

SOMMERKAMP[®]

CITIZENS BAND TRANSCEIVER INSTRUCTION MANUAL

Horst Kronenberg

An- u. Verkauf v. Gebrauchtmöbeln

Fernseher - Radio

6 FRANKFURT AM MAIN

Heidestraße 40 und Höhenstraße 30

Telefon 43 56 53



24 CHANNEL HIGH-POWER BASE USE
MODEL: TS-5030P

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SPECIFICATIONS

GENERAL:

Dimensions	132H × 365W × 290Dmm
Weight	5.5 kg
Power Consumption	
Receive	14 Watt
Transmit (100% mod.)	70 Watt
Finish	Handrubbed Walnut Cabinet with Aluminium Frontpanel
Channels	24 Channels with all Crystals supplied
Controls	Volume, Squelch, Channel, Delta Tuning, Mic. Gain, Power and Clock Controls
Microphone	Dynamic,
Transistors	26
Diodes	18
Special Features	Digital Clock with Alarm and Sleep Controls, Delta Tuning, Mic Gain Control with Modulation Lamp, S-and Power-Meter Digital Channel indication and Fully Automatic Noise Limiter.

RECEIVER:

Frequency Range	26, 965-27, 275 MHz
Sensitivity	0.35 μ V for 500mW output
at 30% mod. 1KHz	0.35 μ V for 10dB S/N
Selectivity	6 KHz at -6dB
Adj. Channel Rejection	50dB average
AF Output at 10% K	3 Watt
AF Output max.	5 Watt
Spurious Response	Better than 50dB down
Intermodulation Rejection	Better than 50dB down
Crossmodulation	Better than 50dB down
Squelch Sensitivity	0.1 μ V
Noise Limiter	Series Gate

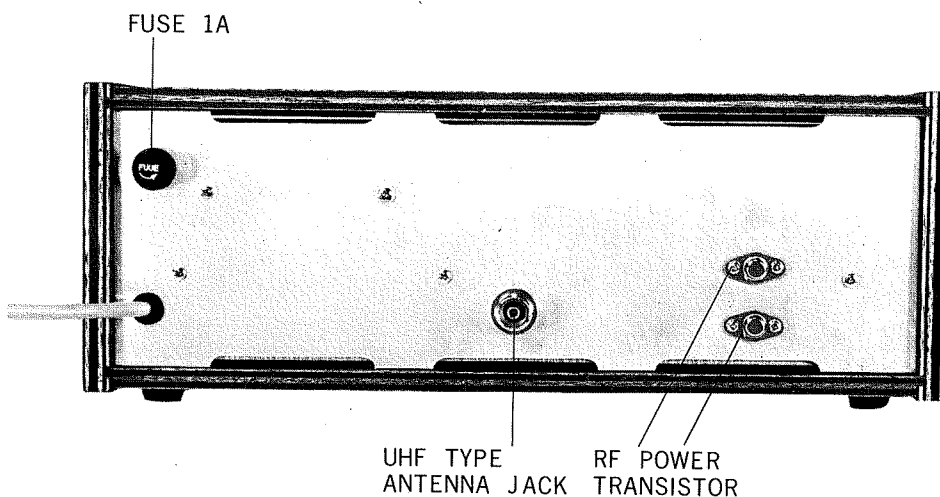
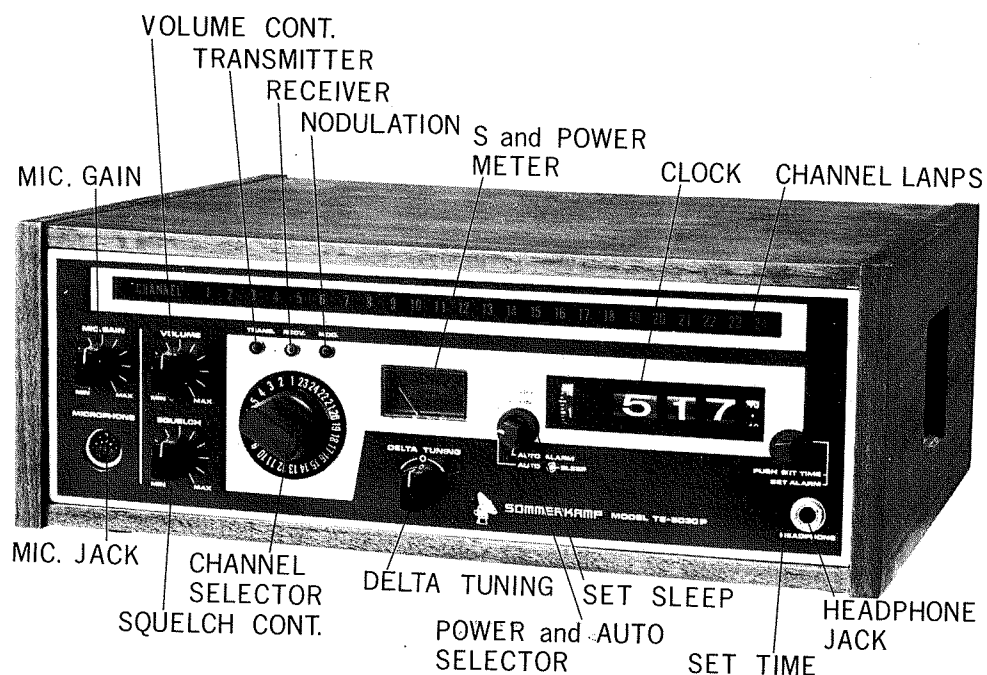
TRANSMITTER:

Frequency Range	26, 965-27, 275
Power Input	36 Watt at no Modulation
Power Output	10 Watt at no Modulation
Power Output	40 Watt PEP at 100% Modulation
Modulation (10mV at Mic.)	100% at 1000Hz
Frequency Tolerance	$\pm 0.005\%$
Antenna Impedance	50 Ohms nominal
Modulation Distortion	Less than 10% at 90% Modulation

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Packing List

Beside this manual, the shipping carton shall contain the following items:

- (1) 1 Transceiver TS-5030P
- (2) 1 Dynamic Microphone with Plug
- (3) 1 Headphone Plug

GENERAL DESCRIPTION

Your SOMMERKAMP TS-5030P transceiver has been designed for continuous heavy duty basestation application. The TS-5030P is for 220V, 50Hz operation.

RECEIVER SECTION

The TS-5030P receiver is designed to receive amplitude modulated (AM/A3) signals in the 26,965 to 27,275 MHz (11 meter) citizen band. The unique combination of a mechanical ceramic filter and LC filters provides 50db attenuation to the adjacent channels.

This extremely sensitive receiver amplifies the signal from the antenna jack more than 100 million times, due to the application of very high gain, low noise transistors in all stages, and not only as usual in the front end RF amplifier, but also in all IF and mixer stages and in the audio stages.

To obtain this sensitivity, the powersupply is regulated with a series voltage regulator and in addition the supply of the RF and IF stages of the receiver is once more regulated by an extremely sharp cutoff Zener diode.

The TS-5030P contains in addition a floating series gate, fully automatic noise limiter, which virtually turns off the audio output during the presence of ignition noise in the signal.

TRANSMITTER SECTION

Your TS-5030P transmitter has been designed for continuous heavy duty transmission of amplitude modulated (AM/A3) signals the 26,965 to 27,275 MHz (11 meter) citizen band.

The TS-5030P transmitter consists of 2 crystal controlled oscillators incorporating 11 crystals. The outputs, which are synthesised in a class B mixer, followed by 2 class C buffer stages and a highly efficient collector modulated driver stage, which is coupled via a series LC and a double pi match filter with matching transformer to the bases of the two final output transistors. These transistors are high power, high temperature transistors with a stabilised base powersupply. The output matching is done by a series LC and a double pi match filter.

DELTA TUNING

The Delta Tuning of your TS-5030P will compensate a receiving frequency by about ± 3 KHz, making it possible to enjoy communication with more clarity.

POWERSUPPLY

The powersupply consists of the heavy duty power transformer, two 4 diode full wave bridge rectifiers and two heavy duty voltage stabilisers. One for 13.5 Volt for the receiver and low power transmitter sections and the other for the 28 Volt supply of the final transmitter linear power amplifier.

CLOCK

The digital clock in your TS-5030P transceiver is synchronised with the 50 Hz frequency of the power line to achieve the highest possible accuracy.

CONSTRUCTION

The TS-5030P has a rustprotected steel chassis, a black satin finish silkscreen printed front panel and a pure aluminium rear panel which is also used as heat sink for the transmitting power transistors and the voltage regulator transistors. The cabinet is made of oiled, handrubbed walnut.

CONNECTIONS

Connections are made by a 3 wire AC cord, standard UHF female connector, 5 pin DIN standard microphone jack and a standard headphone jack.

INSTALLATION AND CHECKOUT

1. Unpack the transceiver carefully and check for exterior damages and the accessories.
2. Connect the 3 wire AC cord to an AC plug in the following manner:
 1. blue to AC terminal
 2. brown to AC terminal
 3. yellow/green to the earth terminal
3. Connect the antenna plug to the antenna jack with an SWR-Meter inserted into the antenna cable.
4. Place the transceiver in operating position and connect the AC plug to a 220 Volt 50 Hz AC outlet. The clock shall start to move.
5. Check very carefully that nothing touches the back panel and that there is a min. 10 cm space between the backpanel and any object nearby. because the transmitting transistors will heat up to 100 degree Centigrade and carry a voltage of 28 Volt DC and high power RF.
6. Switch the transceiver on by turning the left clock control to "ON". The receiving, meter and one channel lamp shall light up.
7. Turn the Squelch control to min.
8. Turn the Volume control to max. until you hear a rushing sound from the speaker.
9. Switch the channelselector to CH 13.
10. Connect the microphone to the microphone jack.
11. Push the transmit button on the microphone and check with the SWR-Meter immediately the SWR of your antenna. The SWR must be less than 1 to 2. Do this within 3 seconds, because if the SWR is higher than 1 to 2 it is very likely that the transmitting transistors will be damaged if you operate the transmitter too long with a antenna having a too high SWR. Also read carefully the recommendations on antennas.
12. If the SWR is less than 1 to 2 continue installation, if it is more than 1 to 2 repair or replace your antenna.
13. Check that the meter needle is near the red mark during transmitting.
14. Check if the intensity of the modulation lamp changes by turning the mic. gain control. Deeper modulation gets more intensity.
15. Talk into the microphone. The meter needle shall move a little.
16. Release the transmit button and switch the channel selector to channel 1, 2 ectr, until you receive a station.
17. Wait until this station stops to transmit and turn the Squelch control slowly

to max. until the background noise just disappears. When the station starts to transmit again, you will hear this station, but you will not hear the background noise during non transmitting periods.

OPERATION

1. Switch the transceiver "ON," select the desired channel, adjust the volume and squelch controls and receive.
2. To transmit, simply push the transmit button on the microphone and talk in a normal voice, while holding the microphone 5-10 cm in front of your mouth.
3. In transmitting, set the mic. gain control to the most desirable modulation level.

CLOCK CONTROLS

1. The front knob of double knob on the left side of the clock has the following positions:
ON Transceiver switched ON.
OFF Transceiver switched OFF.
AUTO Transceiver will be switched ON at the time indicated on the left window of the clock.
AUTO ALARM Same function as AUTO. This position will also switch on a buzzer.
2. The back knob SLEEP will switch the transceiver off after 30 minutes if the front knob is in the OFF position and the back knob turned fully clockwise.
3. The knob on the right side of the clock sets the time of the alarm as indicated in the left window and if pushed and turned sets the time of the clock.
Important: When right window ("second") is between 50 second and 60 second, You can not set the clock.

ANTENNAS

To get the best performance from your TS-5030P transceiver we recomend that you use a Groundplane antenna for basestation to mobile/portable and a Rotarybeam or ubicalquad antenna for longdistance basestation to basestation communication.

A Groundplane antenna has a round radiation pattern which is as ideal for working stations in several directions during the same time, where a Rotarybeam or a Cubicalquad antenna has a concentrated radiation beam in one direction only and should be installed on a antenna rotor.

Due to the concentrated radiation in one direction a typical 3 element Rotarybeam antenna has a power gain of apprx. 8db or 8 times in reference to a halfwave dipole antenna and a forward/backward rejection of 25db. if the SWR is less than 1 to 1.5.

This means that all power fed into the antenna is radiated only in that direction by 8db or by 8 times. Where as on the other hand during reception, the beam antenna will also increase the power of the incoming signal by 8 times and at the same time will reject the power of signals from the backside by 25 times. These values are about 10db and 28 db for a Cubicalquad antenna.

Your antenna should be installed as high as possible to have the biggest possible communication range and the cable should be as short as possible to prevent line losses.

SWR stands for STANDING WAVE RATIO or the relative amount of radiated and reflected power of the antenna and cable. If your transmitter has an output power of 100 watt and you have a SWR of 1 to 2 the reflected power from your antenna is 12% and the radiated power is 88% or 88 watt. In case you use a 3 element beam antenna the radiated power in the direction of the beam is 700 watt or 8db higher than 88 watt. If your SWR is 1 to 1.2 the reflected power is only 1 watt and the radiated power is 99 watt in case of a dipole antenna and 790 watt with an 8db beam antenna.

DX-ing is possible due to the extremely sensitive receiver and the high power heavy duty transmitter in your TS-5030P transceiver during certain periods of the sunspot cycle. It is then possible to communicate with stations many thousands of kilometers away.

EQUIPMENT CHECKOUT AND ALIGNMENT

2-1-0 CHECKOUT AND ALIGNMENT OF POWER SUPPLY

2-1-1 Testequipment required:

AC/DC Voltmeter or Multitester (50Kohm/V)

2-1-2 Procedure:

1. Connect transceiver to 220V/50Hz and observe movement of clock. If the clock does not move, check the fuse and replace with an 1A fuse if necessary.
2. Switch the transceiver ON and observe the RX, Channel and meter lamps. If these lamps light up, check the voltage at T. P. 1 (13.5V) and T. P. 2 (28V) and if necessary adjust RV202 for 13.5V at TP. 1 and RV 201 for 28V at TP. 2
3. If the above values are not obtainable refer to the schematic diagram and check TR-201—206 and D-201—210 for the indicated voltages and replace any defective components.

2-2-0 CHECKOUT OF AF-AMPLIFIER

2-2-1 Testequipment required:

DC-Voltmeter

AF-Millivoltmeter

AF-Signalgenerator

2-2-2 Procedure:

1. Connect the AF-Millivoltmeter across the speaker and the AF-Signal-generator via a 0.1 μ F capacitor to TP. 3.
2. Turn the volume control to max. and the squelch control to min.
3. Tune the AF-Generator to 1 KHz and set the output to 5 mV.
4. You should obtain 4.9V across the speaker.
5. If the above voltage is not obtainable, check the voltages on TR 15—18 and TP. 4, 5, 6 as indicated on the schematic diagram.

2-3-0 CHECKOUT OF CRYSTAL OSCILLATORS

2-3-1 Testequipment required:

RF-Voltmeter

DC-Voltmeter

50 MHz Counter

2-3-2 Procedure:

1. Connect the counter via $0.01 \mu\text{F}$ to TP. 7 and check the frequencies of the 2nd RX oscillator in reference to the following chart:

Channel	1,	5,	9,	13,	21,	10,180 MHz ± 200 Hz
	2,	6,	10,	14,	22,	10,170 MHz ± 200 Hz
	3,	7,	11,	15,	24,	10,160 MHz ± 200 Hz
	4,	8,	12,	16,	23,	10,140 MHz ± 200 Hz

Emf

2. Connect the counter via $0.01 \mu\text{F}$ to TP. 8 and check the frequencies of the 2nd TX oscillator in reference to the following chart, while transmitting:

Channel	1,	5,	9,	13,	17,	21,	10,635 MHz ± 200 Hz
	2,	6,	10,	14,	18,	22,	10,625 MHz ± 200 Hz
	3,	7,	11,	15,	19,	24,	10,615 MHz ± 200 Hz
	4,	8,	12,	16,	20,	23,	10,595 MHz ± 200 Hz

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3. Connect the counter via $0.01 \mu\text{F}$ to TP. 9 and check the frequencies of the master Xtal oscillator in reference to the following chart:

Channel	1—4	37,600 MHz ± 800 Hz
	5—8	37,650 MHz ± 800 Hz
	9—12	37,700 MHz ± 800 Hz
	13—16	37,750 MHz ± 800 Hz
	17—20	37,800 MHz ± 800 Hz
	21,22,23,	37,850 MHz ± 800 Hz
	24	37,880 MHz ± 800 Hz

4. Check the output voltages of the above oscillators with the RF-Voltmeter at TP. 7 (5V), TP. 8 (5V) and TP. 9 (3V).
If necessary adjust L9 to the correct voltage and frequencies at TP. 9.
5. In case the above datas are not obtainable, check the voltages on TR 8, 9, 10, TP. 2, D-6 as indicated on the schematic diagram. Replace if necessary any defective crystals and components.

2-4-0 RECEIVER CHECKOUT AND ALIGNMENT

2-4-1 Testequipment required:

Very, stable signal generator 455 KHz to 27,275 MHz
Multitester 50 Kohm/V
AF-Voltmeter

2-4-2 Checkout procedure

1. Connect the signal generator to the antenna jack and the AF-Voltmeter across the speaker.
2. Set the channel selector to 13 and tune the signalgenerator to 27,115 MHz and set the modulation to 1 KHz/30 %.
3. Set the output attenuator of the signal generator to $0.35 \mu\text{V}$ and the Volume control for a reading of 1 Volt on the AF-Voltmeter.
4. Switch the signal generator to CW without touching the attenuator and take the reading from the AF-Voltmeter (0.3 Volt or less). This indicates the Signal to Noise ratio of the receiver(S/N+N)is $0.35 \mu\text{V}$ for 10db(S/N+N).
5. To check the overall sensitivity of the receiver, turn the volume control to max. and switch the signal generator to 1 KHz/30% modulation and set the attenuator to $0.35 \mu\text{V}$. The AF-Voltmeter shall read 2V (500mw/8 Ohm) or more.

2-4-3 Connect the 50Kohm/V multimeter to TP. 10 and follow the below alignment chart:

1. Alignment chart.

NOTE: Set channel selector to CH 13, volume control to MAX. Squelch control to MIN.

Output reference is 500mw (2V/8ohm) at the speaker.

Modulation of signal generator 1 KHz/30%.

Alignment point	Connect signal generator via 0.01 μ F to	Tune signal generator to	Set attenuator for	Voltage at TP. 10	Alignment
455 KHz	IF AP. 1	455 KHz	12mV	0.25 V	L 8,
455 KHz	IF AP. 2	455 KHz	280 μ V	0.25 V	L 8,
455 KHz	IF AP. 3	455 KHz	50 μ V	0.25 V	L 8, 7, 6,
10.635 MHz	IF AP. 4	10,635 MHz	3.5 μ V	0.25 V	L 4, 5,
27.115 MHz	RF AP. 5	27,115 MHz	0.5 μ V	0.25 V	L 2, 3,
27,115 MHz	RF AP. 6	27,115 MHz	0.3 μ V	0.25 V	L 1, 2, 3,

2. Set the channel selector to 24 and the signal generator to 27.275 MHz and check the overall sensitivity as under 2-4-2. Repeat the same with channel 1 (26.965 MHz).
3. If the readings are not the same, touch up L1, 2, 3, 4, 5, until you obtain approximately the same readings on CH 1 and CH 24.
4. Check all channels as under 2-4-2.
5. If the above datas are not obtainable, check the voltages on TR 1, 2, 3, 4, 5, and replace if necessary any defective components.
6. To align the S-Meter, set the channel selector to CH 13, the signal generator to 27.115 and the attenuator for 50 μ V output. Adjust VR-2 for S-9 on the S-Meter.
7. Set the Squelch control to MAX. and adjust RV5 to a point that the squelch just opens.
8. Disconnect all testequipment.

2-5-0 TRANSMITTER CHECKOUT AND ALIGMENT

2-5-1 Testequipment required:

52 Ohm dummyload and wattmeter suitable for 27 MHz/15 Watt

RF-Millivolt meter

50 MHz frequency counter

30 MHz Oscilloscope

Multitester 50Kohm/V with 1.5A range

AF-Generator

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2-5-2 Checkout procedure

Connect the dummyload/wattmeter, oscilloscope and counter to the antenna jack. Connect the AF-Generator to TP. 13 with output 0.

1. Push the transmit button and check the indication on the wattmeter (10W ± 1 W). Check on the oscilloscope for indications of selfoscillations.
2. Check with the counter the frequencies from CH 1 to CH 24. The frequencies shall be within $\pm 1,000$ Hz.
3. Tune the AF-Generator to 1 KHz and slowly increase the output until the carrier is 100% modulated while checking on the oscilloscope for indications of selfoscillations.
4. Repeat this on all 24 channels.

2-5-3 Transmitter alignment

1. Connect the dummyload/wattmeter, oscilloscope and counter to the antenna jack. Connect the AF-Generator, tuned to 1 KHz/output 0 to TP. 13, the multitester switched to 1.5A into the 28V line to the power amplifier and the RF-Voltmeter to TP. 14.
2. Set the channel selector to CH 13 and tune L 10—16, L101 and CV101 for max. output as indicated on the wattmeter. This must be done very fast to prevent damage to the power transistors. The current indicated on the multitester must never exceed 1,300 mA.
3. Now adjust CV101 for 10 Watt output.
4. Adjust L 10—13 so that the reading on the RF-Voltmeter is the same on CH 1 and CH 24 (0.7V).
5. Disconnect the RF-Voltmeter and slowly increase the output of the AF-Generator to 95% modulation as indicated on the oscilloscope and check for selfoscillations. If the transmitter selfoscillates with any modulation percentage, slightly detune L14.
6. Modulate the transmitter to 95% and adjust L16, CV101, L103, L104, for the best modulation wave form as indicated on the oscilloscope. The reading on the multitester shall be approximately 1.3A (36 Watt DC input).
7. Remove all testequipment, except the wattmeter and connect the counter to the antenna jack. Check the frequencies on all channels and if necessary touch up L9.
8. Remove the counter from the antenna jack and adjust the output power indication with RV-101 so, that the meter needle is in the center of the red mark of the meter.

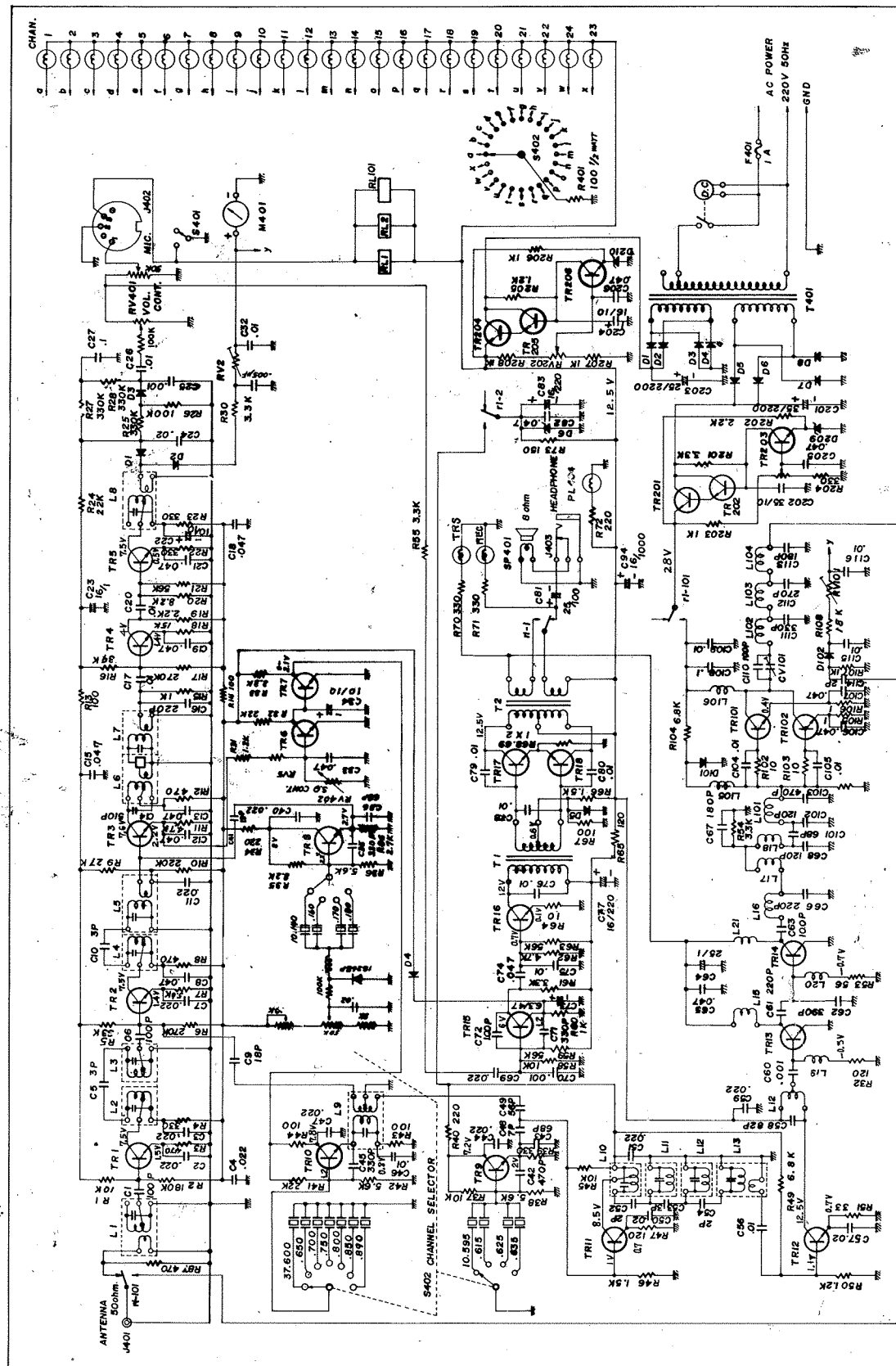
PARTS LIST

DESIGNATION	PARTS NAME	PARTS NO	
MP 10	Front panel	M482013	
MP 2	Chassis	M481004	
MP 3	Clock mtg. stud	M10001a	
MP 40	Rear panel	M483030	
MP 6	Speaker bracket	M40004	
MP 7	Cable clamp	M40005	
MP 8	Lamp holder	M30007	
MP 9	Cabinet	M20011	
MP 10	Speaker net	M40012	
MP 11	Channel lamp window	M30014	
MP 12	Clock window	M40015	
MP 13	Channel knob	M40016	
MP 14	Channel indicator	M40021	
MP 15	Vol./Squ. knob	M40017	
MP 16	Left clock knob (front)	M40018	
MP 17	Left clock knob (back)	M40020	
MP 18	Right clock knob	M40019	
MP 19	Rubber feet	B 692	
MP 20	Lamp lens red	M40024R	
MP 21	Lamp lens green	M40024G	
TR1	Transistor	2SC922	
TR2, 3, 4, 5	Transistor	2SC839	
TR15, 16	Transistor	2SC945	
TR17, 18	Transistor	2SC1096	
TR14	Transistor	2SC799	
TR8, 9, 10, 11	Transistor	2SC710	
TR6, 7, 20, 203, 206	Transistor	2SC711	
TR202, 205	Transistor	2SC1209	
TR12	Transistor	2SC773	
TR13	Transistor	2SC1018	
TR201, 204	Transistor	2SD235	
D1, 2, 4, 102	Ge Diode	IN60	
D3	Si. Diode	IS358S	
D201-208	Si. Diode	IS-1885	
D6, 210	Zener Diode	RD-9A	
D209	Zener Diode	RD-24A	
D5, 101	Varistor	IS1211	
L1	Antenna Coil	L1001 White	
L2	RF-Coil	L1002 Blue	
L3	RF-Coil	L1003 Violet	
L4, 5	10.615 MHz IFT	L4091 Green	
L6, 7	Mech. Filter	MFH-51T Yellow	
L8	455 KHz IFT	L8090 Yellow	
L9	OSC. Coil	L1004 Black	
L10	Synth. Coil	L1005 Orange	
L11, 12	Synth. Coil	L1006 Red	
L13	Synth. Coil	L1007 Brown	

PARTS LIST

DESIGNATION	PARTS NAME	PARTS NO	STOCK NO
L14	RF-Coil	L1008	
L15	RF-Coil	L1010	
L16	RF-Coil	L1011	
L17, 18	RF-Coil	L1012	
L101	RF-Coil	L1013	
L102	RF-Coil	L1014	
L103	RF-Coil	L1015	
L104	RF-Coil	L1016	
L19, 20, 21, 105	RF-Choke	L1009	
L106	RF-Choke	L1017	
T1	Input Trans.	TI -093	
T2	Output Trans.	TO-1001	
T401	Power Trahs.	KK-1	
DC401	Digital Clock	DTH-1/220/50	
F401	Fuse	F-1A	
F401H	Fuseholder	4000	
J401	Antenna Jack	MRM/INCH	
J402	Mic. Jack	CS-2501-4	
J403	Headphone Jack	S-G 7617	
M401	S-Meter	D-33B35R	
PL401, 402, 403	Pilot Lamp	PL 1003	
PL404	Pilot Lamp	PL 1001-160	
PL301-324	Pilot Lamp	PL 1002	
RV2, 5, 101	Trimpot	EVL-S3AA0020KB53	
RV201, 202	Trimpot	EVL-S3AA005KB24	
RV403	Mic Gain Control	PR-1850K	
RV401, 402	Vol./Sq. Control	PR-18-10KA	
RL1, 2	Relays	SP-22D	
RL101	Relays	RABK-12	
S402	Channel Switch	S43P (24) 3-4-24	
SP401	Speaker	101-04	
X1	XTAL 37,600	HG-25U/5024	
X2	XTAL 37,650	HC-25U/5024	
X3	XTAL 37,700	HC-25U/5024	
X4	XTAL 37,750	HC-25U/5024	
X5	XTAL 37,800	HC-25U/5024	
X6	XTAL 37,850	HC-25U/5024	
X7	XTAL 37,890	HC-25U/5024	
X8	XTAL 10,140	HC-25U/5024	
X9	XTAL 10,160	HC-25U/5024	
X10	XTAL 10,170	HC-25U/5024	
X11	XTAL 10,180	HC-25U/5024	
X12	XTAL 10,595	HC-25U/5024	
X13	XTAL 10,615	HC-25U/5024	
X14	XTAL 10,625	HC-25U/5024	
X15	XTAL 10,635	HC-25U/5024	
MIC1	Microphone compl.		

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CIRCUIT DIAGRM

NOTES:

- Resistor values given in OHMS. K=1000 ohms.
- Unless otherwise noted, All resistors are 1/4 watt.
- Capacitor values given in MICRO-FARADS.
- Electrolytic capacitor values are given in W.V.D.C along with rated MICRO-FARADS.

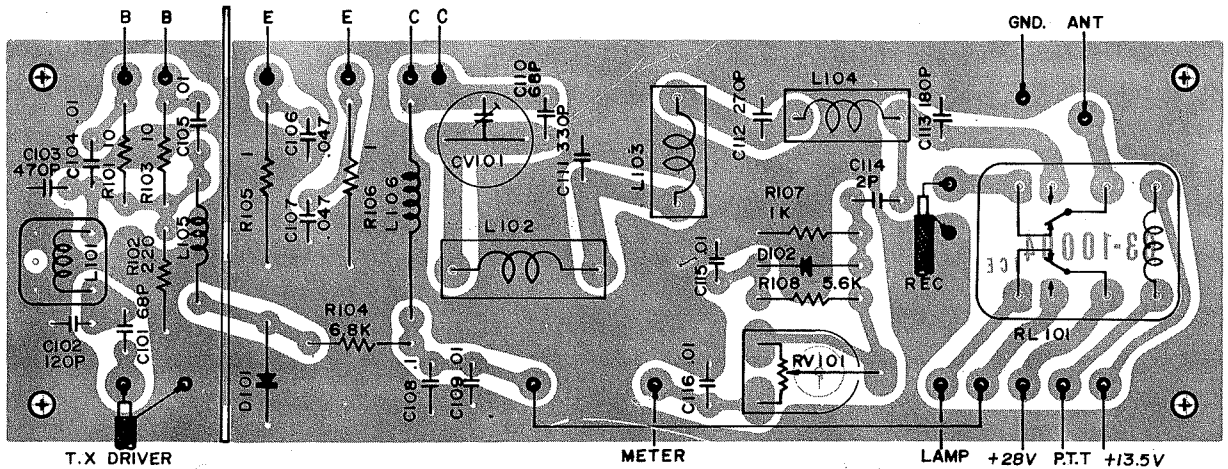
P.C.B. DIAGRAM (MOUNTING SIDE)

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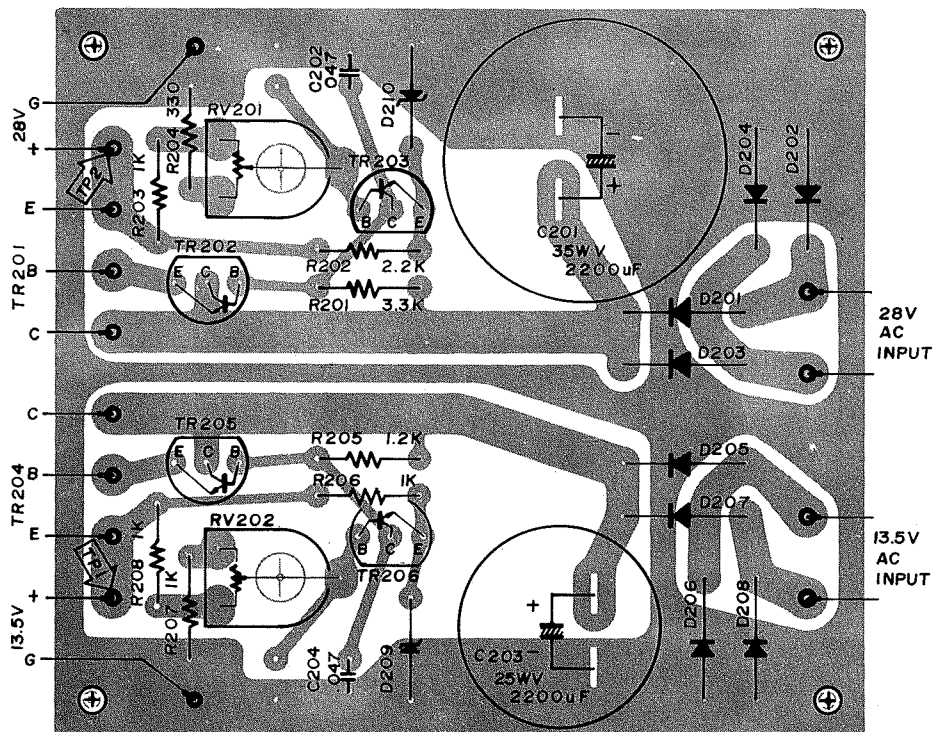
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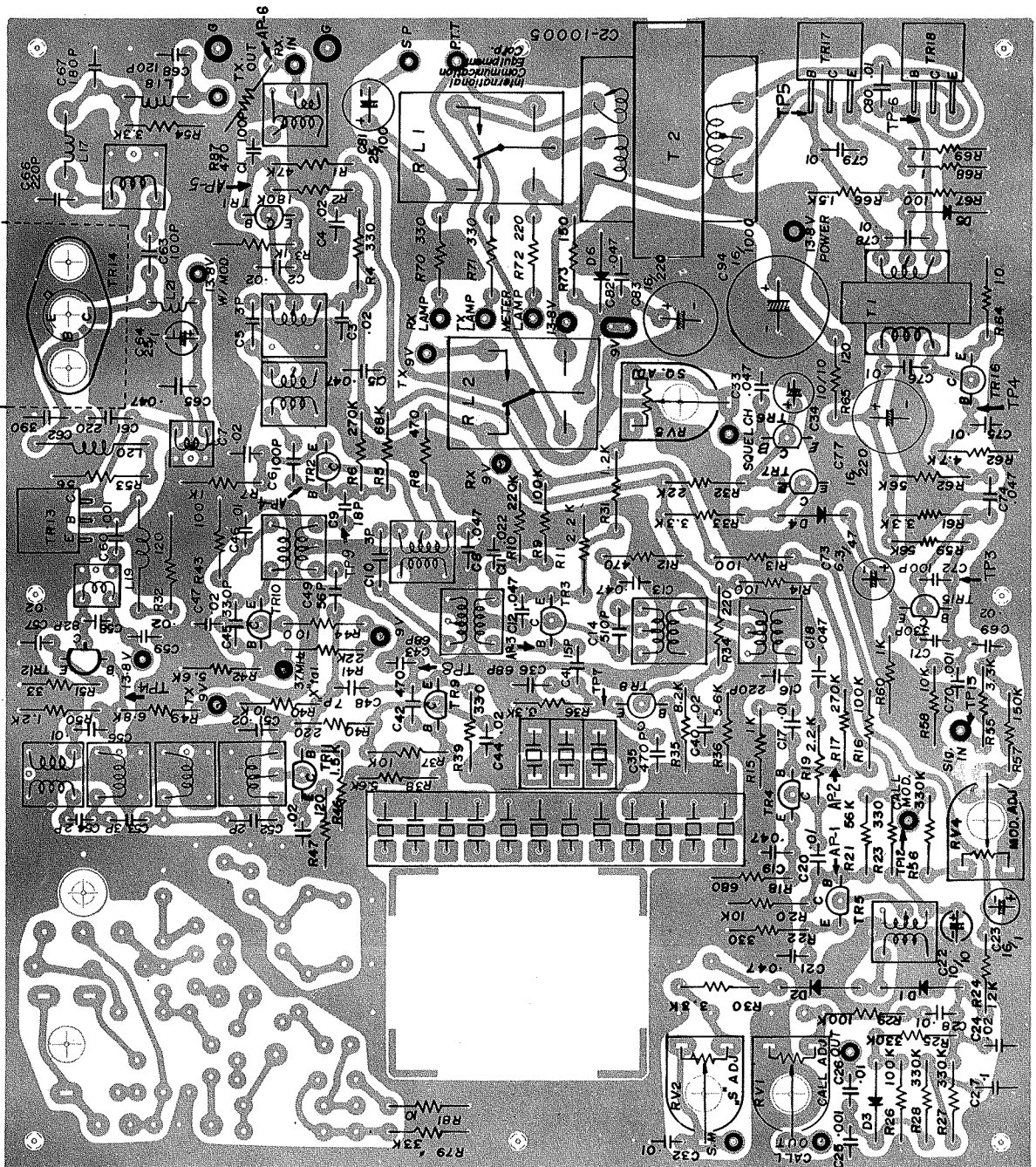
LINEAR AMP. UNIT



REGULATOR UNIT



TRANSCEIVER UNIT



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