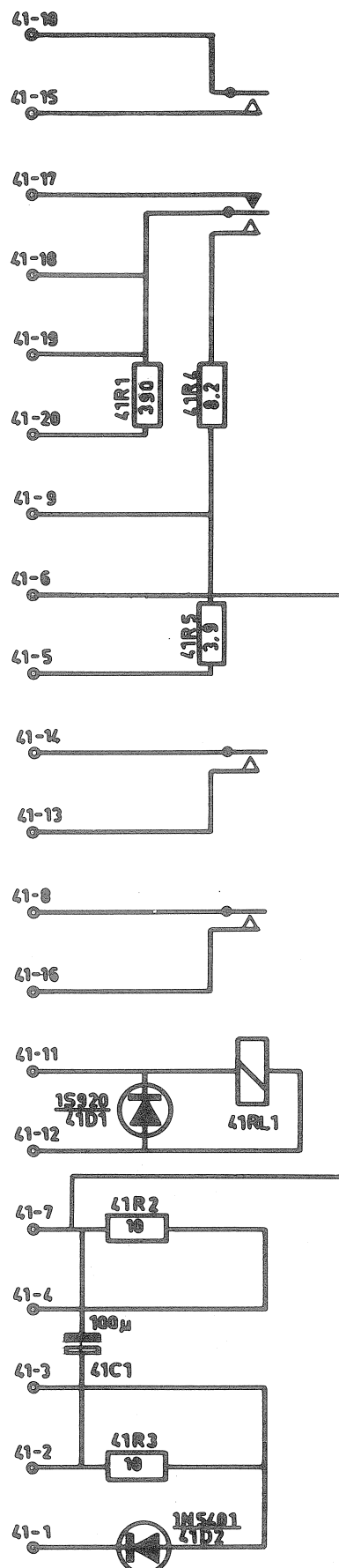
8 -7

TO ALARM SWITCH BACK

TO ALARM SWITCH BACK

57 - PL1 -219

57 - SK1 -3



skanti

CONTROL CIRCUIT



Tegn. JD Konf.

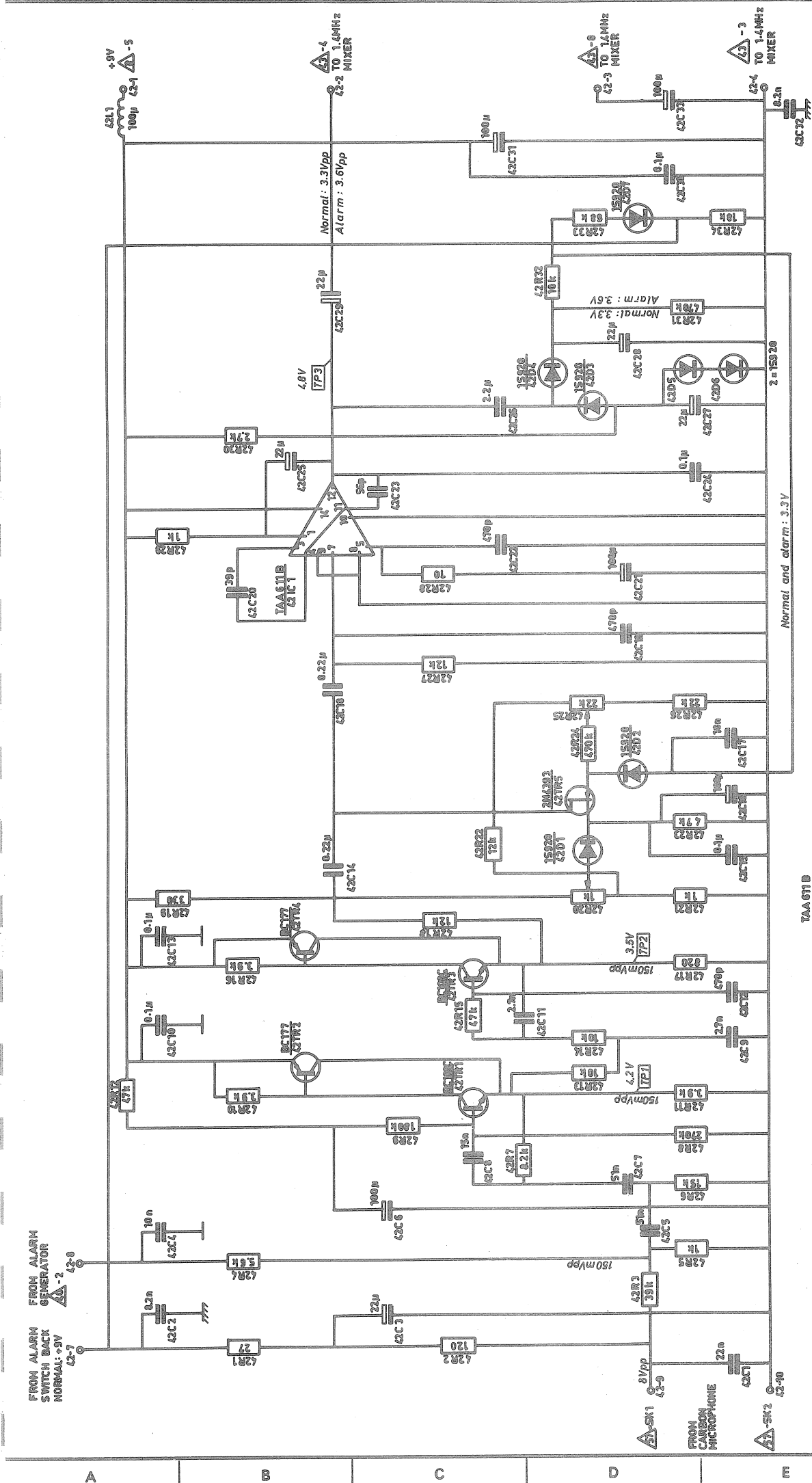
T - 0008 - 2

4 - 2 - 71

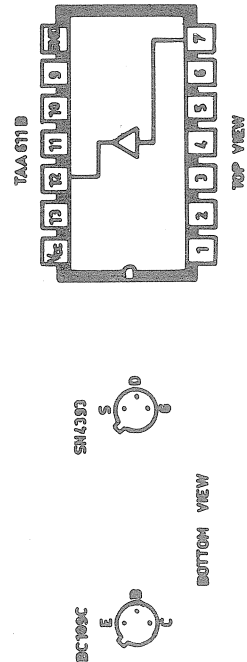
PARTS LIST
FOR
CONTROL CIRCUIT




41C 1	100 μ F		16V	W.alum.
41D 1	1S920			
41D 2	1N5401			
41R 1	390 ohm	5%	1/8W	Car.
41R 2	10 ohm	5%	1/8W	Car.
41R 3	10 ohm	5%	1/8W	Car.
41R 4	8.2 ohm	5%	1W	ww
41R 5	3.9 ohm	5%	3W	ww
41RL 1	RELAY		V23154-D0712-C310	



TEST VOLTAGES:
AC-VOLTAGES: V_{pp} or mV_{pp}
DC-VOLTAGES: V



skanti	AF AMPLIFIER		Tegn. ID	Kont.
			T - 0012 - 3	
			6 - 1 - 72	

PARTS LIST
FOR
AF AMPLIFIER



42C 1	22 nF	-20/+80%	30V	Cer.
42C 2	8.2 nF	-20/+80%	400V	Cer.
42C 3	22 μ F		15V	Tan
42C 4	10 nF	-20/+80%	30V	Cer.
42C 5	51 nF	1%	63V	Polyst.
42C 6	100 μ F		16V	W.alum.
42C 7	51 nF	1%	63V	Polyst.
42C 8	15 nF	1%	63V	Polyst.
42C 9	2.7 nF	1%	125V	Polyst.
42C10	0.1 μ F	-20/+80%	12V	Cer.
42C11	2.7 nF	1%	125V	Polyst.
42C12	470 pF	1%	125V	Polyst.
42C13	0.1 μ F	-20/+80%	12V	Cer.
42C14	0.22 μ F	10%	100V	Polyes.
42C15	0.1 μ F	-20/+80%	12V	Cer.
42C16	100 μ F		16V	W.alum.
42C17	10 nF	-20/+80%	30V	Cer.
42C18	0.22 μ F	10%	100V	Polyes.
42C19	470 pF	1%	125V	Polyst.
42C20	39 pF	5%	400V	Cer.
42C21	100 μ F		16V	W.alum.
42C22	470 pF	1%	125V	Polyst.
42C23	56 pF	5%	400V	Cer.
42C24	0.1 μ F	-20/+80%	12V	Cer.
42C25	22 μ F		15V	Tan
42C26	2.2 μ F	10%	100V	Polyes.
42C27	22 μ F		15V	Tan
42C28	22 μ F		15V	Tan
42C29	22 μ F		15V	Tan
42C30	0.1 μ F	-20/+80%	12V	Cer.
42C31	100 μ F		16V	W.alum.
42C32	8.2 nF	-20/+80%	400V	Cer.
42C33	100 μ F		16V	W.alum.
42D 1- 7	1S920			
42IC 1	TAA611 B12			
42L 1	100 μ H	RF CHOKE	10%	

42R 1	27 ohm	5%	1/8W	Car.
42R 2	120 ohm	5%	1/4W	Car.
42R 3	39 kohm	5%	1/8W	Car.
42R 4	5.6 kohm	5%	1/8W	Car.
42R 5	1 kohm	5%	1/8W	Car.
42R 6	15 kohm	5%	1/8W	Car.
42R 7	8.2 kohm	5%	1/8W	Car.
42R 8	270 kohm	5%	1/8W	Car.
42R 9	180 kohm	5%	1/8W	Car.
42R10	3.9 kohm	5%	1/8W	Car.
42R11	3.9 kohm	5%	1/8W	Car.
42R12	47 kohm	5%	1/8W	Car.
42R13	10 kohm	5%	1/8W	Car.
42R14	10 kohm	5%	1/8W	Car.
42R15	47 kohm	5%	1/8W	Car.
42R16	3.9 kohm	5%	1/8W	Car.
42R17	820 ohm	5%	1/8W	Car.
42R18	12 kohm	5%	1/8W	Car.
42R19	330 ohm	5%	1/8W	Car.
42R20	1 kohm	Var.		Car.
42R21	1 kohm	5%	1/8W	Car.
42R22	12 kohm	5%	1/8W	Car.
42R23	47 kohm	5%	1/8W	Car.
42R24	470 kohm	5%	1/8W	Car.
42R25	22 kohm	Var.		Car.
42R26	22 kohm	5%	1/8W	Car.
42R27	12 kohm	5%	1/8W	Car.
42R28	10 ohm	5%	1/8W	Car.
42R29	1 kohm	5%	1/8W	Car.
42R30	2.7 kohm	5%	1/8W	Car.
42R31	470 kohm	5%	1/8W	Car.
42R32	10 kohm	5%	1/8W	Car.
42R33	68 kohm	5%	1/8W	Car.
42R34	18 kohm	5%	1/8W	Car.

42TR 1	BC109C
42TR 2	BC177B
42TR 3	BC109C
42TR 4	BC177B
42TR 5	2N4393



43

11 12 25 (10) - 2547 (30)

PARTS LIST
FOR
1.4 MHz MIXER



43C 1	0.1 μ F	-20/+80%	12V	Cer.
43C 2	0.1 μ F	-20/+80%	12V	Cer.
43C 3	0.1 μ F	-20/+80%	12V	Cer.
43C 4	0.1 μ F	-20/+80%	12V	Cer.
43C 5	22 μ F		15V	Tan
43C 6	100 μ F		16V	W.alum.
43C 7	10 nF	-20/+80%	30V	Cer.
43C 8	1 μ F	10%	100V	Polyes.
43C 9	0.1 μ F	-20/+80%	12V	Cer.
43C10	0.1 μ F	-20/+80%	12V	Cer.
43C11	0.1 μ F	-20/+80%	12V	Cer.
43C12	0.1 μ F	-20/+80%	12V	Cer.
43C13	5.6 nF	1%	63V	Polyst.
43C14	47 nF	-20/+80%	12V	Cer.
43C15	47 nF	-20/+80%	12V	Cer.
43C16	0.1 μ F	-20/+80%	12V	Cer.
43D 1- 6	1S920			
43IC 1	CA3039			
43L 1	100 μ H	RF CHOKE	10%	
43L 2	100 μ H	RF CHOKE	10%	
43L 3	100 μ H	RF CHOKE	10%	
43L 4	2.2 μ H	RF CHOKE	10%	
43L 5	100 μ H	RF CHOKE	10%	
43L 6	100 μ H	RF CHOKE	10%	
43R 1	1 kohm	5%	1/8W	Car.
43R 2	43.2 ohm	1%	1/8W	MR
43R 3	4.7 kohm	5%	1/8W	Car.
43R 4	1 kohm	Var.		Car.
43R 5	12 kohm	5%	1/8W	Car.
43R 6	69.8 ohm	1%	1/8W	MR
43R 7	820 ohm	5%	1/8W	Car.
43R 8	39 ohm	5%	1/8W	Car.
43R 9	100 kohm	5%	1/8W	Car.
43R10	37.4 ohm	1%	1/8W	Car.
43R11	3.9 kohm	5%	1/8W	Car.
43R12	12 kohm	5%	1/8W	Car.
43R13	2.2 kohm	5%	1/8W	Car.
43R14	121 ohm	1%	1/8W	MR
43R15	100 ohm	5%	1/8W	Car.



43R16	1 kohm	5%	1/8W	Car.
43R17	1 kohm	5%	1/8W	Car.
43R18	1.2 kohm	5%	1/8W	Car.
43R19	270 ohm	5%	1/8W	Car.
43R20	18 ohm	5%	1/8W	Car.
43R21	150 ohm	5%	1/8W	Car.

43T 1	TRANSFORMER	SKANTI CODE: T-0077
43T 2	TRANSFORMER	SKANTI CODE: T-0077

43TR 1	BC177B
43TR 2	BC109C
43TR 3	BC177B
43TR 4	BSX19
43TR 5	2N1613

43X 1	FILTER	TYPE BP4705	1.4MHz
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PARTS LIST

FOR

CT MIXER



44C 1	47 nF	-20/+80%	12V	Cer.
44C 2	47 nF	-20/+80%	12V	Cer.
44C 3	47 nF	-20/+80%	12V	Cer.
44C 4	0.1 μ F	-20/+80%	12V	Cer.
44C 5	47 nF	-20/+80%	12V	Cer.
44C 6	560 pF	1%	125V	Polyst.
44C 7	22 nF	-20/+80%	30V	Cer.
44C 8	47 nF	-20/+80%	12V	Cer.
44C 9	0.1 μ F	-20/+80%	12V	Cer.
44C10	0.1 μ F	-20/+80%	12V	Cer.
44C11	0.1 μ F	-20/+80%	12V	Cer.
44C12	0.1 μ F	-20/+80%	12V	Cer.
44C13	47 nF	-20/+80%	12V	Cer.
44C14	1 nF	1%	125V	Polyst.
44C15	1 nF	1%	125V	Polyst.
44C16	0.1 μ F	-20/+80%	12V	Cer.
44C17	47 nF	-20/+80%	12V	Cer.
44C18	0.1 μ F	-20/+80%	12V	Cer.
44C19	47 nF	-20/+80%	12V	Cer.
44C20	0.1 μ F	-20/+80%	12V	Cer.
44C21	47 nF	-20/+80%	12V	Cer.
44C22	47 nF	-20/+80%	12V	Cer.
44C23	47 nF	-20/+80%	12V	Cer.
44C24	22 nF	-20/+80%	30V	Cer.
44C25	47 nF	-20/+80%	12V	Cer.
44C26	22 nF	-20/+80%	30V	Cer.
44C27	1 nF	1%	125V	Polyst.
44C28	560 pF	1%	125V	Polyst.
44C29	22 nF	-20/+80%	30V	Cer.
44C30	3.9 nF	1%	63V	Polyst.
44C31	680 pF	1%	125V	Polyst.
44C32	680 pF	1%	125V	Polyst.
44C33	0.1 μ F	-20/+80%	12V	Cer.
44C34	0.22 μ F	-20/+80%	12V	Cer.

44D 1- 5 1S920

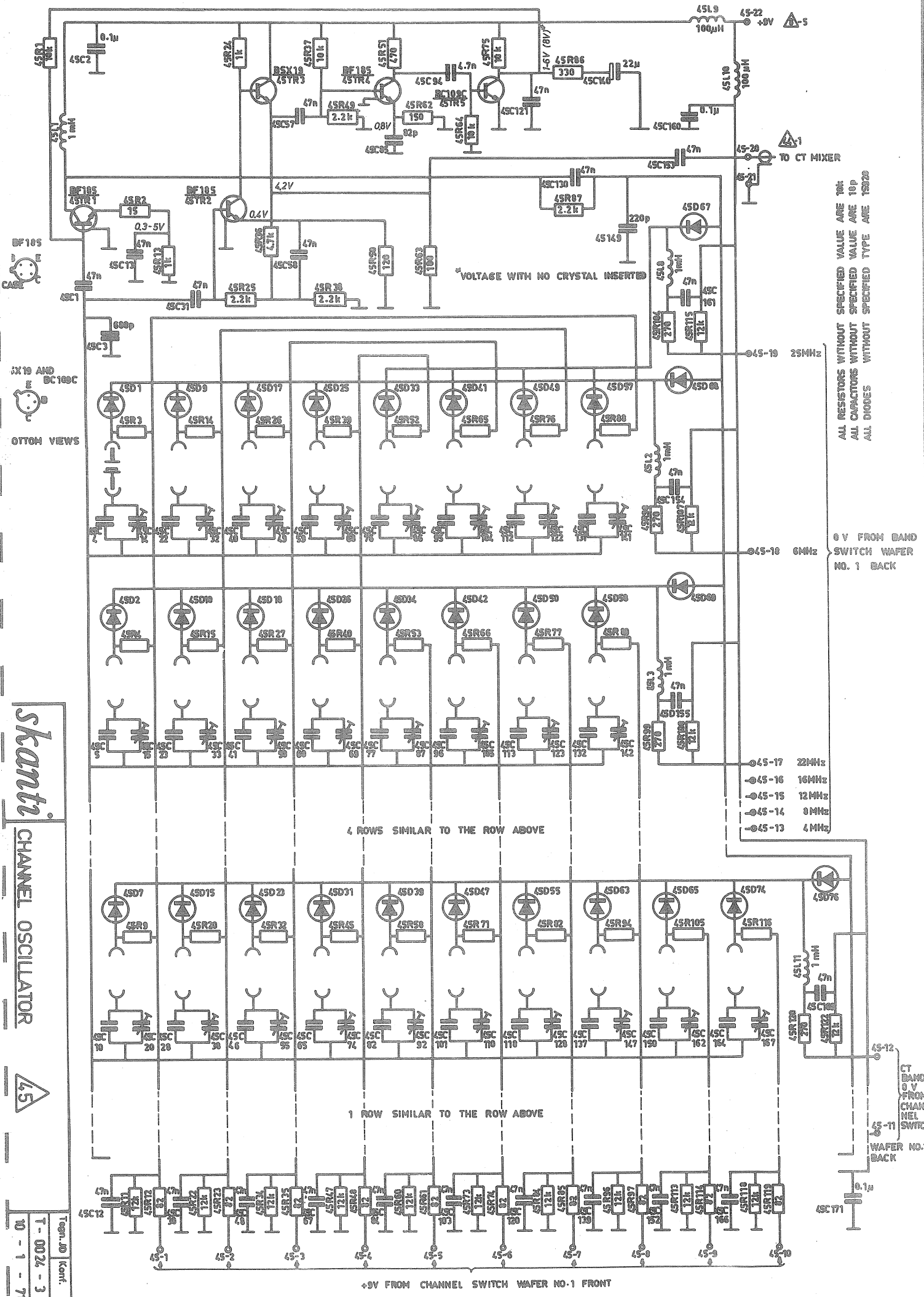
44IC 1 TBA120
 44IC 2 CA3039
 44IC 3 TBA120

44L 1	COIL		SKANTI CODE: T-0113
44L 2	100 μ H	RF CHOKE	10%
44L 3	100 μ H	RF CHOKE	10%
44L 4	4.7 μ H	RF CHOKE	10%
44L 5	100 μ H	RF CHOKE	10%
44L 6	COIL		SKANTI CODE: T-0116
44L 7	COIL		SKANTI CODE: T-0113
44L 8	1 μ H	RF CHOKE	10%
44L 9	100 μ H	RF CHOKE	10%
44R 1	56 ohm	5%	1/8W Car.
44R 2	8.2 kohm	5%	1/8W Car.
44R 3	1.2 kohm	5%	1/8W Car.
44R 4	820 ohm	5%	1/8W Car.
44R 5	10 kohm	5%	1/8W Car.
44R 6	22 kohm	5%	1/8W Car.
44R 7	68 kohm	5%	1/8W Car.
44R 8	150 ohm	5%	1/8W Car.
44R 9	18 ohm	5%	1/8W Car.
44R10	100 ohm	Var.	Car.
44R11	12 kohm	5%	1/8W Car.
44R12	470 ohm	5%	1/8W Car.
44R13	12 kohm	5%	1/8W Car.
44R14	820 ohm	5%	1/8W Car.
44R15	270 ohm	5%	1/8W Car.
44R16	220 ohm	5%	1/8W Car.
44R17	180 ohm	5%	1/8W Car.
44R18	10 ohm	5%	1/8W Car.
44R19	390 ohm	5%	1/8W Car.
44R20	82 ohm	5%	1/8W Car.
44R21	100 ohm	5%	1/8W Car.
44R22	1 kohm	5%	1/8W Car.
44R23	6.8 ohm	5%	1/8W Car.
44R24	100 ohm	5%	1/8W Car.
44R25	1 kohm	5%	1/8W Car.
44R26	1 kohm	5%	1/8W Car.
44R27	56 ohm	5%	1/8W Car.
44R28	56 ohm	5%	1/8W Car.
44R29	22 kohm	5%	1/8W Car.
44R30	47 kohm	5%	1/8W Car.
44R31	1 kohm	5%	1/8W Car.
44R32	82 ohm	5%	1/8W Car.
44R33	6.8 kohm	5%	1/8W Car.
44R34	1 kohm	5%	1/8W Car.
44R35	560 ohm	5%	1/8W Car.
44R36	220 ohm	5%	1/8W Car.
44R37	10 ohm	5%	1/8W Car.
44R38	15 ohm	5%	1/8W Car.
44R39	10 ohm	5%	1/8W Car.
44R40	10 kohm	5%	1/8W Car.
44R41	100 ohm	5%	1/8W Car.
44R42	470 ohm	5%	1/8W Car.



44T 1	TRANSFORMER	SKANTI CODE: T-0277
44T 2	TRANSFORMER	SKANTI CODE: T-0117
44T 3	TRANSFORMER	SKANTI CODE: T-0077
44T 4	TRANSFORMER	SKANTI CODE: T-0118

44TR 1	BF185
44TR 2	BC109C
44TR 3	BSX19
44TR 4	BC109C
44TR 5	BC109C
44TR 6	BC109C
44TR 7	BFW17A



skanti
CHANNEL OSCILLATOR



Topn. 00 Kant.
T - 0024 - 3
10 - 1 - 71

ALL RESISTORS WITHOUT SPECIFIED VALUE ARE 10K
ALL CAPACITORS WITHOUT SPECIFIED VALUE ARE 10p
ALL DIODES WITHOUT SPECIFIED TYPE ARE 15020

0 V FROM BAND
SWITCH WAFER
NO. 1 BACK

CT BAND
0 V FROM
CHANNEL
SWITCH
WAFER NO.1
BACK

+9V FROM CHANNEL SWITCH WAFER NO.1 FRONT

PARTS LIST
FOR
CHANNEL OSCILLATOR



45C 1	47 nF	-20/+80%	12V	Cer.
45C 2	0.1 μ F	-20/+80%	12V	Cer.
45C 3	680 pF	1%	125V	Polyst.
45C 4-11	18 pF	5%	400V	Cer. NP0
45C12	47 nF	-20/+80%	12V	Cer.
45C13	47 nF	-20/+80%	12V	Cer.
45C14-21	20 pF	Var.		Cer.
45C22-29	18 pF	5%	400V	Cer.NP0
45C30	47 nF	-20/+80%	12V	Cer.
45C31	47 nF	-20/+80%	12V	Cer.
45C32-39	20 pF	Var.		Cer.
45C40-47	18 pF	5%	400V	Cer.NP0
45C48	47 nF	-20/+80%	12V	Cer.
45C49-56	20 pF	Var.		Cer.
45C57	47 nF	-20/+80%	12V	Cer.
45C58	47 nF	-20/+80%	12V	Cer.
45C59-66	18 pF	5%	400V	Cer.NP0
45C67	47 nF	-20/+80%	12V	Cer.
45C68-75	20 pF	Var.		Cer.
45C76-83	18 pF	5%	400V	Cer.NP0
45C84	47 nF	-20/+80%	12V	Cer.
45C85	82 pF	5%	400V	Cer.N150
45C86-93	20 pF	Var.		Cer.
45C94	4.7 nF	-20/+80%	30V	Cer.
45C95-102	18 pF	5%	400V	Cer.NP0
45C103	47 nF	-20/+80%	12V	Cer.
45C104-111	20 pF	Var.		Cer.
45C112-119	18 pF	5%	400V	Cer.NP0
45C120	47 nF	-20/+80%	12V	Cer.
45C121	47 nF	-20/+80%	12V	Cer.
45C122-129	20 pF	Var.		Cer.
45C130	47 nF	-20/+80%	12V	Cer.
45C131-138	18 pF	5%	400V	Cer.NP0
45C139	47 nF	-20/+80%	12V	Cer.
45C140	22 μ F	20%	15V	Neto
45C141-148	20 pF	Var.		Cer.
45C149	220 pF	1%	125V	Polyst.
45C150-151	18 pF	5%	400V	Cer.NP0
45C152	47 nF	-20/+80%	12V	Cer.
45C153	47 nF	-20/+80%	12V	Cer.
45C154-159	47 nF	-20/+80%	12V	Cer.
45C160	0.1 μ F	-20/+80%	12V	Cer.
45C161	47 nF	-20/+80%	12V	Cer.
45C162-163	20 pF	Var.		Cer.
45C164-165	18 pF	5%	400V	Cer.NP0
45C166	47 nF	-20/+80%	12V	Cer.
45C167-168	20 pF	Var.		Cer.
45C169-170	47 nF	-20/+80%	12V	Cer.
45C171	0.1 μ F	-20/+80%	12V	Cer.

45D 1-77

1S920

45L 1- 8	1 mH	RF CHOKE	10%
45L 9-10	100 μ H	RF CHOKE	10%
45L11-12	1 mH	RF CHOKE	10%

45R 1	10 kohm	5%	1/8W	Car.
45R 2	15 ohm	5%	1/8W	Car.
45R 3-10	10 kohm	5%	1/8W	Car.
45R11	12 kohm	5%	1/8W	Car.
45R12	82 ohm	5%	1/8W	Car.
45R13	1 kohm	5%	1/8W	Car.
45R14-21	10 kohm	5%	1/8W	Car.
45R22	12 kohm	5%	1/8W	Car.
45R23	82 ohm	5%	1/8W	Car.
45R24	1 kohm	5%	1/8W	Car.
45R25	2.2 kohm	5%	1/8W	Car.
45R26-33	10 kohm	5%	1/8W	Car.
45R34	12 kohm	5%	1/8W	Car.
45R35	82 ohm	5%	1/8W	Car.
45R36	4.7 kohm	5%	1/8W	Car.
45R37	10 kohm	5%	1/8W	Car.
45R38	2.2 kohm	5%	1/8W	Car.
45R39-46	10 kohm	5%	1/8W	Car.
45R47	12 kohm	5%	1/8W	Car.
45R48	82 ohm	5%	1/8W	Car.
45R49	2.2 kohm	5%	1/8W	Car.
45R50	120 ohm	5%	1/8W	Car.
45R51	470 ohm	5%	1/8W	Car.
45R52-59	10 kohm	5%	1/8W	Car.
45R60	12 kohm	5%	1/8W	Car.
45R61	82 ohm	5%	1/8W	Car.
45R62	150 ohm	5%	1/8W	Car.
45R63	180 ohm	5%	1/8W	Car.
45R64-72	10 kohm	5%	1/8W	Car.
45R73	12 kohm	5%	1/8W	Car.
45R74	82 ohm	5%	1/8W	Car.
45R75-83	10 kohm	5%	1/8W	Car.
45R84	12 kohm	5%	1/8W	Car.
45R85	82 ohm	5%	1/8W	Car.
45R86	330 ohm	5%	1/8W	Car.
45R87	2.2 kohm	5%	1/8W	Car.
45R88-95	10 kohm	5%	1/8W	Car.
45R96	12 kohm	5%	1/8W	Car.
45R97	82 ohm	5%	1/8W	Car.
45R98-104	270 ohm	5%	1/8W	Car.
45R105-106	10 kohm	5%	1/8W	Car.
45R107-113	12 kohm	5%	1/8W	Car.
45R114	82 ohm	5%	1/8W	Car.
45R115	12 kohm	5%	1/8W	Car.
45R116-117	10 kohm	5%	1/8W	Car.



45R118	12 kohm	5%	1/8W	Car.
45R119	82 ohm	5%	1/8W	Car.
45R120-121	270 ohm	5%	1/8W	Car.
45R122-123	12 kohm	5%	1/8W	Car.

45TR 1	BF185
45TR 2	BF185
45TR 3	BSX19
45TR 4	BF185
45TR 5	BC109C



PARTS LIST

FOR

HF MIXER



46C 1	47 nF	-20/+80%	12V	Cer.
46C 2	0.1 μ F	-20/+80%	12V	Cer.
46C 3	383 pF	1%	125V	Polyst.
46C 4	82 pF	5%	400V	Cer.N150
46C 5	464 pF	1%	125V	Polyst.
46C 6	422 pF	1%	125V	Polyst.
46C 7	374 pF	1%	125V	Polyst.
46C 8	324 pF	1%	125V	Polyst.
46C 9	240 pF	1%	125V	Polyst.
46C10	100 pF	1%	125V	Polyst.
46C11	0.1 μ F	-20/+80%	12V	Cer.
46C12	0.1 μ F	-20/+80%	12V	Cer.
46C13	0.1 μ F	-20/+80%	12V	Cer.
46C14	100 pF	1%	125V	Polyst.
46C15	0.1 μ F	-20/+80%	12V	Cer.
46C16	22 nF	-20/+80%	30V	Cer.
46C17	22 nF	-20/+80%	30V	Cer.
46C18	0.1 μ F	-20/+80%	12V	Cer.
46C19	47 nF	-20/+80%	12V	Cer.
46C20	0.1 μ F	-20/+80%	12V	Cer.
46C21	47 nF	-20/+80%	12V	Cer.
46C22	47 nF	-20/+80%	12V	Cer.
46C23	0.1 μ F	-20/+80%	12V	Cer.
46C24	240 pF	1%	125V	Polyst.
46C25	0.1 μ F	-20/+80%	12V	Cer.
46C26	22 nF	-20/+80%	30V	Cer.
46C27	0.1 μ F	-20/+80%	12V	Cer.
46C28	22 nF	-20/+80%	12V	Cer.

46D 1- 3 1S920

46IC 1 CA3039
46IC 2 TBA120

46L 1	100 μ H	RF CHOKE	10%
46L 2	COIL		SKANTI CODE: T-0116
46L 3	COIL		SKANTI CODE: T-0114
46L 4	COIL		SKANTI CODE: T-0115
46L 5	100 μ H	RF CHOKE	10%
46L 6	100 μ H	RF CHOKE	10%
46L 7	100 μ H	RF CHOKE	10%

46R 1	150 ohm	5%	1/8W	Car.
46R 2	220 ohm	5%	1/8W	Car.
46R 3	1 kohm	5%	1/8W	Car.
46R 4	120 ohm	5%	1/8W	Car.
46R 5	18 ohm	5%	1/8W	Car.
46R 6	100 ohm	5%	1/8W	Car.
46R 7	18 ohm	5%	1/8W	Car.
46R 8	100 ohm	5%	1/8W	Car.
46R 9	1 kohm	5%	1/8W	Car.
46R10	1 kohm	5%	1/8W	Car.
46R11	150 ohm	5%	1/8W	Car.
46R12	560 ohm	5%	1/8W	Car.
46R13	1.5 kohm	Var.		Car.
46R14	82 ohm	5%	1/8W	Car.
46R15	390 ohm	5%	1/8W	Car.
46R16	2.2 kohm	5%	1/8W	Car.
46R17	10 ohm	5%	1/8W	Car.
46R18	10 ohm	5%	1/8W	Car.
46R19	56 ohm	5%	1/8W	Car.
46R20	470 ohm	5%	1/8W	Car.
46R21	100 ohm	5%	1/8W	Car.

46T 1	TRANSFORMER	SKANTI CODE: T-0120
46T 2	TRANSFORMER	SKANTI CODE: T-0077

46TR 1	BSX19
46TR 2	BSX19
46TR 3	BFW17

PARTS LIST
FOR
HF HARMONIC FILTER



47C 1- 4	0.1 μ F	-20/+80%	12V	Cer.
47C 5	10 nF	-20/+80%	30V	Cer.
47C 6- 9	33 pF	5%	400V	Cer.N150
47C10	27 pF	5%	400V	Cer.NP0
47C11	22 pF	5%	400V	Cer.NP0
47C12	0.1 μ F	-20/+80%	12V	Cer.
47C13	22 μ F	20%	15V	Tan
47C14	10 nF	-20/+80%	30V	Cer.
47C15	0.1 μ F	-20/+80%	12V	Cer.
47C16	22 μ F	20%	15V	Tan
47C17	0.1 μ F	-20/+80%	12V	Cer.
47C18	0.1 μ F	-20/+80%	12V	Cer.
47C19	47 nF	-20/+80%	12V	Cer.
47C20	0.1 μ F	-20/+80%	12V	Cer.
47C21	22 μ F	20%	15V	Tan
47C22	6.8 nF	$\pm 1\%$	63V	Polyst.
47C23-29	0.1 μ F	-20/+80%	12V	Cer.
47C30	1.2 nF	$\pm 1\%$	125V	Polyst.
47D 1-20	AAZ17			
47D21-23	BB104	green		
47D24-26	1S920			
47D27	AAZ17			
47IC 1	SN7400			
47IC 2	SN74H72			
47IC 3	SN74163			
47IC 4	SN7400			
47IC 5	SN74H00			
47IC 6- 7	SN7473			
47L 1- 6	1.0 mH	RF CHOKE	10%	
47L 7	100 μ H	RF CHOKE	10%	
47L 8-14	1.0 mH	RF CHOKE	10%	
47L15-16	2.2 μ H	RF CHOKE	10%	



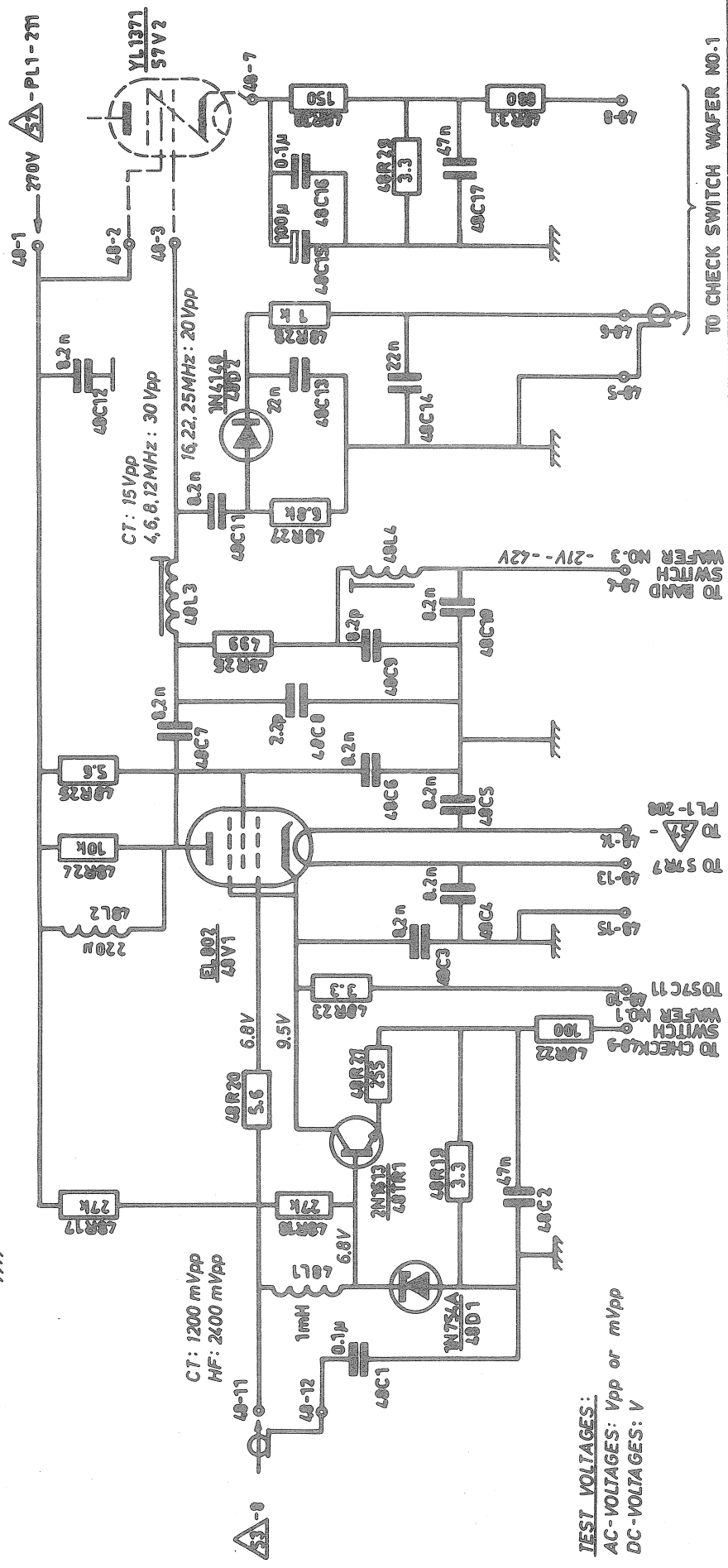
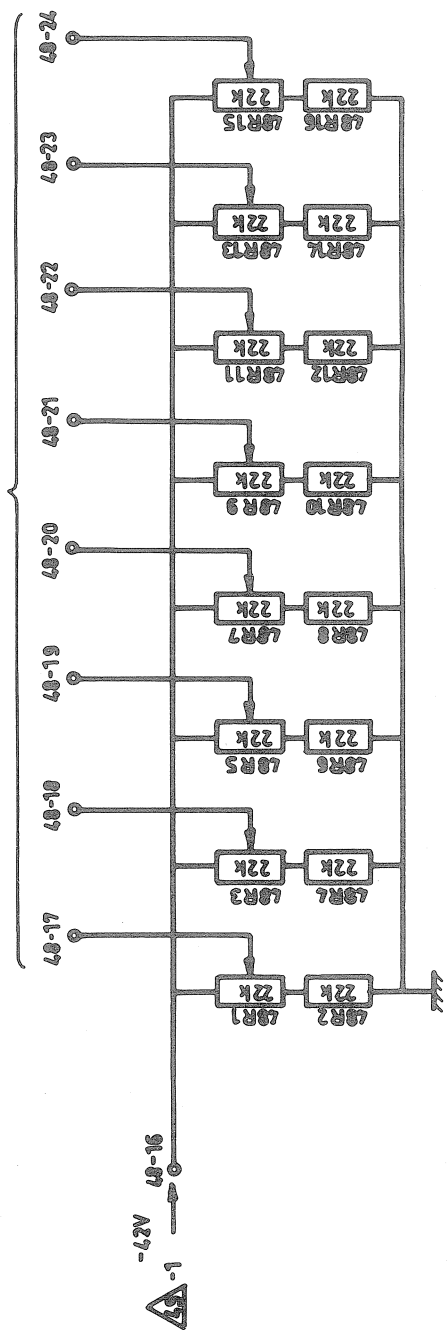
47R 1- 4	1 kohm	5%	1/8W	Car.
47R 5	220 ohm	5%	1/8W	Car.
47R 6	150 ohm	5%	1/8W	Car.
47R 7	1 kohm	5%	1/8W	Car.
47R 8	1 kohm	5%	1/8W	Car.
47R 9	3x3.3 ohm	5%	1/8W	Car.
47R10	39 ohm	5%	1/8W	Car.
47R11	68 ohm	5%	1/8W	Car.
47R12	330 ohm	5%	1/8W	Car.
47R13	100 ohm	5%	1/8W	Car.
47R14	1 kohm	5%	1/8W	Car.
47R15	33 ohm	5%	1/2W	Car.
47R16	1 kohm	5%	1/8W	Car.
47R17	1 kohm	5%	1/8W	Car.
47R18	470 ohm	5%	1/8W	Car.
47R19	47 ohm	5%	1/8W	Car.
47R20	1 kohm	5%	1/8W	Car.
47R21	33 ohm	5%	1/8W	Car.
47R22	100 ohm	5%	1/8W	Car.
47R23	22 kohm	5%	1/8W	Car.
47R24	56 ohm	5%	1/8W	Car.

47T 1	TRANSFORMER	SKANTI CODE: T-0222
47T 2	TRANSFORMER	SKANTI CODE: T-0119

47TR 1 BC109C

47X 1	CRYSTAL	HC-25/U	4.2MHz	SKANTI CODE: T-0279
47X 2	CRYSTAL	HC-25/U	5.6MHz	SKANTI CODE: T-0281
47X 3	CRYSTAL	HC-25/U	9.8MHz	SKANTI CODE: T-0282
47X 4	CRYSTAL	HC-25/U	14.0MHz	SKANTI CODE: T-0283
47X 5	CRYSTAL	HC-25/U	19.6MHz	SKANTI CODE: T-0284
47X 6	CRYSTAL	HC-25/U	22.4MHz	SKANTI CODE: T-0285

TO BAND SWITCH WAFER NO. 3



TEST VOLTAGES:
AC-VOLTAGES: Vpp or mVpp
DC-VOLTAGES: V

TO CHECK SWITCH WAFER NO. 1

TO CHECK SWITCH WAFER NO. 1
TO 57C 11
TO 57R 7
TO 57L 208

TO BAND SWITCH WAFER NO. 3 - 21V - 42V

CT: 1200 mVpp
HF: 2400 mVpp

CT: 15Vpp
4, 6, 8, 12 MHz: 30 Vpp
16, 22, 25 MHz: 20 Vpp

PARTS LIST
FOR
DRIVER AMPLIFIER



48C 1	0.1 μ F	$\pm 10\%$	250V	Polyes.
48C 2	47 nF	-20/+80%	12V	Cer.
48C 3- 7	8.2 nF	-20/+80%	400V	Cer.
48C 8	2.2 pF	-20/+80%	400V	Cer.
48C 9	8.2 pF	± 0.25 pF	400V	Cer.N150
48C10-12	8.2 nF	-20/+80%	400V	Cer.
48C13-14	22 nF	-20/+80%	400V	Cer.
48C15	100 μ F		16V	W.alum.
48C16	0.1 μ F	-20/+80%	30V	Cer.
48C17	47 nF	-20/+80%	12V	Cer.
48D 1	1N754A	Zener		
48D 2	1N4148			
48L 1	1 mH	RF CHOKE	10%	
48L 2	220 μ H	RF CHOKE	10%	
48L 3	COIL		SKANTI CODE: T-0197	
48L 4	COIL		SKANTI CODE: T-0198	
48R 1	22 kohm	Var.		Car.
48R 2	22 kohm	5%	1/8W	Car.
48R 3	22 kohm	Var.		Car.
48R 4	22 kohm	5%	1/8W	Car.
48R 5	22 kohm	Var.		Car.
48R 6	22 kohm	5%	1/8W	Car.
48R 7	22 kohm	Var.		Car.
48R 8	22 kohm	5%	1/8W	Car.
48R 9	22 kohm	Var.		Car.
48R10	22 kohm	5%	1/8W	Car.
48R11	22 kohm	Var.		Car.
48R12	22 kohm	5%	1/8W	Car.
48R13	22 kohm	Var.		Car.
48R14	22 kohm	5%	1/8W	Car.
48R15	22 kohm	Var.		Car.
48R16	22 kohm	5%	1/8W	Car.
48R17	27 kohm	5%	1W	Car.
48R18	27 kohm	5%	1W	Car.
48R19	3.3 ohm	5%	1/8W	Car.
48R20	5.6 ohm	5%	1/8W	Car.
48R21	255 ohm	1%	1/8W	Car.
48R22	100 ohm	5%	1/8W	Car.
48R23	3.3 ohm	5%	1/8W	Car.
48R24	10 kohm	5%	1/8W	Car.
48R25	5.6 ohm	5%	1/8W	Car.



48R26	499 ohm	1%	1/8W	Car.
48R27	6.8 kohm	5%	1/8W	Car.
48R28	1 kohm	5%	1/8W	Car.
48R29	3.3 ohm	5%	1/8W	Car.
48R30	150 ohm	5%	3W	ww
48R31	680 ohm	5%	1/8W	Car.

48TR 1 2N1613

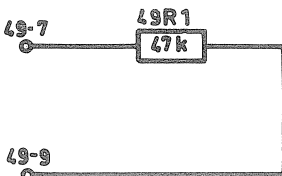
48V 1 EL 802

TO CHECK SWITCH 49-7
WAFFER NO.1

+24V



-PL 1 -206



TO CHECK SWITCH
WAFFER NO. 2

-49V



-PL 1 -209



-16



- 6

-30V--40V

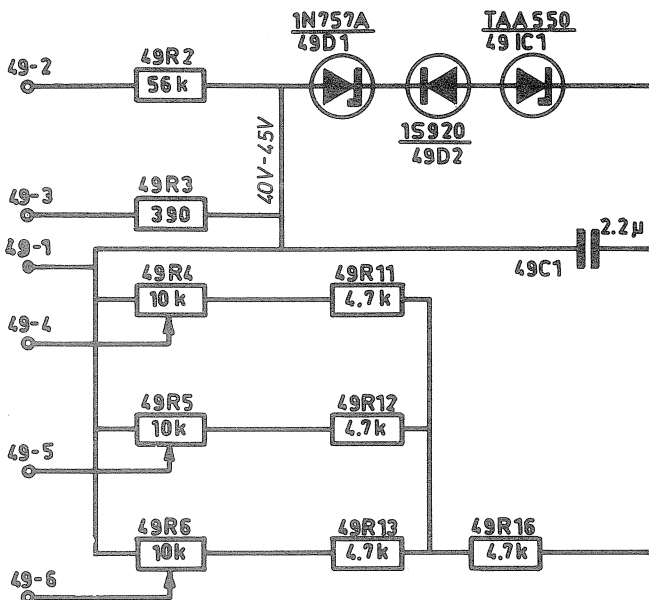


- 17

-30V--40V



- 19



TO CHASSIS

49-8

TO CHECK SWITCH
WAFFER NO.1

49-13

+1050V



-PL 2



+150V



- 11



+270V



-PL 1 -211



TO CHECK SWITCH
WAFFER NO.1

49-12

skanti

GRID VOLTAGE STABILIZER

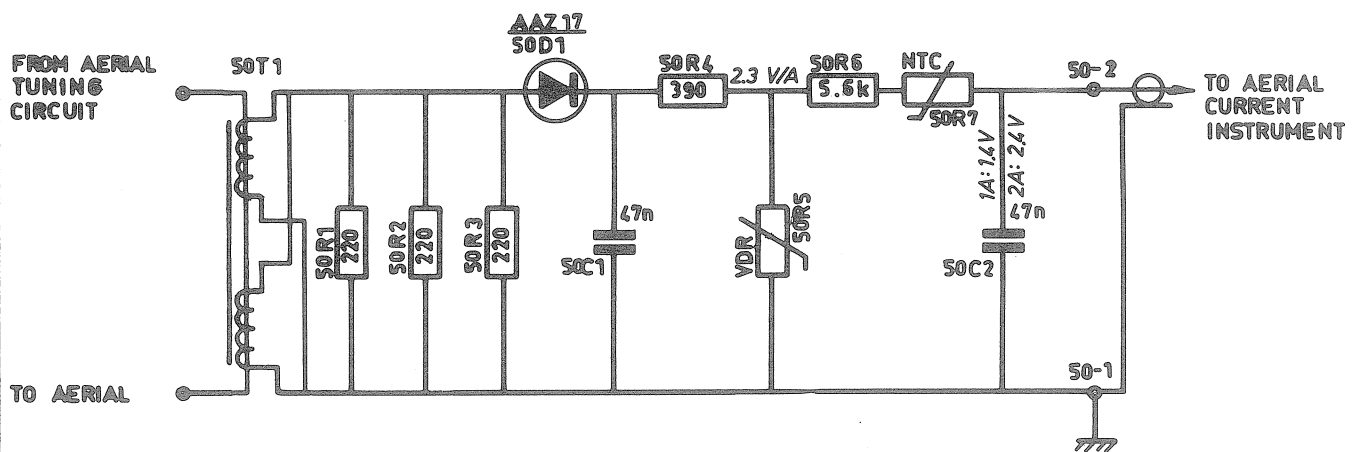


Tegn. JD	Konf.
T - 0040 - 1	
4 - 2 - 71	

PARTS LIST
FOR
GRID VOLTAGE STABILIZER



49C 1	2.2 μ F	10%	100V	Polyes.
49D 1	1N757A	Zener		
49D 2	1S920			
49IC 1	TAA550			
49R 1	47 kohm	5%	1/8W	Car.
49R 2	56 kohm	5%	1/8W	Car.
49R 3	390 ohm	5%	1/8W	Car.
49R 4	10 kohm	Var.		Car.
49R 5	10 kohm	Var.		Car.
49R 6	10 kohm	Var.		Car.
49R 7	470 kohm	5%	1W	Car.
49R 8	47 kohm	5%	1W	Car.
49R 9	470 kohm	5%	1W	Car.
49R10	220 kohm	5%	1W	Car.
49R11	4.7 kohm	5%	1/8W	Car.
49R12	4.7 kohm	5%	1/8W	Car.
49R13	4.7 kohm	5%	1/8W	Car.
49R14	470 kohm	5%	1W	Car.
49R15	220 kohm	5%	1W	Car.
49R16	4.7 kohm	5%	1/8W	Car.
49R17	560 kohm	5%	1W	Car.
49R18	47 kohm	5%	1W	Car.
49R19	560 kohm	5%	1W	Car.
49R20	1 kohm	5%	1/4W	Car.
49R21	1 kohm	5%	1/4W	Car.



skanti

AERIAL CURRENT METER CIRCUIT



Tegn.JD	Konf.
T - 0044 - 1	
19 - 2 - 71	

PARTS LIST
FOR
AERIAL CURRENT METER CIRCUIT

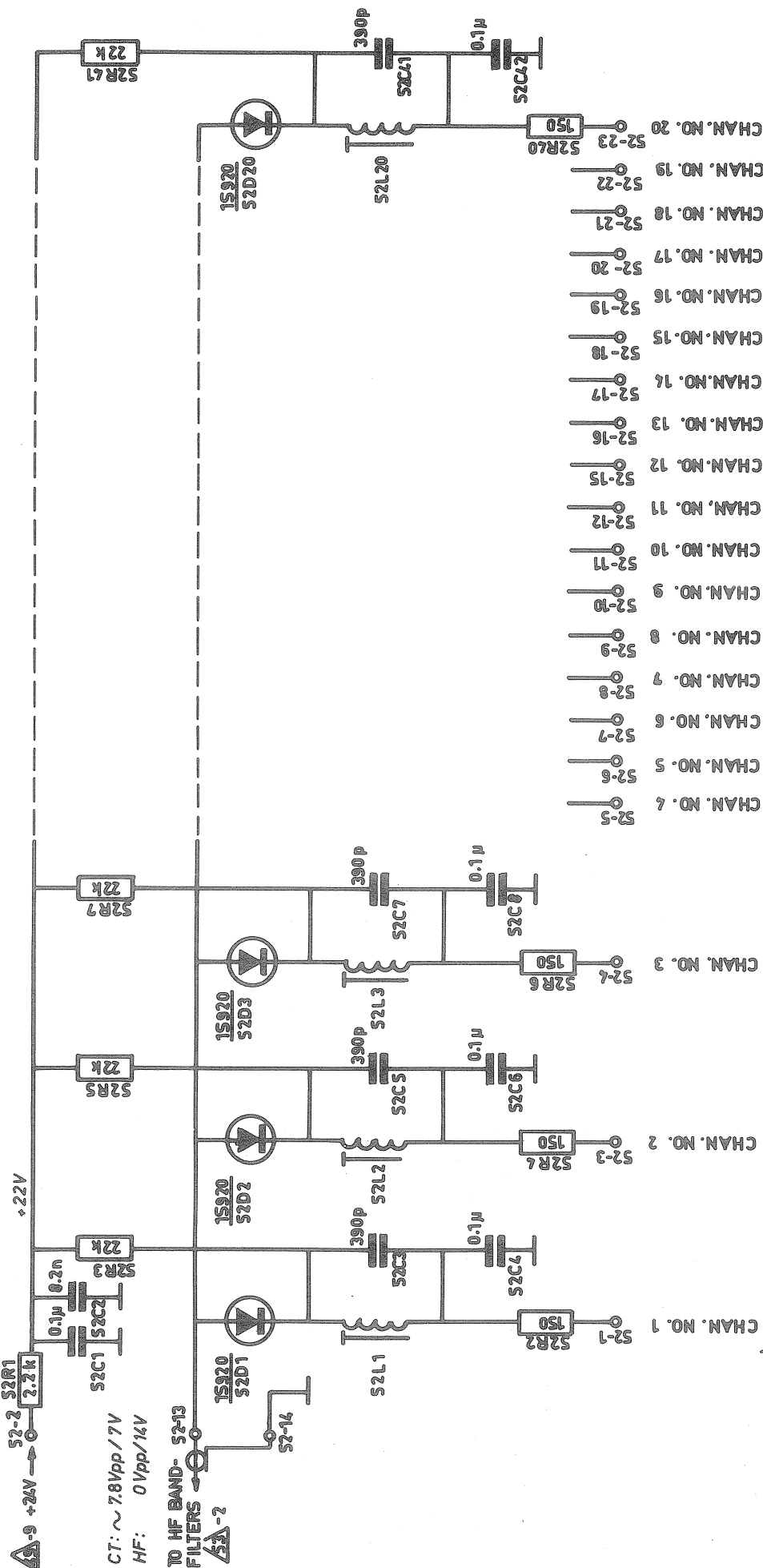


50C 1	47 nF	-20/+80%	12V	Cer.
50C 2	47 nF	-20/+80%	12V	Cer.
50D 1	AAZ 17			
50R 1	220 ohm	5%	1W	Car.
50R 2	220 ohm	5%	1W	Car.
50R 3	220 ohm	5%	1W	Car.
50R 4	390 ohm	5%	1/8W	Car.
50R 5	470 ohm	VDR		
50R 6	5.6 kohm	5%	1/8W	Car.
50R 7	470 ohm	NTC		

PARTS LIST
FOR
DRIVER ANODE CIRCUIT HF



51C 1- 2	8.2 nF	-20/+80%	400V	Cer.
51C 3	330 pF	1%	125V	Polyst.
51C 4- 6	8.2 nF	-20/+80%	400V	Cer.
51C 7	390 pF	1%	125V	Polyst.
51C 8- 9	8.2 nF	-20/+80%	400V	Cer.
51C10	180 pF	1%	125V	Polyst.
51C11-12	8.2 nF	-20/+80%	400V	Cer.
51C13	110 pF	1%	125V	Polyst.
51C14-15	8.2 nF	-20/+80%	400V	Cer.
51C16	82 pF	±5%	400V	Cer.
51C17-18	8.2 nF	-20/+80%	400V	Cer.
51C19	110 pF	1%	125V	Polyst.
51C20-21	8.2 nF	-20/+80%	400V	Cer.
51C22	39 pF	±5%	400V	Cer.
51C23-29	8.2 nF	-20/+80%	400V	Cer.
51D 1- 8	1S920			
51L 1	COIL	SKANTI CODE: T-0217		
51L 2	COIL	SKANTI CODE: T-0224		
51L 3	COIL	SKANTI CODE: T-0218		
51L 4	COIL	SKANTI CODE: T-0219		
51L 5	COIL	SKANTI CODE: T-0220		
51L 6	COIL	SKANTI CODE: T-0221		
51L 7	COIL	SKANTI CODE: T-0222		
51L 8	COIL	SKANTI CODE: T-0223		
51L 9-11	1 mH	RF CHOKE	10%	
51R 1	150 kohm	5%	1/8W	Car.
51R 2	470 kohm	5%	1/4W	Car.
51R 3	470 kohm	5%	1/4W	Car.
51R 4	820 ohm	5%	1/4W	Car.
51R 5	1500 ohm	1%	1/8W	MR
51R 6	150 kohm	5%	1/8W	Car.
51R 7	1 kohm	5%	1/4W	Car.
51R 8	150 kohm	5%	1/8W	Car.
51R 9	1 kohm	5%	1/4W	Car.
51R10	150 kohm	5%	1/8W	Car.
51R11	1.2 kohm	5%	1/4W	Car.
51R12	150 kohm	5%	1/8W	Car.
51R13	1.8 kohm	5%	1/4W	Car.
51R14	150 kohm	5%	1/8W	Car.
51R15	150 kohm	5%	1/8W	Car.



0V FROM CHANNEL
 SWITCH WAFER NO. 2

TEST VOLTAGES:
 AC-VOLTAGES: Vpp or mVpp
 DC-VOLTAGES: V

PARTS LIST
FOR
DRIVER GRID CIRCUIT CT



52C 1	0.1 μ F	10%	100V	Polyes.
52C 2	8.2 nF	-20/+80%	400V	Cer.
52C 3	390 pF	1%	125V	Polyst.
52C 4	0.1 μ F	10%	100V	Polyes.
52C 5	390 pF	1%	125V	polyst.
52C 6	0.1 μ F	10%	100V	Polyes.
52C 7	390 pF	1%	125V	Polyst.
52C 8	0.1 μ F	10%	100V	Polyes.
52C 9	390 pF	1%	125V	Polyst.
52C10	0.1 μ F	10%	100V	Polyes.
52C11	390 pF	1%	125V	Polyst.
52C12	0.1 μ F	10%	100V	Polyes.
52C13	390 pF	1%	125V	Polyst.
52C14	0.1 μ F	10%	100V	Polyes.
52C15	390 pF	1%	125V	Polyst.
52C16	0.1 μ F	10%	100V	Polyes.
52C17	390 pF	1%	125V	Polyst.
52C18	0.1 μ F	10%	100V	Polyes.
52C19	390 pF	1%	125V	Polyst.
52C20	0.1 μ F	10%	100V	Polyes.
52C21	390 pF	1%	125V	Polyst.
52C22	0.1 μ F	10%	100V	Polyes.
52C23	390 pF	1%	125V	Polyst.
52C24	0.1 μ F	10%	100V	Polyes.
52C25	390 pF	1%	125V	Polyst.
52C26	0.1 μ F	10%	100V	Polyes.
52C27	390 pF	1%	125V	Polyst.
52C28	0.1 μ F	10%	100V	Polyes.
52C29	390 pF	1%	125V	Polyst.
52C30	0.1 μ F	10%	100V	Polyes.
52C31	390 pF	1%	125V	Polyst.
52C32	0.1 μ F	10%	100V	Polyes.
52C33	390 pF	1%	125V	Polyst.
52C34	0.1 μ F	10%	100V	Polyes.
52C35	390 pF	1%	125V	Polyst.
52C36	0.1 μ F	10%	100V	Polyes.
52C37	390 pF	1%	125V	Polyst.
52C38	0.1 μ F	10%	100V	Polyes.
52C39	390 pF	1%	125V	Polyst.
52C40	0.1 μ F	10%	100V	Polyes.
52C41	390 pF	1%	125V	Polyst.
52C42	0.1 μ F	10%	100V	Polyes.

52D 1-20 1S920

52L 1-20 COIL

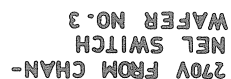
SKANTI CODE: T-0228

52R 1	2.2 kohm	5%	1/8W	Car.
52R 2	150 ohm	5%	1/8W	Car.
52R 3	22 kohm	5%	1/8W	Car.
52R 4	150 ohm	5%	1/8W	Car.
52R 5	22 kohm	5%	1/8W	Car.
52R 6	150 ohm	5%	1/8W	Car.
52R 7	22 kohm	5%	1/8W	Car.
52R 8	150 ohm	5%	1/8W	Car.
52R 9	22 kohm	5%	1/8W	Car.
52R10	150 ohm	5%	1/8W	Car.
52R11	22 kohm	5%	1/8W	Car.
52R12	150 ohm	5%	1/8W	Car.
52R13	22 kohm	5%	1/8W	Car.
52R14	150 ohm	5%	1/8W	Car.
52R15	22 kohm	5%	1/8W	Car.
52R16	150 ohm	5%	1/8W	Car.
52R17	22 kohm	5%	1/8W	Car.
52R18	150 ohm	5%	1/8W	Car.
52R19	22 kohm	5%	1/8W	Car.
52R20	150 ohm	5%	1/8W	Car.
52R21	22 kohm	5%	1/8W	Car.
52R22	150 ohm	5%	1/8W	Car.
52R23	22 kohm	5%	1/8W	Car.
52R24	150 ohm	5%	1/8W	Car.
52R25	22 kohm	5%	1/8W	Car.
52R26	150 ohm	5%	1/8W	Car.
52R27	22 kohm	5%	1/8W	Car.
52R28	150 ohm	5%	1/8W	Car.
52R29	22 kohm	5%	1/8W	Car.
52R30	150 ohm	5%	1/8W	Car.
52R31	22 kohm	5%	1/8W	Car.
52R32	150 ohm	5%	1/8W	Car.
52R33	22 kohm	5%	1/8W	Car.
52R34	150 ohm	5%	1/8W	Car.
52R35	22 kohm	5%	1/8W	Car.
52R36	150 ohm	5%	1/8W	Car.
52R37	22 kohm	5%	1/8W	Car.
52R38	150 ohm	5%	1/8W	Car.
52R39	22 kohm	5%	1/8W	Car.
52R40	150 ohm	5%	1/8W	Car.
52R41	22 kohm	5%	1/8W	Car.

PARTS LIST
FOR
HF-BANDFILTERS



53C 1- 2	8.2 nF	-20/+80%	400V	Cer.
53C 3	0.1 μ F	-20/+80%	12V	Cer.
53C 4	47 nF	-20/+80%	12V	Cer.
53C 5	0.1 μ F	-20/+80%	12V	Cer.
53C 6	47 nF	-20/+80%	12V	Cer.
53C 7	0.1 μ F	-20/+80%	12V	Cer.
53C 8	47 nF	-20/+80%	12V	Cer.
53C 9	0.1 μ F	-20/+80%	12V	Cer.
53C10	820 pF	1%	125V	Polyst.
53C11	15 pF	5%	400V	Cer.N150
53C12-13	390 pF	1%	125V	Polyst.
53C14-15	0.1 μ F	-20/+80%	12V	Cer.
53C16	10 pF	± 0.25 pF	400V	Cer.N150
53C17-18	390 pF	1%	125V	Polyst.
53C19-20	0.1 μ F	-20/+80%	12V	Cer.
53C21	3.3 pF	± 0.25 pF	400V	Cer.N150
53C22-23	100 pF	1%	125V	Polyst.
53C24-25	47 nF	-20/+80%	12V	Cer.
53C26	3.9 pF	± 0.25 pF	400V	Cer.N150
53C27	82 pF	5%	400V	Cer.N150
53C28	100 pF	1%	125V	Polyst.
53C29-30	47 nF	-20/+80%	12V	Cer.
53C31-32	6.8 pF	± 0.25 pF	400V	Cer.N150
53C33	82 pF	5%	400V	Cer.N150
53C34	100 pF	1%	125V	Polyst.
53C35-36	47 nF	-20/+80%	12V	Cer.
53C37	12 pF	5%	400V	Cer.N150
53C38	2.7 pF	± 0.25 pF	400V	Cer.NP0
53C39	82 pF	5%	400V	Cer.N150
53C40	100 pF	1%	125V	Polyst.
53C41-42	22 nF	-20/+80%	30V	Cer.
53C43	10 pF	± 0.25 pF	400V	Cer.N150
53C44	12 pF	5%	400V	Cer.N150
53C45	82 pF	5%	400V	Cer.N150
53C46	100 pF	1%	125V	Polyst.
53C47	22 nF	-20/+80%	30V	Cer.
53C48	1 nF	1%	500V	Polyst.
53C49	22 nF	-20/+80%	30V	Cer.
53C50-51	8.2 nF	-20/+80%	400V	Cer.
53D 1-16	1S920			
53L 1- 2	220 μ F	RF CHOKE	10%	
53L 3	COIL		SKANTI CODE: T-0225	
53L 4	100 μ F	RF CHOKE	10%	
53L 5	COIL		SKANTI CODE: T-0202	

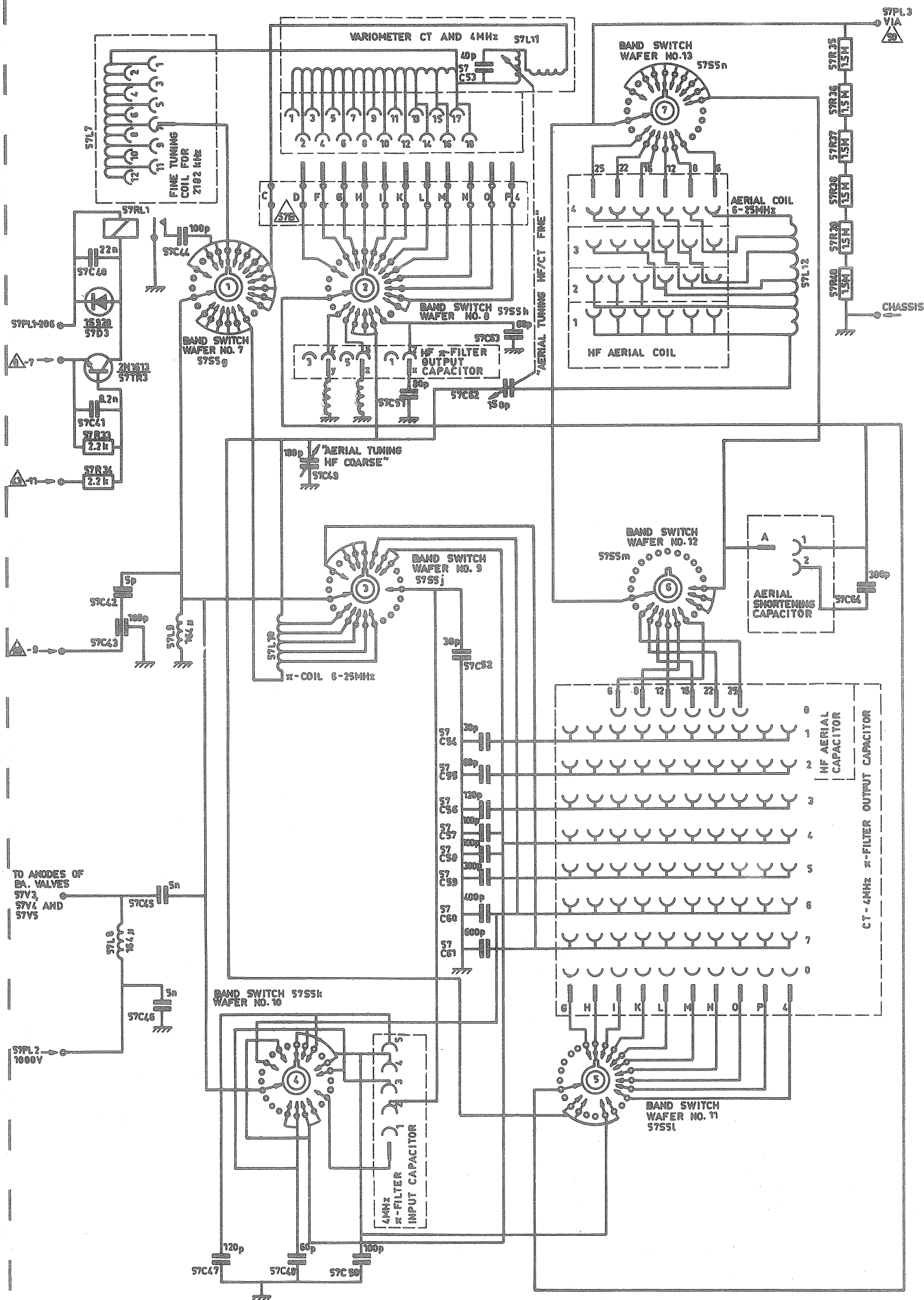


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PARTS LIST
FOR
DRIVER ANODE CIRCUIT CT



54C 1	8.2 nF	-20/+80%	400V	Cer.
54C 2	390 pF	1%	125V	Polyst.
54C 3	0.1 μ F	10%	400V	Polyes.
54C 4	390 pF	1%	125V	Polyst.
54C 5	0.1 μ F	10%	400V	Polyes.
54C 6	390 pF	1%	125V	Polyst.
54C 7	0.1 μ F	10%	400V	Polyes.
54C 8	390 pF	1%	125V	Polyst.
54C 9	0.1 μ F	10%	400V	Polyes.
54C10	390 pF	1%	125V	Polyst.
54C11	0.1 μ F	10%	400V	Polyes.
54C12	390 pF	1%	125V	Polyst.
54C13	0.1 μ F	10%	400V	Polyes.
54C14	390 pF	1%	125V	Polyst.
54C15	0.1 μ F	10%	400V	Polyes.
54C16	390 pF	1%	125V	Polyst.
54C17	0.1 μ F	10%	400V	Polyes.
54C18	390 pF	1%	125V	Polyst.
54C19	0.1 μ F	10%	400V	Polyes.
54C20	390 pF	1%	125V	Polyst.
54C21	0.1 μ F	10%	400V	Polyes.
54C22	390 pF	1%	125V	Polyst.
54C23	0.1 μ F	10%	400V	Polyes.
54C24	390 pF	1%	125V	Polyst.
54C25	0.1 μ F	10%	400V	Polyes.
54C26	390 pF	1%	125V	Polyst.
54C27	0.1 μ F	10%	400V	Polyes.
54C28	390 pF	1%	125V	Polyst.
54C29	0.1 μ F	10%	400V	Polyes.
54C30	390 pF	1%	125V	Polyst.
54C31	0.1 μ F	10%	400V	Polyes.
54C32	390 pF	1%	125V	Polyst.
54C33	0.1 μ F	10%	400V	Polyes.
54C34	390 pF	1%	125V	Polyst.
54C35	0.1 μ F	10%	400V	Polyes.
54C36	390 pF	1%	125V	Polyst.
54C37	0.1 μ F	10%	400V	Polyes.
54C38	390 pF	1%	125V	Polyst.
54C39	0.1 μ F	10%	400V	Polyes.
54C40	390 pF	1%	125V	Polyst.
54C41	0.1 μ F	10%	400V	Polyes.
54D 1-20	1S923			
54L 1-20	COIL			SKANTI CODE: T-0229
54R 1-20	150 kohm	5%	1/8W	Car.



PARTS LIST
FOR
CHASSIS (electrical parts)



57C 1- 2	8.2 nF	-20/+80%	400V	Cer.
57C 3	0.1 μ F	-20/+80%	400V	Cer.
57C 4- 5	8.2 nF	-20/+80%	400V	Cer.
57C 6	4.7 nF	\pm 20%	5kVs	Cer.
57C 7	6 μ F	10%	250V	MP
57C 8	0.1 μ F	-20/+80%	12V	Cer.
57C 9	180 pF	1%	125V	Polyst.
57C10	39 pF	5%	400V	Cer.
57C11	470 μ F		16V	W.alum.
57C12-13	22 nF	-20/+80%	30V	Cer.
57C14-15	0.1 μ F	10%	250V	Polyes.
57C16	120 pF	5%	400V	Cer.
57C17	8.2 nF	-20/+80%	400V	Cer.
57C18	0.1 μ F	-20/+80%	12V	Cer.
57C19-27	8.2 nF	-20/+80%	400V	Cer.
57C28	10 nF	10%	400V	Polyes.
57C29	47 nF	-20/+80%	12V	Cer.
57C30	10 nF	10%	400V	Polyes.
57C31	47 nF	-20/+80%	12V	Cer.
57C32	10 nF	10%	400V	Polyes.
57C33	47 nF	-20/+80%	12V	Cer.
57C34	0.1 μ F	10%	250V	Polyes.
57C35	4 μ F	10%	300V	MP
57C36	100 μ F		16V	W.alum.
57C37	Not used			
57C38	Not used			
57C39	Not used			
57C40	22 nF	-20/+80%	30V	Cer.
57C41	8.2 nF	-20/+80%	400V	Cer.
57C42	5 pF	10%	2kVs	Cer.P140-100
57C43-44	100 pF	\pm 10%	3kVs	Cer.P140-100
57C45	10 nF	10%	1600V	Polyst.
57C46	5 nF	\pm 20%	1500V	mica
57C47	120 pF	10%	3kVs	Cer.N200-300
57C48	60 pF	\pm 5%	3kVs	Cer.P140-100
57C49	100 pF	Var.	air	SKANTI CODE: T-0165
57C50	100 pF	\pm 5%	3kVs	Cer.P140-100
57C51	80 pF	10%	2kVs	Cer.P140-100
57C52	30 pF	10%	3kVs	Cer.P140-100
57C53	40 pF	10%	3kVs	Cer.P140-100
57C54	30 pF	\pm 5%	3kVs	Cer.P140-100
57C55	60 pF	\pm 5%	3kVs	Cer.P140-100
57C56	120 pF	10%	3kVs	Cer.N200-300
57C57-58	100 pF	\pm 5%	3kVs	Cer.P140-100
57C59	300 pF	10%	3kVs	Cer.N200-300
57C60	400 pF	10%	3kVs	Cer.N200-300
57C61	600 pF	10%	3kVs	Cer.N200-300
57C62	150 pF	Var.	air	SKANTI CODE: T-0243
57C63	60 pF	10%	2kVs	Cer.P140-100
57C64	300 pF	10%	3kVs	Cer.N200-300

57S 1a,b,c,d	power	ROTARY SWITCH	SKANTI CODE: T-0073
57S 2a,b	check	ROTARY SWITCH	SKANTI CODE: T-0095
57S 3	alarm	ROTARY SWITCH	SKANTI CODE: T-0093
57S 4	mode	ROTARY SWITCH	SKANTI CODE: T-0091
57S 5a,b,c,d	band	ROTARY SWITCH	SKANTI CODE: T-0096
57S 5e,f	neutr.	ROTARY SWITCH	SKANTI CODE: T-0191
57S 5g til n	band	ROTARY SWITCH	SKANTI CODE: T-0097
57S 6a,b,c	channel	ROTARY SWITCH	SKANTI CODE: T-0092
57S 7	alarm	PUSH-BOTTOM SWITCH	
57S 8		MICRO SWITCH	V3/550 VTS

57SL 1- 2	LAMP	12V	913 0012	Schurter
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57SK 1	socket	T3403	Tuchel
57SK 2	socket	BNC UG 657/isol.	Pre-fact

57T 1	TRANSFORMER	SKANTI CODE: T-0152
57T 2	TRANSFORMER Type 0.32-13820	J.S.

57TR 1	2N3055
57TR 2	2N4240
57TR 3	2N1613

57V 1	Not used
57V 2	YL1371
57V 3- 5	YL1070

57D 1	BZY93-C39	Zener
57D 2	1N754A	Zener
57D 3	1S920	

57L 1- 3	COIL	SKANTI CODE: T-0273
57L 4- 6	COIL	SKANTI CODE: T-0161
57L 7	COIL	SKANTI CODE: T-0196
57L 8- 9	COIL	SKANTI CODE: T-0156
57L10	COIL	SKANTI CODE: T-0174
57L11	COIL	SKANTI CODE: T-0230
57L12	COIL	SAKNTI CODE: T-0238

57ME 1	LEVEL METER	1 mA	70 ohm SKANTI CODE: T-0110
57ME 2	AERIAL CURRENT	1 mA	70 ohm SKANTI CODE: T-0130

57MT 1	Handset	SKANTI CODE: T-0338
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57PL 2	1 pole plug	L623p B&L
57PL 3	antenna	SKANTI CODE: T-0105
57PL 4	earth	SKANTI CODE: T-0105

57R 0	220 kohm	5%	1W	Car.
57R 1	6.8 ohm	5%	27W	ww
57R 2	56 ohm	5%	1/8W	Car.
57R 3	150 ohm	5%	1/8W	Car.
57R 4	56 ohm	5%	1/8W	Car.
57R 5	120 ohm	5%	1/8W	Car.
57R 6	5.6 kohm	5%	1/8W	Car. SKANTI CODE: T-0255
57R 7	8.4+7.6 ohm	5%	20W	ww
57R 8	12 ohm	5%	14W	ww
57R 9	470 kohm	5%	1/8W	Car.
57R10	9 ohm	5%	27W	ww
57R11	220 ohm	5%	1/8W	Car.
57R12	9 ohm	5%	27W	ww
57R13	220 ohm	5%	1/8W	Car.
57R14	9 ohm	5%	27W	ww
57R15	220 ohm	5%	1/8W	Car.
57R16	PTC	2322 661 91003		Miniwatt
57R17	68 ohm	5%	1/4W	Car.
57R18-20	6x6.8 ohm	5%	1/4W	Car.
57R21	PTC	2322 661 91003		Miniwatt
57R22-25	47 kohm	5%	1W	Car.
57R26-28	68 ohm	5%	1/4W	Car.
57R29-31	120 ohm	5%	1/2W	Car.
57R32	470 kohm	5%	1W	Car.
57R33-34	2.2 kohm	5%	1/8W	Car.
57R35-40	1.5 Mohm	5%	1W	Car.

57RL 1	RELAY	KMK2	24V DC	Keyswitch
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PARTS LIST

FOR

"FILTER"



57A C 1- 4	2.2 nF	-20/+80%	30V	Cer.
57A C 5- 9	0.1 μ F	10%	250V	Polyst.
57A C10	8.2 nF	-20/+80%	400V	Cer.
57A C11-13	2.2 nF	-20/+50%	750V	Cer.
57A C14-17	0.1 μ F	10%	250V	Cer.

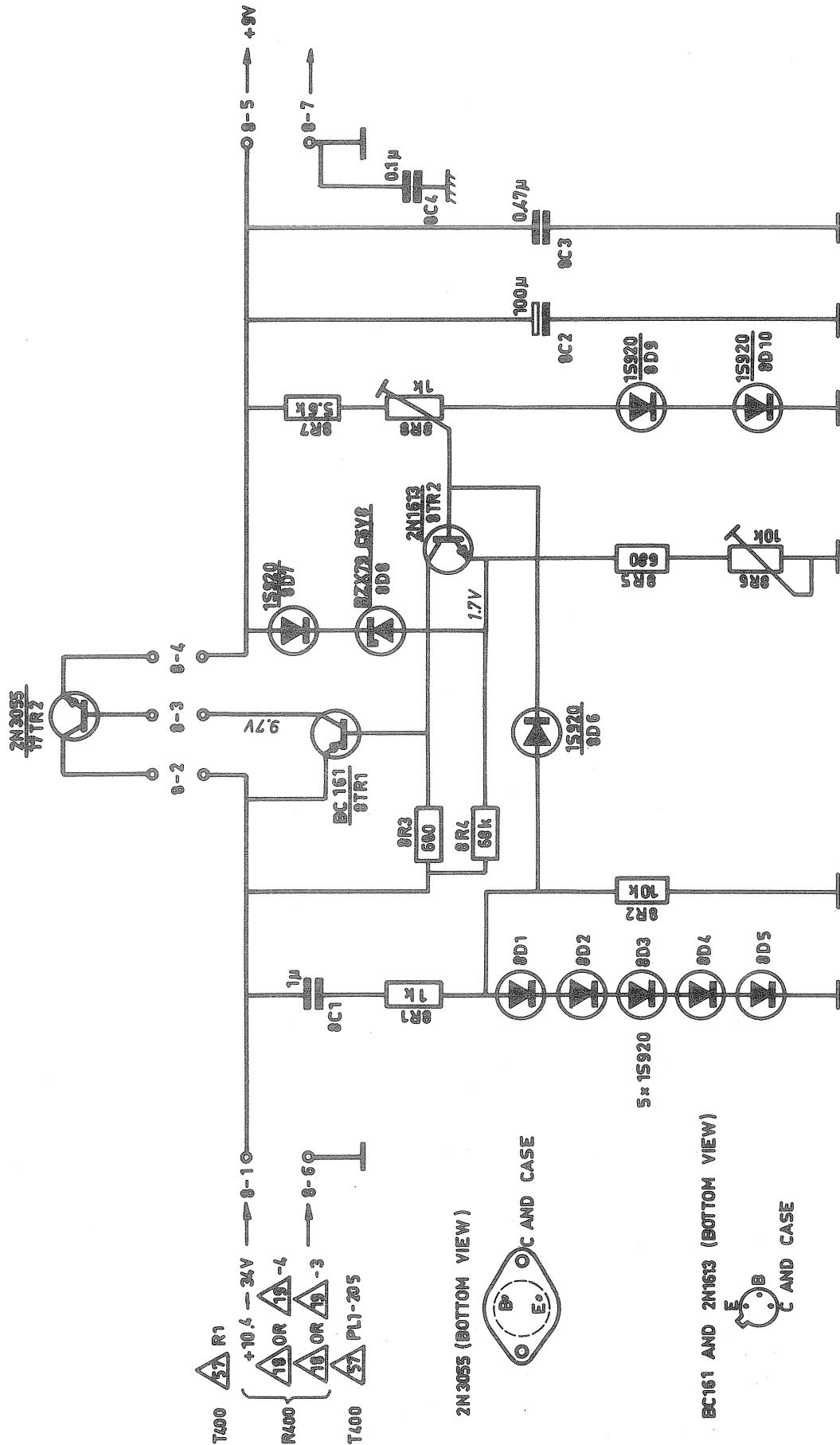
57A L 1- 8	25 μ H	RF CHOKE	3A
57A L 9-11	100 μ H	RF CHOKE	10%
57A L12-14	2.2 μ H	RF CHOKE	10%
57A L15-18	100 μ H	RF CHOKE	10%
57A L19	2.2 μ H	RF CHOKE	10%

57A PL 1	25 pole plug	XP25	McMurdo
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PARTS LIST
FOR
NEUTRALIZATION



58C 1	8.2 nF	-20/+80%	400V	Cer.
58C 2	20 pF	Var.		Cer.
58C 3	18 pF	5%	400V	Cer.
58C 4	20 pF	Var.		Cer.
58C 5	27 pF	5%	400V	Cer.
58C 6	20 pF	Var.		Cer.
58C 7	27 pF	5%	400V	Cer.
58C 8	20 pF	Var.		Cer.
58C 9	27 pF	5%	400V	Cer.
58C10-12	8.2 nF	-20/+80%	400V	Cer.
58C13	22 pF	5%	400V	Cer.
58C14	8.2 nF	-20/+80%	400V	Cer.
58D 1- 4	1N4148			
58L 1- 2	COIL		SKANTI CODE: T-0242	
58L 3	COIL		SKANTI CODE: T-0241	
58L 4- 5	1 mH	RF CHOKE	10%	
58R 1- 2	470 kohm	5%	1/8W	Car.
58R 3	33 kohm	5%	1/8W	Car.
58R 4- 5	470 kohm	5%	1/8W	Car.
58R 6	15 kohm	5%	1/8W	Car.
58T 1	TRANSFORMER		SKANTI CODE: T-0278	



PARTS LIST
FOR
9V VOLTAGE REGULATOR



8C 1	1.0 μ F	10%	100V	Polyes.
8C 2	100 μ F		16V	W.alum.
8C 3	0.47 μ F	10%	100V	Polyes.
8C 4	0.1 μ F	10%	250V	Polyes.
8D 1- 7	1S920			
8D 8	BZX79 C6V8	Zener		
8D 9-10	1S920			
8R 1	1.0 kohm	5%	1/8W	Car.
8R 2	10 kohm	5%	1/8W	Car.
8R 3	680 ohm	5%	1/8W	Car.
8R 4	68 kohm	5%	1/8W	Car.
8R 5	680 ohm	5%	1/8W	Car.
8R 6	10 kohm	Var.		Car.
8R 7	5.6 kohm	5%	1/8W	Car.
8R 8	1 kohm	Var.		Car.
8TR 1	BC161/10			
8TR 2	2N1613			

8

7

6

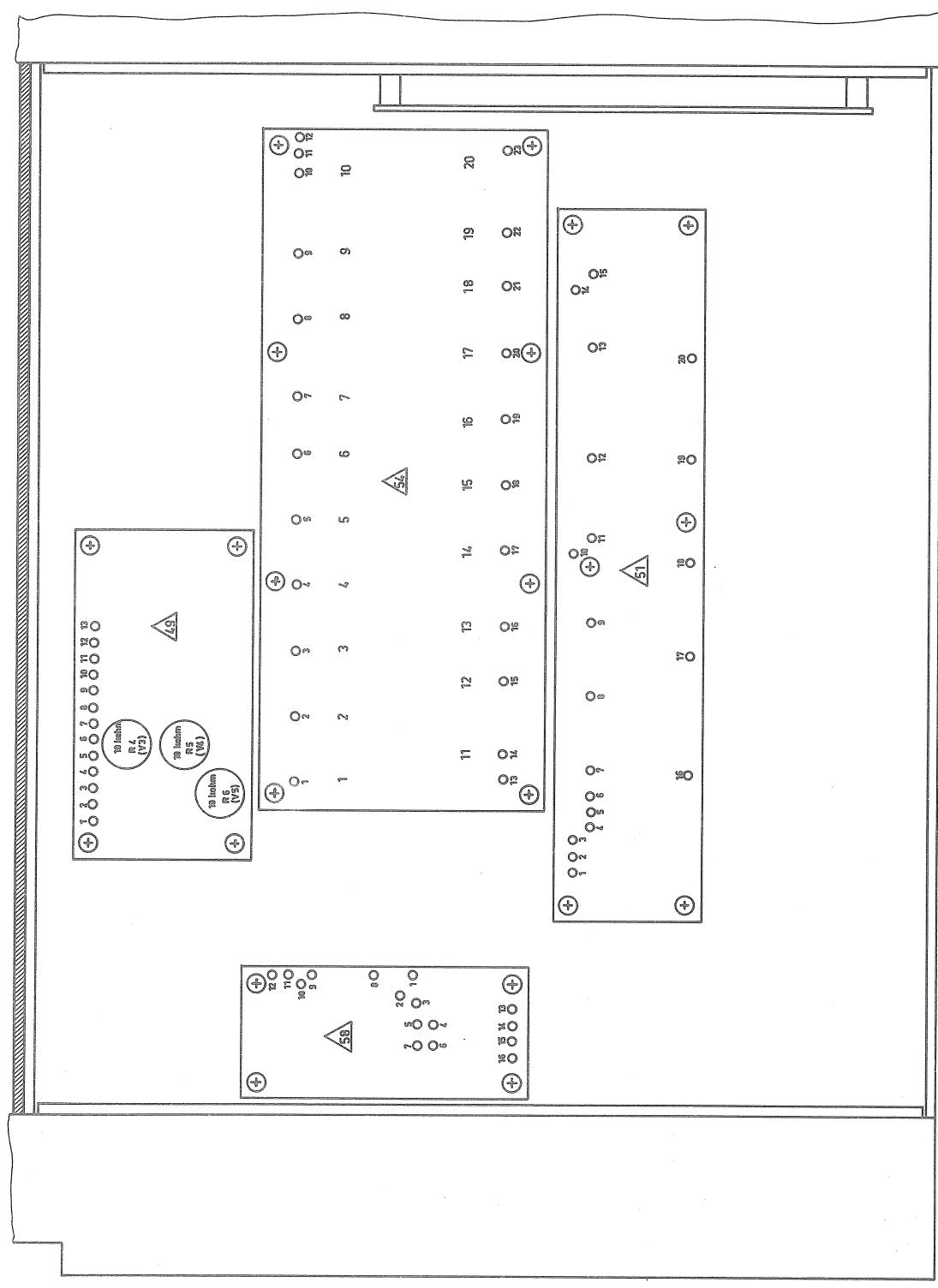
5

4

3

2

1



Material:	Overfladdbeh.: mm	Toleranser hvor intet andet er anført ±	Måleforhold: 1:1
skanti	Bottom compartment		Tegn-ID Kont.
	Circuit board location plan		T - 0295 - 1
			28 - 10 - 71

A

B

C

D

E

F

G

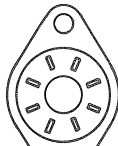
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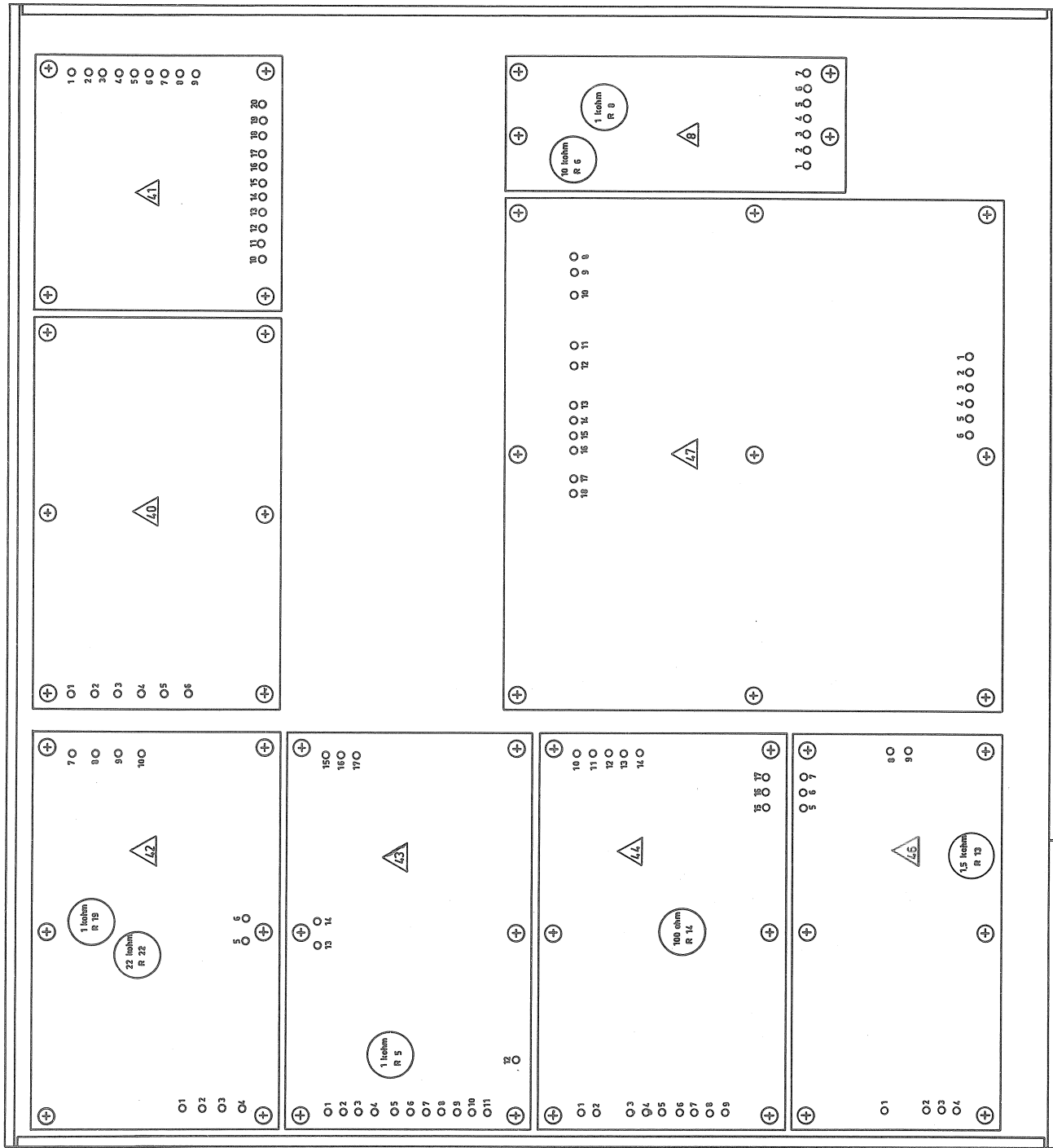
J

K

L

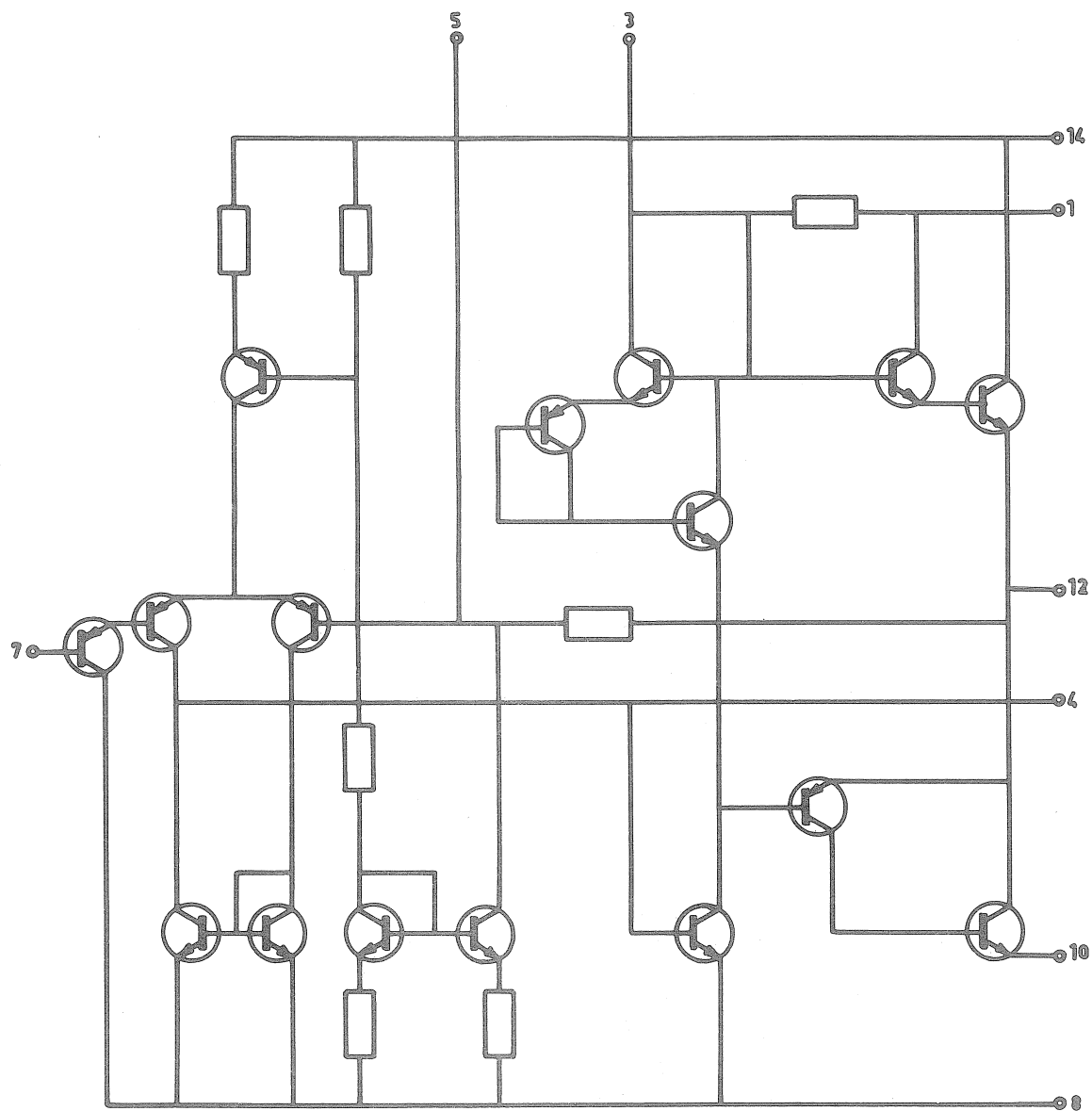
M





Materiale:	Overlaidobeh.: mm	Tolerantie voor inmat endat er anfert ±	Maftehold: 1:1
skanti	Right side compartment	uit loca lan	Tegn. ID kont.
			T-0296 - 1
			10 -

A	B	C	D	E	F	G	H	I	J	K	L	M
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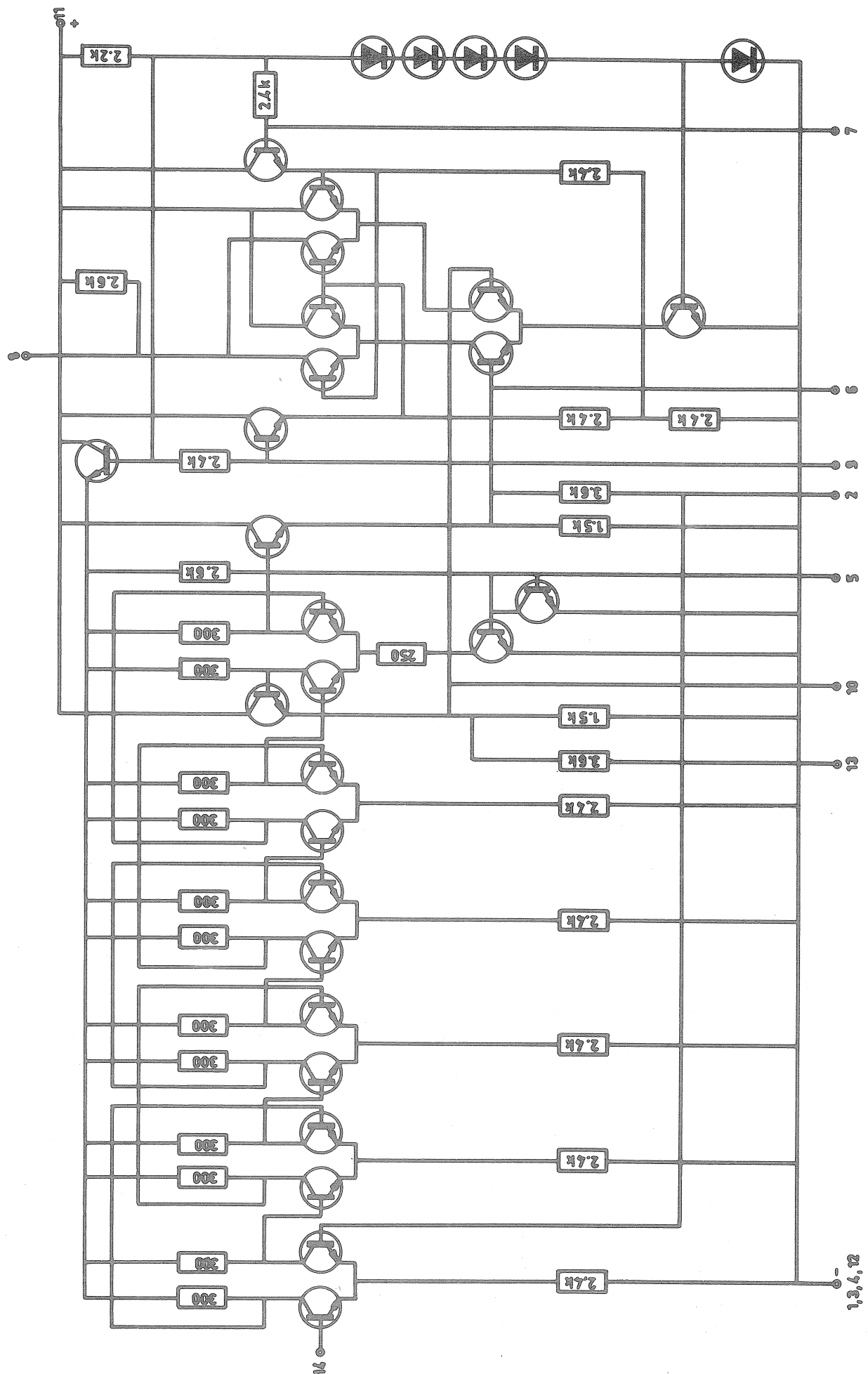
skanti

CIRCUIT DIAGRAM OF TAA611 B

Tegn. JD Konf.

T- 0601 - 1

20 - 1 - 72



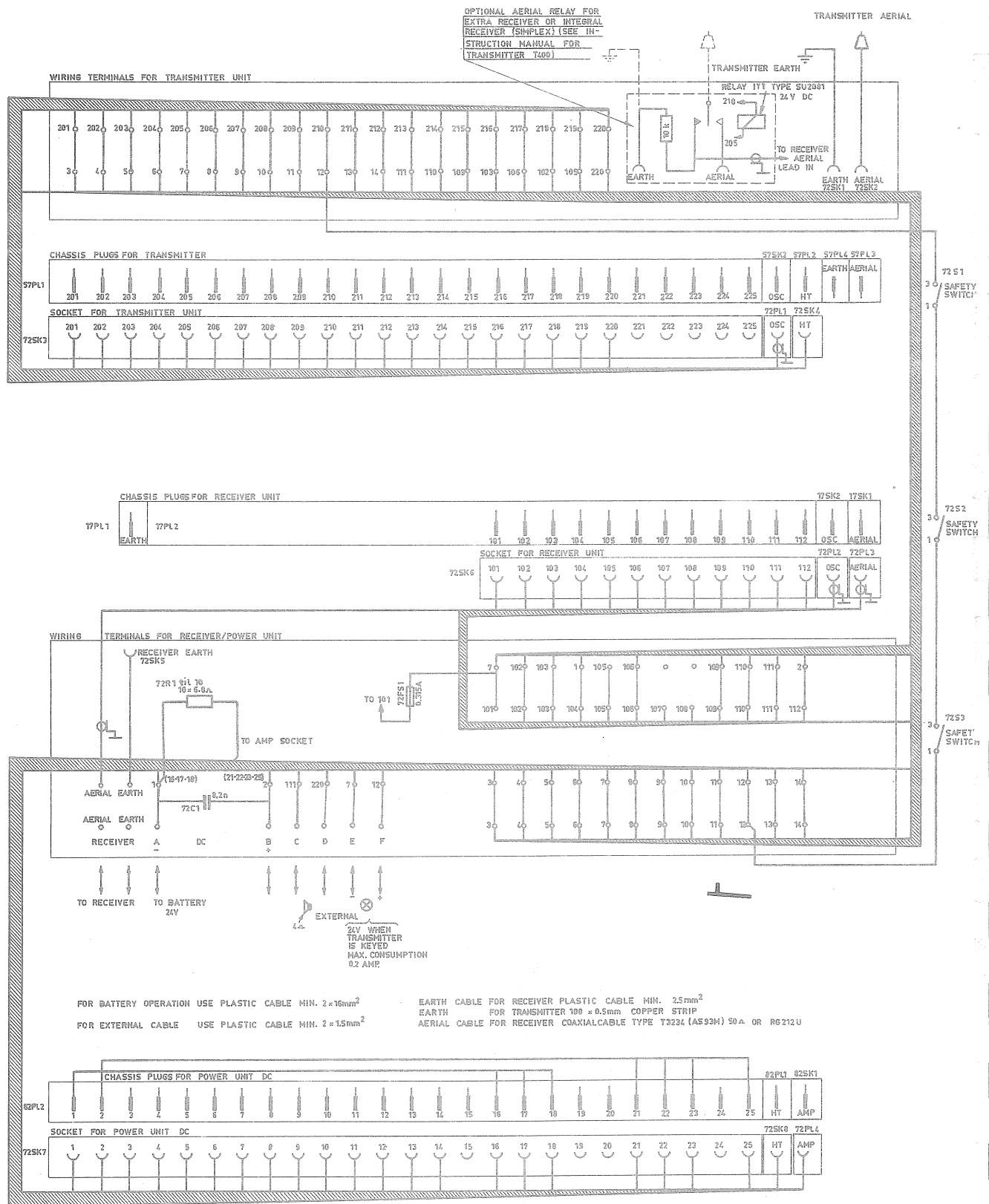
skanti

CIRCUIT DIAGRAM OF TBA120

Tegn. JD | Konf.

R - 0311 - 1

30 - 10 - 70



CAUTION: IN INSTALLATIONS FOR DUPLEX OPERATION IT IS NECESSARY TO USE SEPARATE EARTH CONNECTIONS FOR RECEIVER AND TRANSMITTER.

PARTS LIST

FOR

AC RACK



71PL 1	1 pole plug		BNC
71PL 2	1 pole plug		BNC
71PL 3	1 pole plug		BNC
71S 1	safety switch	D52	Burgess
71S 2	safety switch	D52	Burgess
71S 3	safety switch	D52	Burgess
71SK 1	socket	EARTH	SKANTI CODE: T-0335
71SK 2	socket	ANTENNA	SKANTI CODE: T-0335
71SK 3	socket	25 pole XS25	McMurdo
71SK 4	socket	1 pole L623/S	B&L
71SK 5	socket	EARTH	SKANTI CODE: T-0335
71SK 6	socket	12 pole XS12	McMurdo
71SK 7	socket	25 pole XS25	McMurdo
71SK 8	socket	1 pole L623/S	B&L

PARTS LIST

FOR

DC RACK



72C 1	8.2 nF	5%	125V	Polyes.
72PL 1- 3	1 pole plug			BNC
72PL 4	1 pole plug			AMP
72R 1-10	6.8 ohm	5%	27W	ww
72S 1- 3	safety switch		D52	Burgess
72SK 1	socket	EARTH		SKANTI CODE: T-0335
72SK 2	socket	ANTENNA		SKANTI CODE: T-0335
72SK 3	socket	25 pole XS25		McMurdo
72SK 4	socket	1 pole L623/S		B&L
72SK 5	socket	EARTH		SKANTI CODE: T-0335
72SK 6	socket	12 pole XS12		McMurdo
72SK 7	socket	25 pole XS25		McMurdo
72SK 8	socket	1 pole L623/S		B&L

1