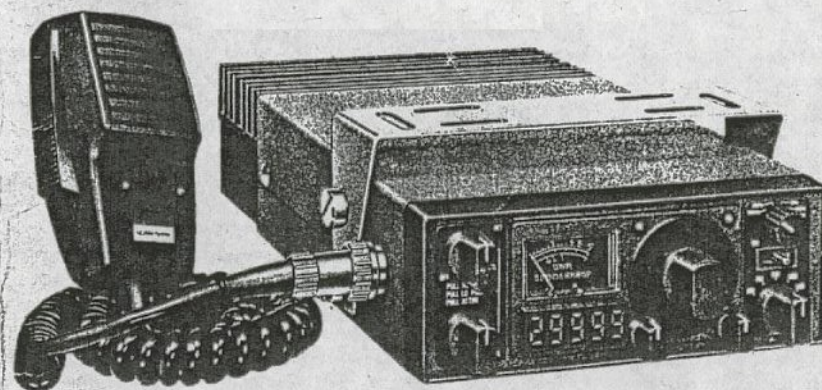


SOMMERKAMP

AM / FM / LSB / USB / CW TRANSCEIVER

WITH DIGITAL FREQUENCY READOUT

MODEL TS-788DX



SOMMERKAMP ELECTRONIC SAS

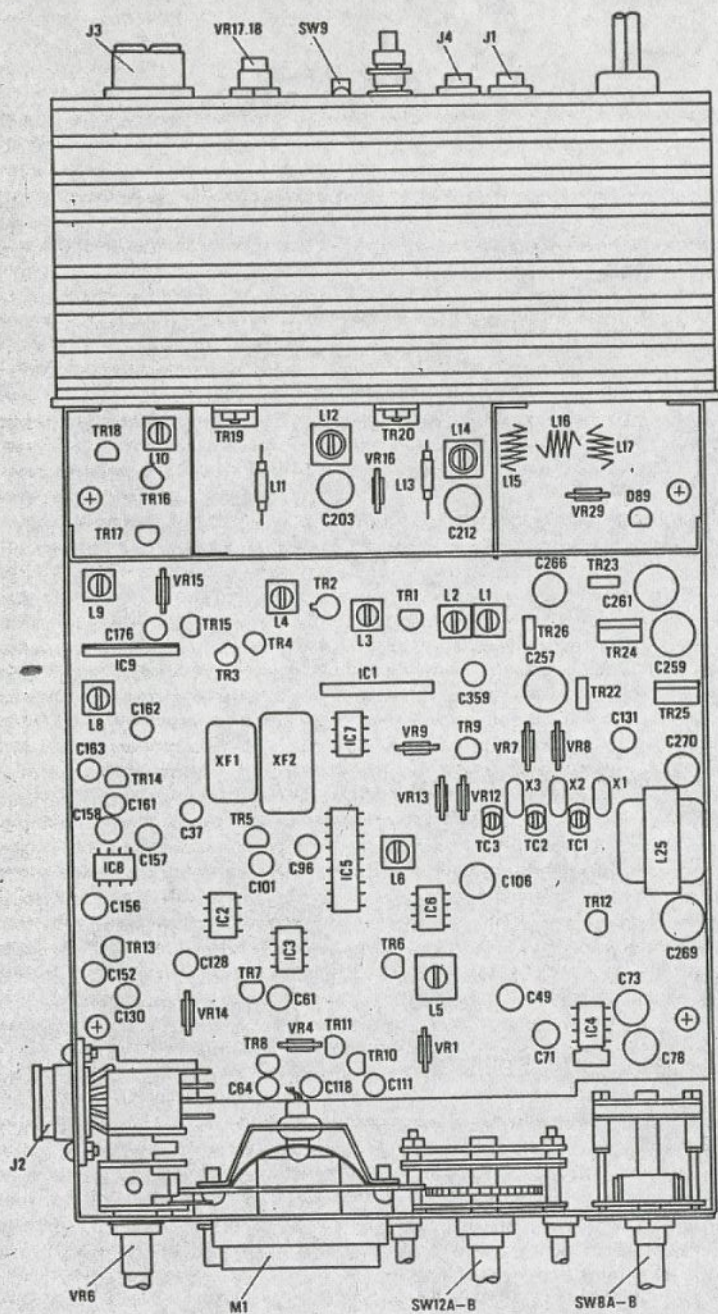
CH-6903 LUGANO, P.O. BOX 176

SWITZERLAND

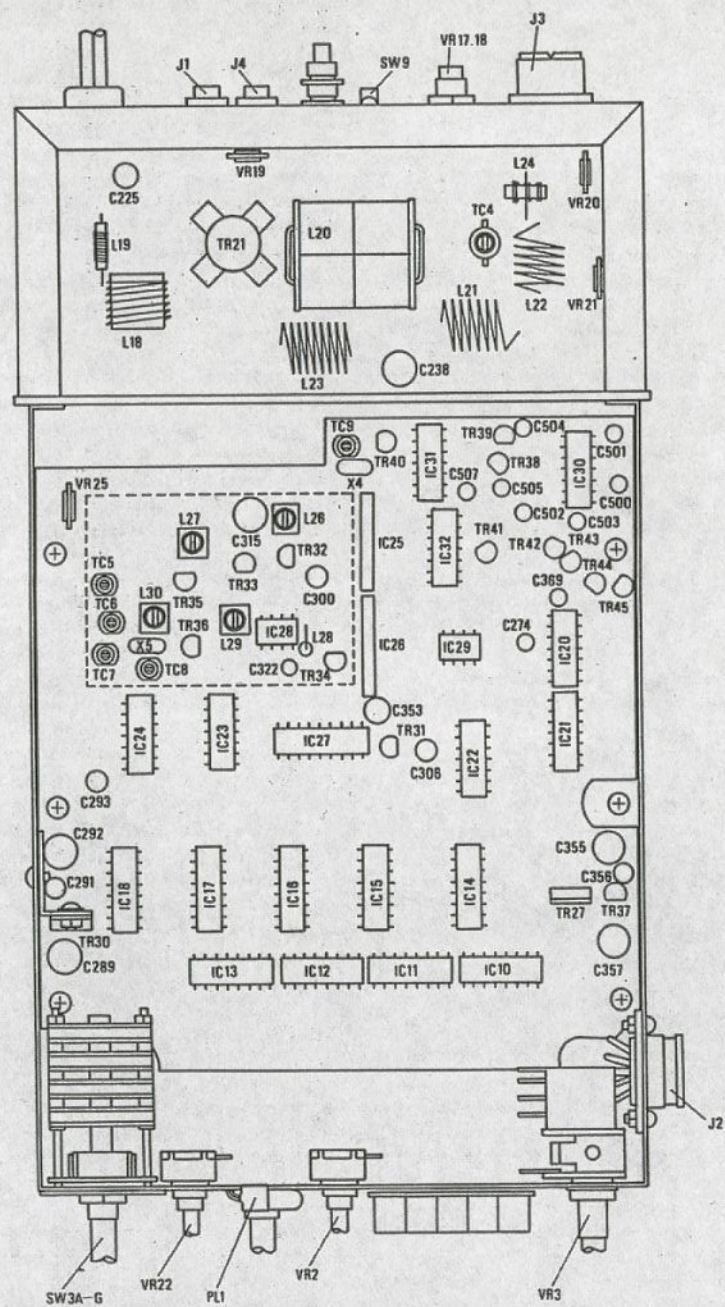
TEL.91 688543 TELEX:79314

INSTRUCTION MANUAL

COMPLETE PARTS LAYOUT



COMPLETE PARTS LAYOUT



MOBILE INSTALLATION

Mounting bracket and screws are supplied with the transceiver. For electrical connection, first make sure the transceiver is turned off. Then connect the red wire to the ACC terminal of the ignition switch or plus (+) terminal of the battery, and ground the black wire to the car body or chassis. The black wire should be grounded as short as possible to minimize noise interference.

BASE STATION OPERATION

For base station use, a suitable regulated 15 Amp power supply is recommended. When a power supply is used, simply connect the red wire to the plus (+) terminal of the power supply and the black wire to the minus (-) terminal.

ANTENNA REQUIREMENT

This transceiver can be operated with any standard 50 ohm ground-plane, vertical, mobile whip, long wire or other adequate antennas. A standard SO-239 type connector is provided on the back panel for use with popular PL-259 antenna plug. A ground-plane type will provide greater coverage, and since it is essentially non-directional, it is ideal in base station to mobile operation.

From base station to base station, or point to point operation, a directional beam will give greater distance even under the adverse conditions.

A vertical whip antenna is best suited for mobile use. A non-directional antenna must be used for best result in any case. The base loaded whip antenna will normally provide effective communication. For greater range and more reliable operation, a full quarter wave whip may be used. Either of these antennas use the metal car body as a ground-plane, and the shield of the base as well as the metal case of the transceiver should be grounded.

GENERAL OPERATING INSTRUCTION

Never operate this transceiver without an adequate antenna system or load. Antenna SWR should not exceed 2:1. Failure to follow these recommendations could result in damage to the output transistors.

1. Make sure the proper connections are made for antenna system, power cable and microphone.
2. Set the squelch control fully counter-clockwise.
3. Set the mode selector to the desired mode.
4. Snap the power source toggle switch, and the meter and the frequency readouts shall be lighted.
5. Rotate the volume control clockwise to the desired listening levels.
6. With no signal present, rotate the squelch control clockwise until the rushing noise just disappears.
7. Set to the desired frequency by operating frequency selector on the front panel or UP/DOWN button on the microphone.
8. To transmit, simply press and hold the PTT bar on the microphone and speak in a normal tone of voice.
9. Set the clarifier either on the front panel or on the microphone for best reception.

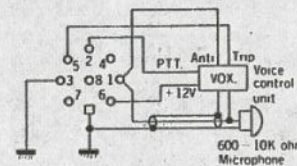
MIC JACK

The 8-pin DIN standard Mic jack has the following internal connections:

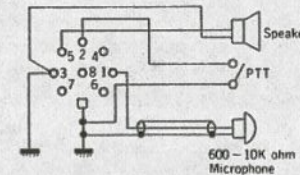
- | | |
|------------------------------------|-------------------------------|
| 1. Microphone input (Z600-10K ohm) | 6. +12V for VOX unit etc. |
| 2. Transmit/Receive switching | 7. AF out for selective call. |
| 3. Ground (SP) | 8. RIT |
| 4. Audio output. (Z8-10K ohm) | Case = ground |
| 5. Internal speaker. | |

Always operate the transceiver with the microphone plug inserted in the microphone jack, or with the following external connections:

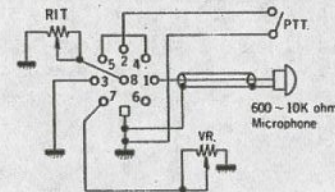
1. Microphone with VOX.



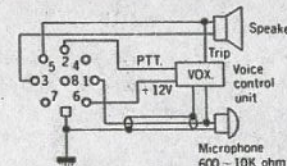
2. Headset or Telephoneset with PTT.



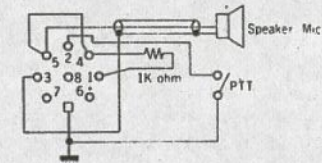
3. External microphone



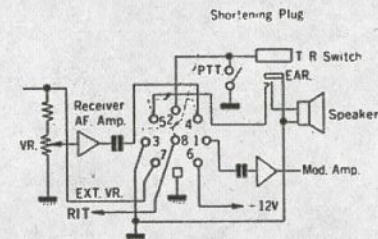
4. Headset or Telephoneset with VOX.



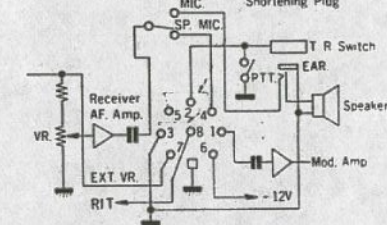
5. External microphone Speaker with PTT.



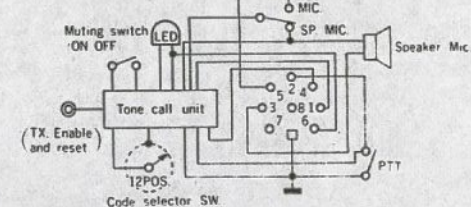
6. Internal connection



7. Internal connection with SP selection switch



8. Parrot 76



1. Set the switch to C (Calibrate).
2. Press the PTT bar of the microphone and adjust the calibration potentiometer found on the rear panel so the meter needle is at the maximum position. And then release the PTT bar of the microphone.
3. Set the switch to SWR to the bottom position.
4. Press the PTT bar of the microphone again and read the SWR measurement on the bottom scale on the meter.
5. Then switch it to the S/RF position of the slide switch for normal operation.

The SWR scale is calibrated at 1, 1.5, 2 and 3. If the meter pointer stops at 2—for instance, it can be said that the SWR is 2:1. It is recommended that the SWR does not exceed 1.5:1 or at maximum 2:1.

CW OPERATION

For operating a Morse Key device, connect a plug into the CW key jack provided on the rear panel of this transceiver, and set the mode switch to CW position. For tuning to an incoming CW signal, adjust the clarifier (RIT) control so that you can catch the tone frequency in the vicinity of 700Hz. Always press the PTT bar of the microphone or set the figure & CW switch to the CW position during CW transmission.

S/RF METER

In the receive position, it read the level of the incoming signals, and in the transmit position, it indicates the relative power output.

1. In the AM mode, the meter will read power at all times when the transmit button of the microphone is depressed. On SSB, however, it will only indicate RF output power when you modulate the signal.
2. In the SSB mode, no meter can follow the rapid voice peak power attained. Therefore, while the transmitter is developing much more power than on AM, the additional power will not be fully reflected on the meter.

EXTERNAL SPEAKER JACK

You may add any 8-16 ohm external speaker. Connecting an external speaker will automatically disconnect the internal speaker.

ANTENNA CONNECTOR

A standard SO-239 type connector is applied for attaching either mobile or base antenna.

MICROPHONE

The microphone supplied with the transceiver has the following functions:

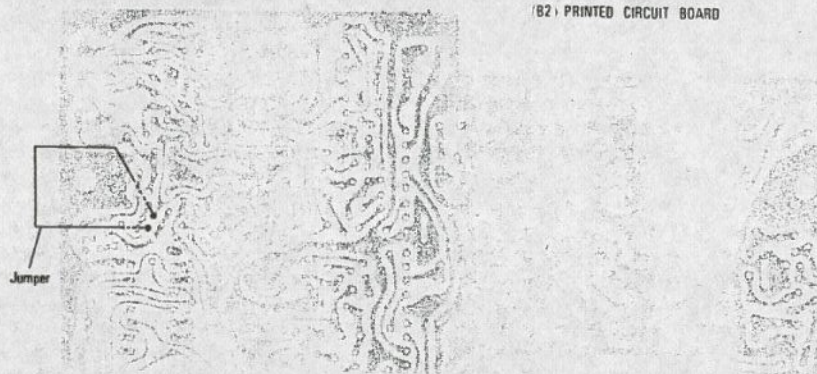
1. Ceramic type microphone
2. Extension speaker
3. UP/DOWN frequency control
4. Volume control
5. Clarifier (RIT) control
6. Main speaker & microphone speaker switch

To transmit simply press the PTT bar of the microphone and release it for reception. The microphone has an auxiliary volume control which is an extension of the regular front panel receiver volume control. It offers great operating convenience by giving you instant volume adjustment right at your fingertips even while you are driving. As this is an extension control, the regular front panel volume control should be advanced in order. The same applies to the extension clarifier (RIT) control on the microphone, that means the regular front panel clarifier (RIT) should be fully advanced before using the clarifier on the microphone. By the speaker switch found on the back of the microphone, you can select the speaker being used, whether the main speaker of the set or the speaker installed in the microphone.

Important Hint:

For using a dynamic type microphone, telephone handset or PARROT 76, simply cut out the jumper wire as follows. But no function of UP/DOWN frequency control on the microphone will then be possible.

(B2) PRINTED CIRCUIT BOARD



NEGATIVE GROUND

Almost all vehicles are negative grounded. Your TS-788DX is also designed to operate on the negative ground only. In the negative ground systems, the minus (-) pole of the transceiver should be connected to the car body or chassis. Many newer cars use plastic dash pieces. Make sure the screws or contacts you choose are attached to the metal framework of the car.

LOW-HIGH OUTPUT POWER SELECTION

Pull both Volume and Clarifier (RIT) knobsLow power (about 10WPEP)
 One of the knobs is pulled or pushedHigh power (about 100WPEP)
 Push both Volume and Clarifier knobsHigh power (about 100WPEP)

FEATURES AND CONTROLS

VOLUME/ATTENUATOR

The receiver volume is increased as the knob is turned clockwise. To pull it, the attenuator circuit is opened and excessive incoming signals shall be moderately balanced.

CLARIFIER (RIT)/NOISE BLANKER

The clarifier is an electronic tuning circuit which shall allow you to shift the frequency on reception. In SSB operation, even small differences in frequencies between stations can cause poor reception. In effect, the clarifier shall electronically fine tune the station being received. In AM operation, this acts as a fine tuning circuit.

The N.B. (Noise Blanker) circuit will be on, when this knob is pulled, to cut off the incoming noise to the minimum level.

FREQUENCY SELECTOR

This is an electronic frequency selector. By first rotation it counts frequency slowly by the number of the figure selector already set and by second full position it counts it fast. By right rotation, frequency increases and by left it decreases.

FREQUENCY FIGURE AND CW SWITCH

This switch will ease to select the desired frequency and will function as CW switch as well.

There are indications of 100KHz, 10KHz, 1KHz, 100Hz and CW.

At each figure indication, the frequency of this figure can be moved and selected. The number of the 1MHz figure can be achieved by repeat running of the 100KHz figure.

For instance, 26.789MHz can be achieved in the following manner:

1. You set the figure selection to the 100KHz.
2. You continue to rotate the frequency selector until the frequency readout indicates 26. XXX.
3. Then you carefully handle the frequency selector to get 7 on the 100KHz figure.
4. Now you set the figure selector to the 10KHz figure.
5. And you get the number of 8 in the same manner as above.
6. Then you set to the 1KHz and get the number of 9.

Although the digital readout displays only 5 figures, 100Hz the 6th figure can also be controlled by setting the figure selector to the 100Hz and rotating the frequency selector. By rotating it, it counts 100Hz and this figure can be used for fine tuning both for TX and RX.

On the CW position, CW transmission can be operated without pushing the press-to-talk bar on the microphone. However release this position on each CW

reception. That means you should switch back to any of the figure position on each CW reception. Otherwise CW reception will be impossible.

This position may be useful for a long continuous transmission on CW.

FREQUENCY MEMORY

A useful feature of this transceiver is the frequency memory. The frequency you used last is memorized even after your switch off the transceiver and will work and be indicated again when you turn it on next by snapping the toggle power on-off switch to the left position.

MODE SWITCH

You can select either AM, FM, LSB, USE and/or CW.

POWER ON-OFF SWITCH

You can turn on the transceiver by snapping the toggle switch either to the left or right position, and off by switching it back to the center position. By the right position, the transceiver will immediately be ready on the emergency channel of CH-9 (27.065MHz) both on reception and transmission. By the left position, the transceiver will work on from the memorized frequency you used last.

SQUELCH CONTROL

The squelch control is used to eliminate the background noise when there are no signals present to overcome the noise. To adjust the squelch control, select a frequency where there is no signal. Turn the volume control up to normal listening levels. Rotate the squelch control clockwise until the background noise just disappears.

AUTOMATIC SCAN/SPEED

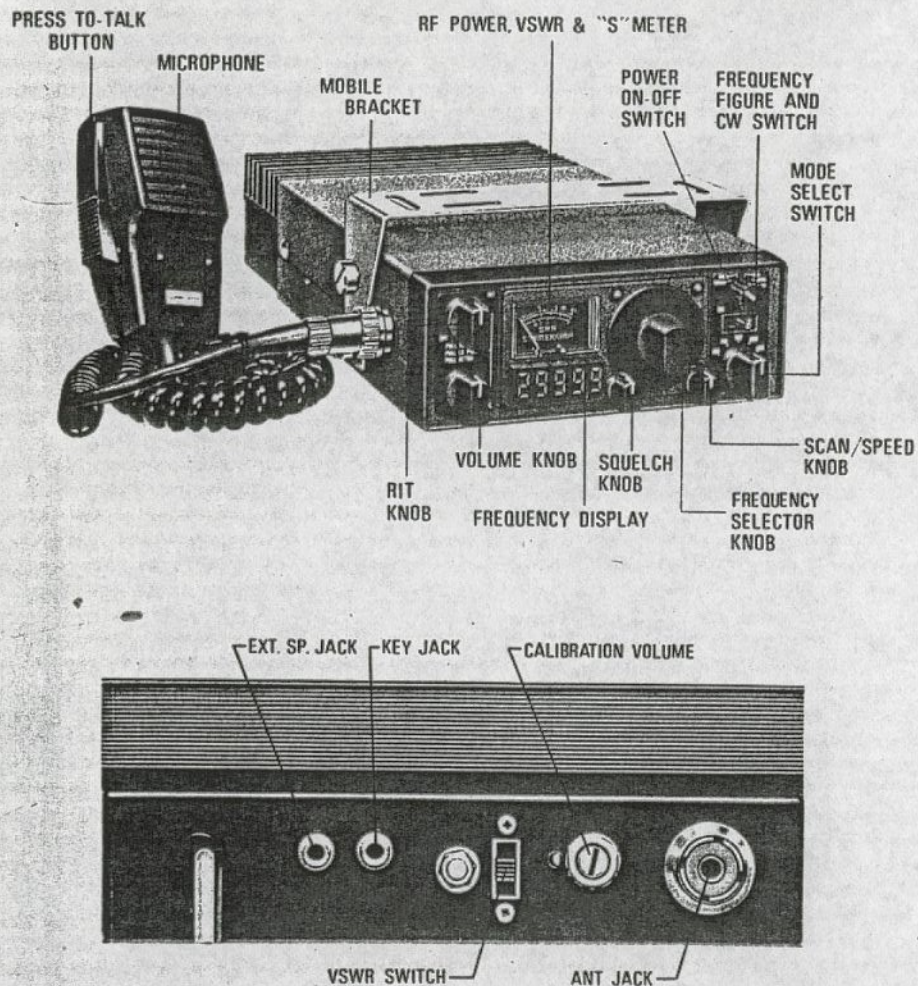
A particular feature of this set is that you can scan either upward or downward. First you rotate this knob until a click is heard, and you keep rotating the frequency selector, for instance, to the rightward for a few seconds until upward scanning will automatically start. The automatic scanning will continue until a signal is present or you rotate the frequency selector to the leftward. The scanning speed can be adjusted by further rotating SCAN/SPEED knob. The scanning speed control is only possible when this potentiometer is switched on with a click.

Automatic scanning can also be made pushing for a few seconds the UP or DOWN button of the microphone. In this case, however, it is not necessary to rotate the scan switch, and the scan speed cannot be controlled.

S/RF-CALIB-SWR METER FUNCTION SWITCH & CALIBRATION

In the top position of the 3-position slide switch found on the rear panel, the meter operates normally as S-meter and RF-output meter. In the center and the bottom position, the SWR (Standing Wave Ratio) can be measured. To measure the SWR of the antenna you use, select an open or little used frequency as close as possible to the center of the band, i. e. 28.000MHz.

CONTROL LOCATIONS:



PACKING LIST:

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

1. Transceiver TS-788DX
2. Mounting bracket
3. Screws for mounting
4. Microphone
5. Microphone hanger

GENERAL DESCRIPTION

Your SOMMERKAMP TS-788DX transceiver has been designed for continuous heavy duty mobile and base station application on AM, FM, LSB (Lower Single Side Band), USB (Upper Single Side Band) and CW (Morse Key).

The biggest feature of this transceiver is the continuous coverage on entire frequencies between 26.000MHz and 29.999MHz.

One more special feature of your TS-788DX is that you can operate this transceiver with the remote control microphone by which you can control frequency selection, volume, clarifier and scanner.

This transceiver is designed to operate with a 13.8V DC power supply as a base station or mobile station.

RECEIVER SECTION

The receiver section is designed to receive either AM/A3, FM/F3, SSB/A3J and CW/A1 signals in the 26.000 to 29.999 MHz band.

The unique combination of low noise Field Effect Transistors (FET), a combination of ceramic filters and crystal filter, efficient noise limiter (ANL) and a HiFi quality speaker amplifier will give you exceptional reception quality.

In addition, the above combination of the latest technology provides you with a sensitivity and unwanted signal rejection and noise suppression available previously only in space and military communication equipment.

Power supply of the receiver RF, IF and oscillator section is stabilized by an extreme sharp cut-off Zener diode to obtain the high sensitivity and unwanted signal rejection. The efficient series gate noise limiter, which virtually cuts off the audio output during ignition noise pulses, is defeatable to make even the weakest signal audible which otherwise would be cut off by the threshold level of the ANL switching diode.

The high squelch sensitivity is achieved by using a separate squelch detector and switching circuit with a carefully balanced hysteresis.

The transformerless HiFi quality audio amplifier will drive any load between 8 ohms and indefinite such as internal speaker or external speaker/microphone or headset combinations having the above impedances.

An automatic tuning circuit will automatically tune to the best reception on the entire band.

TRANSMITTER & MODULATOR SECTION

The transmitter section is designed for continuous heavy duty transmission of either AM/A3, FM/F3, SSB/A3J and CW/A1 signal in the 26.000 to 29.999 MHz band. The transmitter consists of a Phase-Locked Loop circuit and one crystal controlled oscillator, of which output is synthesized in a balance mixer followed by a double tuned filter, class AB1 buffers, auto-tune circuit and power output stage, coupled by series and pi-matching filters to the antenna jack.

Modulator is consisted of an input audio filter, audio pre-amplifier, ALC amplifier and audio buffer followed by balance modulator for AM and SSB, or VCO for FM. The input designed for 1K ohm ceramic microphone, 500 ohm dynamic microphone or 32 ohm speaker/microphone combination with a 1K ohm resistor in series.

PARTS LIST for TS-788DX

DESIGNATION	PARTS NAME	PARTS NO.
D3,4,5,42,43,44,46,80	Varicap Diode	1S2689
D9,40,53,54,62,63,64,65,90 125,126	Germanium Diode	1N60
D45,47,48,49,60,61,73,	Silicon Diode	1N4002
D78,79	Varicap Diode	1S2339
D76,77	♦ ♦	1SV50
D89	SCR	FOR1B
D39,51	Zener Diode	WZ-050
D21,29,50,75,86	♦ ♦	WZ-062
D57,59,74,87,110	♦ ♦	WZ-072
D56	♦ ♦	WZ-090
D101	LED	TLR-102KB
D120	♦	TLG-102KB
XF-1	X'tal Filter	10F-2D
XF-2	♦ ♦	10F-8D
CF-1~3	Ceramic Filter	SFE-10-7MS
M-1	Meter	OS-601
SP	Speaker	F66C02
J1	Ext. SP. Jack	SJ-296
J4	Key Jack	♦
J2	Mic. Jack	8P
J3	Ant. Jack	MRM/INCH
SW-3A~36	Rotary Switch	S32BP(24)1-2-5W
SW-8A~8B	♦ ♦	ESR-E125K25A
SW9	Slide Switch	SS(H)-23-05
SW-10A~10B	Toggle Switch	8S-2021
SW-12A~12B	Channel Selector Switch	S32BP(24)5W
TC1~3,5~9	Trimmer 12PF	CV05-C120
TC-4	♦ 30PF	CV05-E300
FB1~2	Ferrite Beads	T314,0P-315-3-IH
FB3~8	♦ ♦	T314,0P-3-5-6-IH
VR2	Variable Resistor (SQU) 10K ohm	V12M4-IS
VR3	♦ ♦ (VOL) 50K ohm	VM13E-VER22
VR6	♦ ♦ (RIT) 100K ohm	GM86E507A-UER22-100KB
VR17,18	♦ ♦ (SWR) 50K ohm x2	GM70A
VR22	♦ ♦ (SCAN) 1M ohm	V12M4-IS
VR16	Semi Variable Resistor 200 ohm	SVR200S3
VR15	♦ ♦ 500 ohm	SVR500S3
VR12	♦ ♦ 1K ohm	SVR001KS3
VR7,14	♦ ♦ 2K ohm	SVR002KS3

PARTS LIST for TS-788DX

DESIGNATION	PARTS NAME	PARTS NO.
VR8,13,24,29	Semi Variable Resistor 5K ohm	SVR005KS3
VR20,21,25	♦ ♦ 10K ohm	SVR010KS3
VR1,4,9,10,28	♦ ♦ 50K ohm	SVR050KS3
VR 5,23,26,27	♦ ♦ 100K ohm	SVR100KS3
VR19	♦ ♦ 200K ohm	SVR200KS2
VR11	♦ ♦ 100K ohm	SVR100K52
L1,2	RX-RF.Tuning Coil	361-051
L3	♦ ♦	361-052
L4,6	RX.Mixing/RX.FM.Det.Coil	011-904
L5	RX.AM Det.Coil	361-006
L7,19,28	TX.RF.Choke Coil/VCO Mixing, Filter choke Coil	005-903
L8	TX.Mixing Coil	361-053
L9	TX.Mixing output Coil	361-054
L10	TX.Buffer Coil	361-055
L11,13	TX.Drive RFC.	010-907
L12	TX.PRI.Drive Coil	005-907
L14	TX.Drive Coil	361-801
L15,16,17	TX.LPF,Coil	152-903
L21,22	Booster LPF,Coil	361-901
L23	Booster RF Choke Coil	089-916
L26	VCO Coil	361-001
L27	VCO AMP.Coil	361-056
L29	11.3MHz.DSC.AMP,Coil	011-351
L30	11.3MHz.OSC.Coil	361-057
L18,20	TX.Power Input/TX.Power Output Coil	OP13-12-5-8H
L24	VSWR.Pick up Coil	280-702
L25	Power Choke Coil	E1-24
PL1	Meter Lamp	554700
PL2	VSWR.Indicator Lamp	554700
MP-443	Front Frame	524405
MP-592	Front Plate (R)	544683
MP-593	Front Plate (L)	544684
MP-594	Back Plate	544682
MP-595	Chassis Frame	542101
MP-107	Mounting Bracket	484085
MP-596	Cabinet Cover (Upper)	543091
MP-597	♦ ♦ (Lower)	542100
MP-540	Back Pannel	534560
MP-221	Meter Lamp Reflection Plate	484063

PARTS RIST for TS-788DX

DESIGNATION	PARTS NAME	PARTS NO.
MP-541	Heat sink	534557
MP-457	Booster Chassis	523060
MP-353	Heatsink (A)	494251
MP-543	Mode SW. Mounting Plate	534561
MP-117	Knob for Channel Selector	484116
MP-17	Knob for vol./Rit./Mode Control	474011
MP-307	Knob for Squ./Scan. Control	494199
MP-598	Shield Case	543092
MP-599	Shield Case Cover	544664
MP-600	Shield Plate	543094
MP-601	Mounting Bracket for Speaker	544657
MP-110	Mounting Bracket for Metev	484064
MP-120	Screw for Mounting Bracket	484098
MP-548	Microphone Hanger	484056
MP-549	Lamp Holder	484088
MP-550	Spacer	534517
MP-118	Nut for Channel Selector	484073
MP-551	Spacer for Booster	534564
MP-552	Brass Bobbin	534566
MP-602	Acrylic Resin Plate	544681
MP-462	Booster Chassis Cover	524421
MP-603	Meter Fixing Plate	544660
	Step Selector Knob	TK-1124
MP-452, 453	Shield Plate (C.D)	524430
MP-604	(F)	544654
MP-605	Meter Fixing Plate Spacer	544661
MP-606	Step Selector SW Spacer	544663
MP-607	Metev Spacer	544668
MP-608	SP. Net	544686
MP-609	SP. Cover	484050

SPECIFICATIONS

GENERAL:

- Semiconductors : 31 IC's, 41 Transistors, 2 FET's & 113 Diodes.
- Frequency Range : 26.000 - 29.999 MHz
- Modes of Operation : AM, FM, LSB, USB & CW
- Speaker : Dynamic type, 8 ohm.
- Microphone : Ceramic type
- Power Supply : 11V - 16V DC, negative ground.
- Antenna Impedance : 50 ohm.
- Size : 61 x 156 x 290 mm

RECEIVER:

- Receiver System : Single Conversion PLL Superheterodyne.
- Sensitivity at S/N 10dB : AM 0.75 μ V
FM 0.75 μ V
SSB 0.25 μ V
- Selectivity : AM 6KHz at Bandwidth-6dB.
FM 6KHz 60db down at 8 KHz
SSB 2.4KHz at Bandwidth-6db
60db down at 4.8 KHz
- AGC Figure of Range : 80 dB.
- Squelch Range : 1 μ V - 100 μ V.
- Audio Output Power : 2.5 Watts
- Spurious Response : -60dB.
- I.F. : 10.7 MHz.

AM TRANSMITTER:

- RF Output Power : 100 watts PEP (25 watts carrier)
- Modulation Capability : More than 80 %
- Harmonic Suppression : More than 50dB.

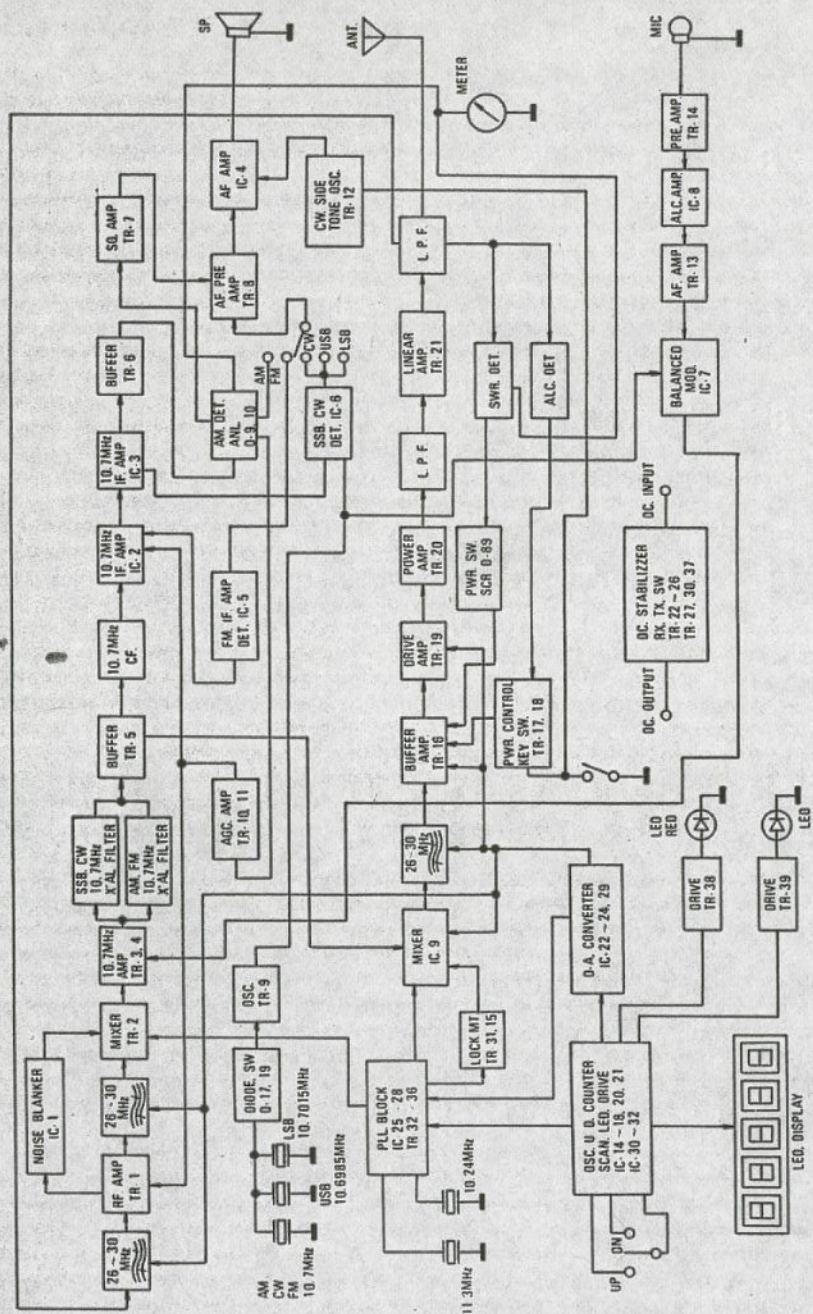
FM TRANSMITTER:

- RF Output Power : 100 Watts
- Deviation : \pm 1.5 KHz.
- Harmonic Suppression : More than 60 dB.

SSB TRANSMITTER:

- RF Output Power : 100 Watts PEP.
- Carrier Suppression : More than 50dB.
- Unwanted Sideband Suppression : More than 60dB.
- Harmonic Suppression : More than 60dB.

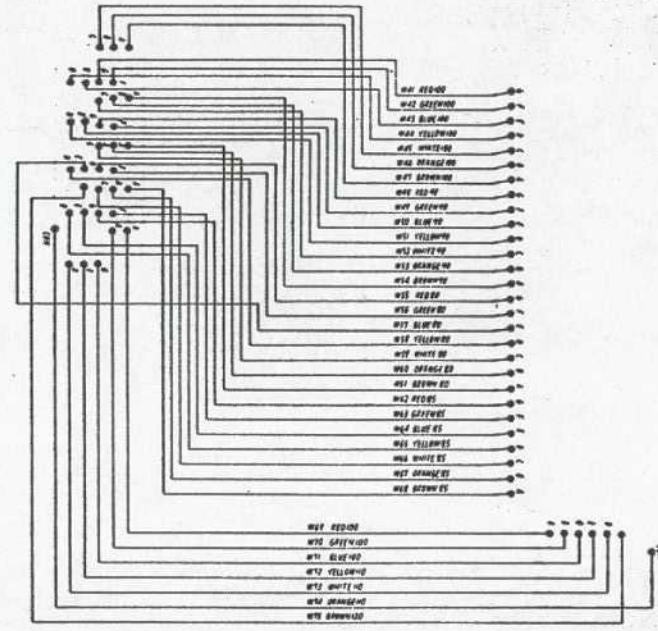
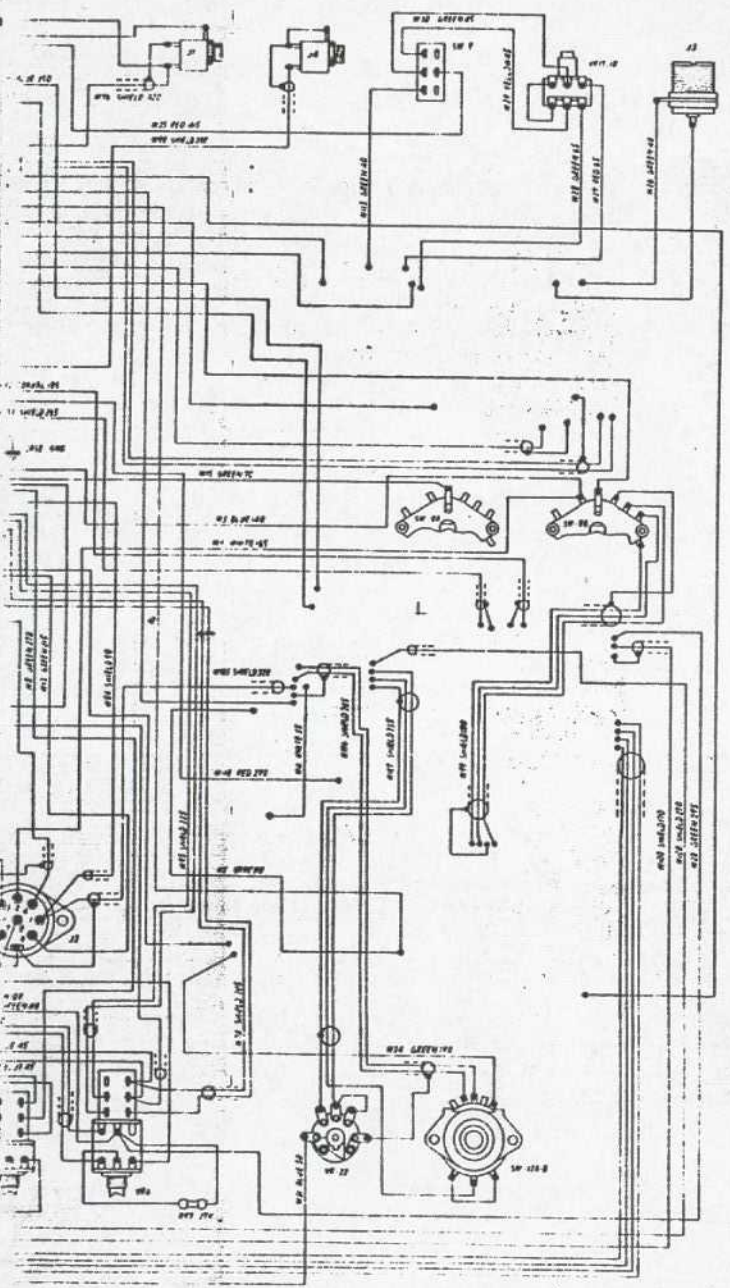
BLOCK DIAGRAM



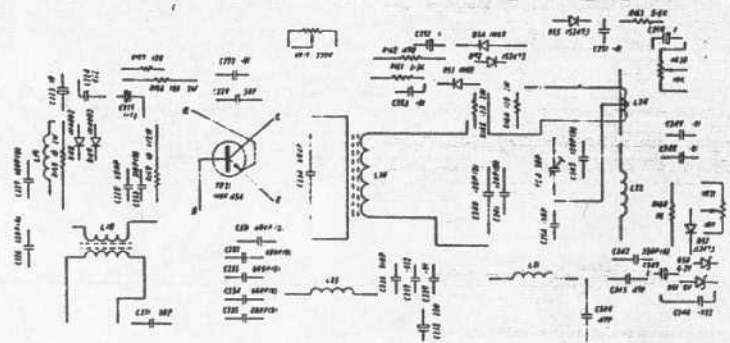
PARTS RIST for TS-788DX

DESIGNATION	PARTS NAME	PARTS NO.
IC.1	Integrated circuit	HD-1211
IC.2	♦ ♦	SL-1612
IC.3	♦ ♦	SL-1611
IC.4	♦ ♦	μPC-575C2
IC.5	♦ ♦	SL-6640
IC.5,7,28	♦ ♦	SL-1640
IC.8	♦ ♦	SL-1626C
IC.9	♦ ♦	TA-7310
IC.10,11,12,13	♦ ♦	TC-5022
IC.14,15,16,17,18	♦ ♦	MC-14510B
IC.20	♦ ♦	MC-14001B
IC.21	♦ ♦	MC-14081B
IC.22,23,24	♦ ♦	MC-14069B
IC.25	♦ ♦	TC-5082P
IC.26	♦ ♦	TC-5081P
IC.27	♦ ♦	TC-9122P
IC.29	♦ ♦	NJM-4559D
IC.30,31,32	♦ ♦	MC-14011B
TR1	Transistor	2SC1856
TR3,4,5,6,9,32,33,34,35,36	♦	2SC1923(O)
TR7,8,13,14	♦	2SC1815(Y)
TR11,31	♦	2SA1015(Y)
TR12,15,40,43,45	♦	2SC1815(GR)
TR16	♦	2SC2086
TR17,18	♦	2SA562(O)
TR19	♦	2SC1306
TR20	♦	2SC2098
TR21	♦	MRF-454
TR22,23,26	♦	2SC496(Y)
TR24,27,30	♦	2SD880(Y)
TR25	♦	2SB435
TR37	♦	2SC2060(Q)
TR38,39	♦	2SC1646(B)
TR41,42,44	♦	2SA1015(GR)
TR2	FET	3SK40
TR10	♦	2SK30(A)
LED1~5	LED	FND-357
D1,2,6-8,10-20,22,24-28,30-38,41,52,55,58,81-85,88,92,100,102-109,111-119,121-124,127-129	Silicon Diode	1S2473

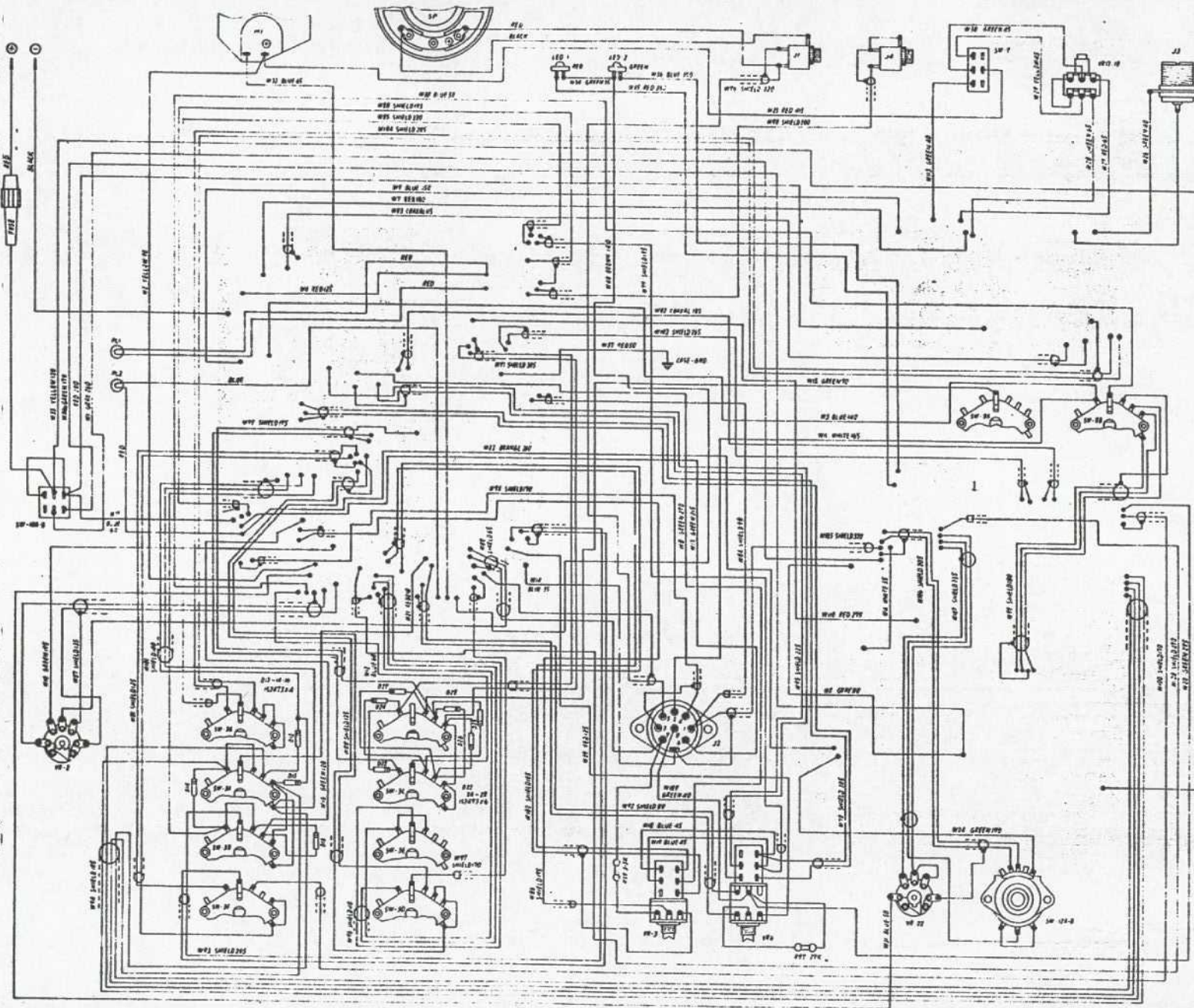
WIRING LAYOUT.



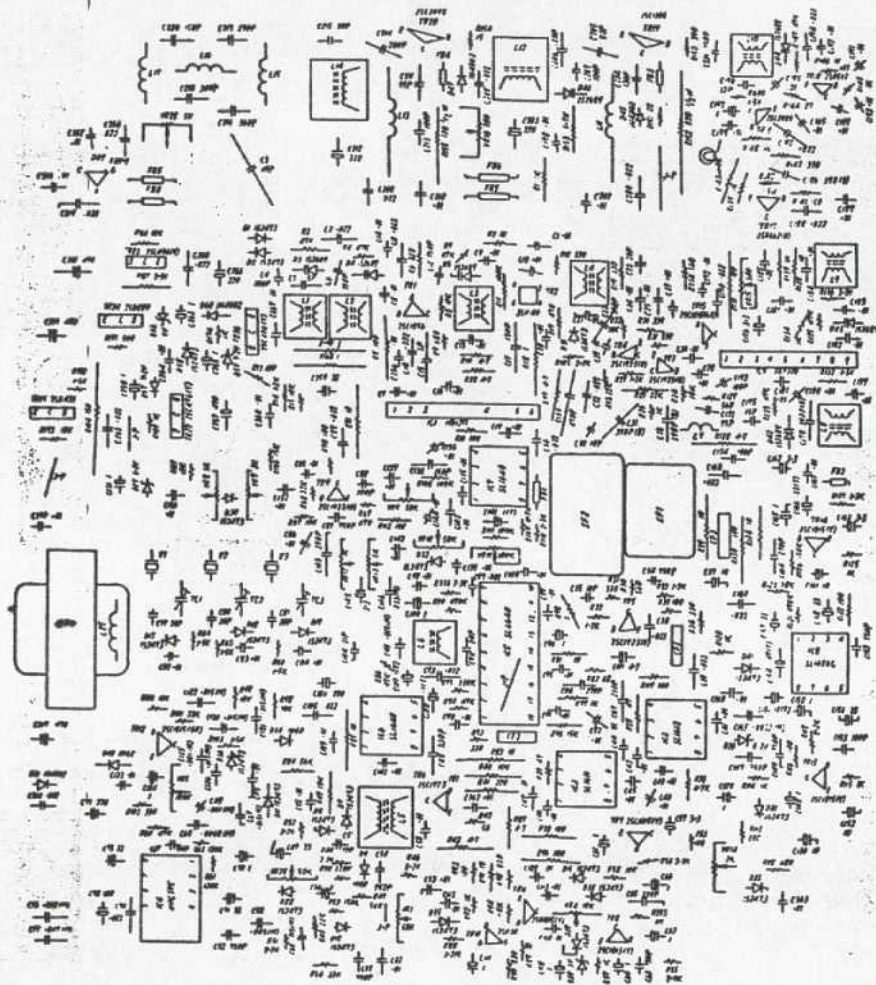
PRINTED CIRCUIT BOARD PARTS LAYOUT



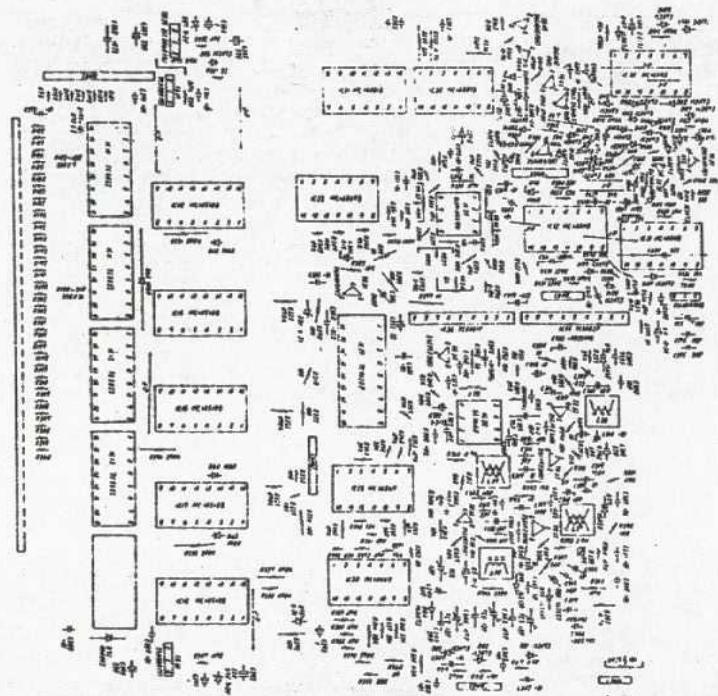
WIRING LAYOUT



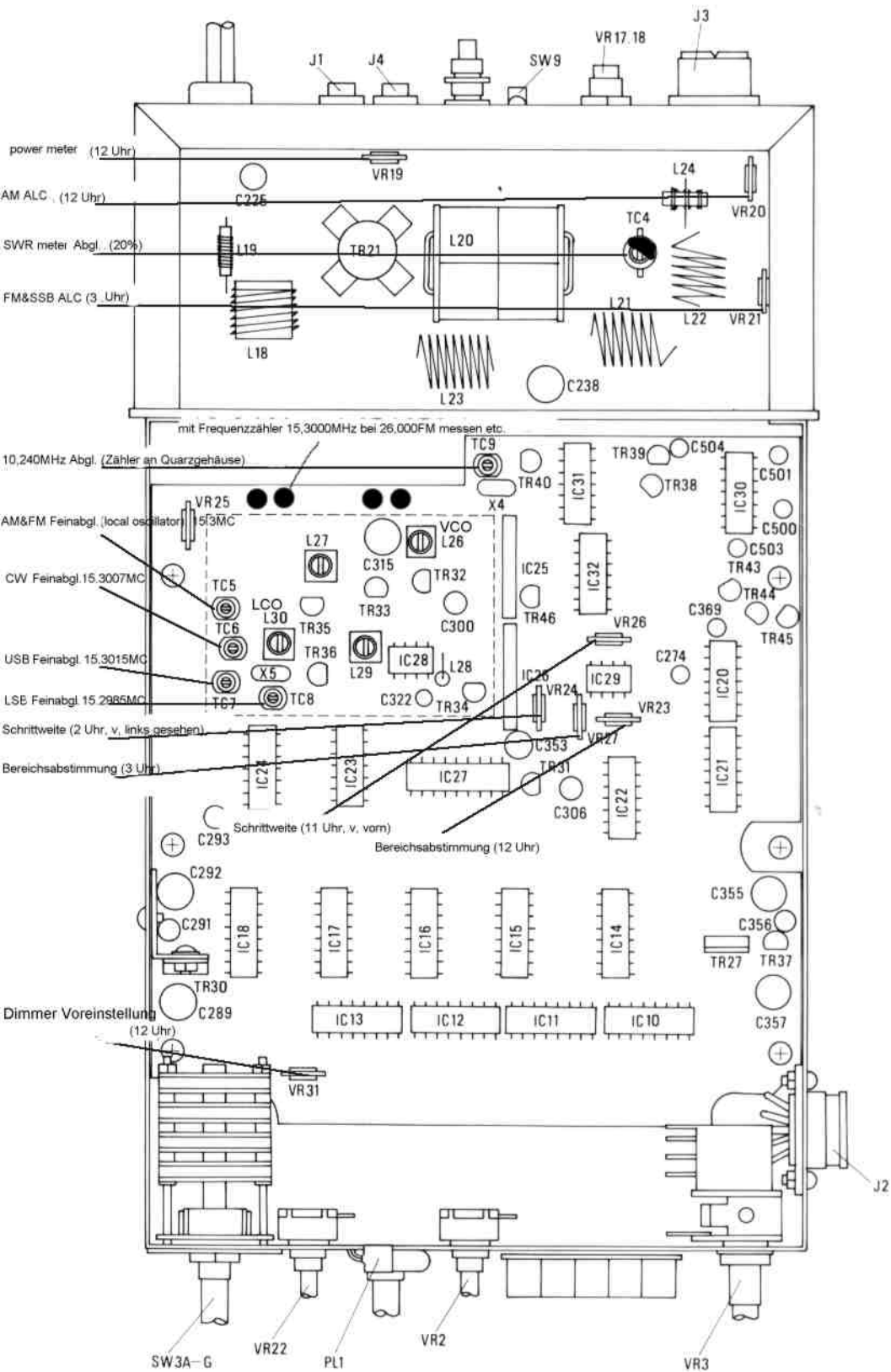
PRINTED CIRCUIT BOARD PARTS LAYOUT



PRINTED CIRCUIT BOARD PARTS LAYOUT



COMPLETE PARTS LAYOUT



COMPLETE PARTS LAYOUT

