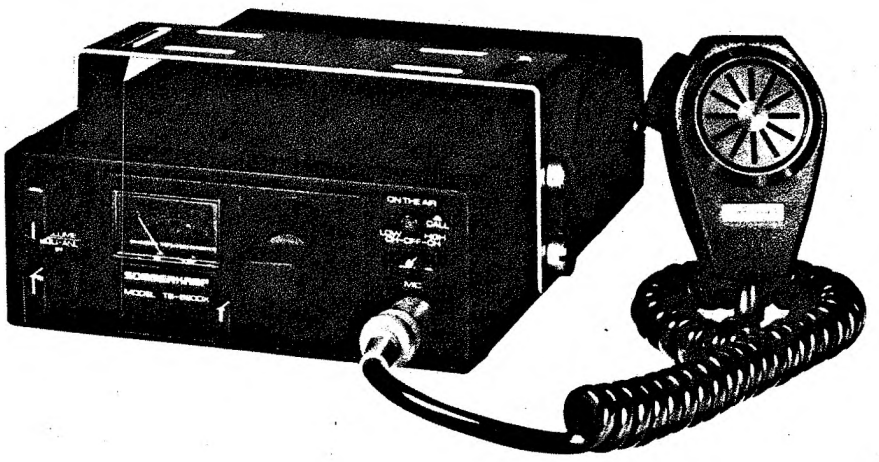
# SOMMERKAMP®

## CITIZENS BAND TRANSCEIVER

## INSTRUCTION MANUAL



## MODEL: TS-680DX

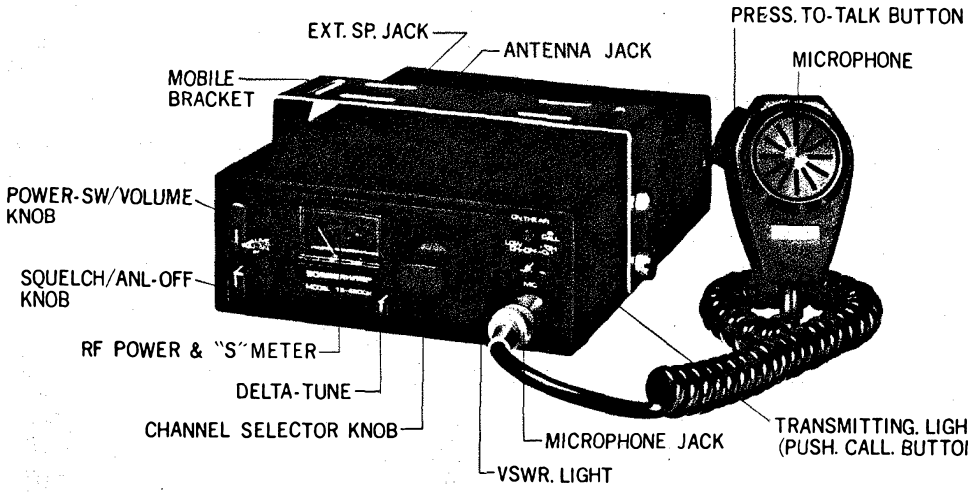
## SPECIFICATIONS for TS-680DX

| | |
|---|---|
| Semiconductors: | 4 Integrated Circuits,<br>2 FET, 22 Transistors.<br>1 SCR, 23 Silicon diode.<br>2 Varicap, 5 Zener diode. |
| Transmitter System: | Synthesized PLL controlled.<br>Collector modulation AM. |
| Frequency: | 80 Channels on 27 MHz. |
| Output Power: | 10 Watts at 13.8V DC. |
| Band Width: | 8 KHz. (max.) |
| Antenna impedance: | 50-52 ohms. |
| Receiver System: | Double conversion superheterodyne,<br>PLL controlled. |
| Sensitivity: | 1$\mu$V or better for 100mW output,<br>10 dB signal to noise ratio. |
| Intermediate Frequency: | 1st I.F. 10.7MHz, 2nd I.F. 455KHz. |
| Receiver Selectivity: | 40 dB down at 10 KHz. or more. |
| Squelch Sensitivity: | 1$\mu$V. |
| Audio Output Power: | 2 watts in 10% distortion. |
| Power Source: | 11~16V D.C. Negative Ground.<br>Fuse 5A. |
| Microphone: | Dynamic type with press-talk switch.<br>Impedance 500 ohm. |
| Speaker: | Dynamic type, Voice coil Impedance 8 ohm. |
| Size: | 156×58×205 mm. |
| Weight: | 2.3 kg. |
| Accessories: | Mounting bracket, Mounting hardware,<br>power cord. |

**SOMMERKAMP ELECTRONIC SAS**

CH-6903 LUGANO, P.O. BOX 176
SWITZERLAND
TEL.91 688543 TELEX:79314

## CONTROL LOCATIONS:




## PACKING LIST

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

1. Transceiver TS-680DX
1. Mounting bracket.
4. Screw for Mounting bracket.
1. Microphone hanger.
1. Microphone.

## GENERAL DESCRIPTION

Your SOMMERKAMP TS-680DX transceiver has been designed for continous heavy duty mobile and base station application.
It can be operated with a microphone and internal speaker or handset, speaker/ microphone combination, telephoneset incorporating automatic voice operated transmit/receive switching, external selective calling with automatic answer-back and many more.

## GENERAL

The transceiver is designed to operate from 13.8 Volt DC powersupply as a base or mobile station. It's straght forward 80 channel capability allows it to operate on any channel within 26.965 and 27.755 MHz.

## RECEIVER SECTION

The receiver section is designed to receive amplitude modulated (AM/A3) signals in the 26.965 to 27.755 MHZ. (11 meter) citizens band .
The unique combination of low noise Field Effect Transistor (FET), double conversion, a combination of mechanical ceramic, and L/C filters, fully automatic noise limiter (ANL) and a hifi quality speaker amplifier will give you exceptional reception quality in this fine piece of equipment.
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.
The 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 fully automatic 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 seperate squelch detector and switching circuit with a carefully balanced hysteresis. The transformerless hifi quality audio power amplifier will drive any load between 8 ohms and indefininite such as internal speaker or external speaker/microphone or headset combinations having the above impedances.
The meter indicates the field strength during reception of a signal.

## TRANSMITTER & MODULATOR SECTION:

The trasmitter section is designed for continous heavy duty transmission of amplitude modulated (AM/A3) signals in the 26.965 to 27.755 MHz. (11 meter) citizens band.

The transmitter consists of a Phase Locked Loop circuit and an one-crystal controlled oscillator, of which output is synthesized in a class B mixer, followd by a double tuned filter, class AB1 buffers, and a highly efficient collector-modulated class C driver and power output stage, coupled by series and pi-matching filters to the antenna jack.

The modulator consists of an input audio filter, ALC amplifier integrated pre- and power amplifier and modulation transformer. This gives you the lowest possible modulation distortion and up to 100% modulation.

The input is designed for 500 ohm dynamic microphone or 32 ohm speaker/ microphone combination with a 1K ohm resistor in series.

## RECEIVE/TRANSMIT SWITCHING

The receive/transmit switching is done by a single pole, single throw switch in the microphone and a combination of NPN and PNP switching transistors.

## METER

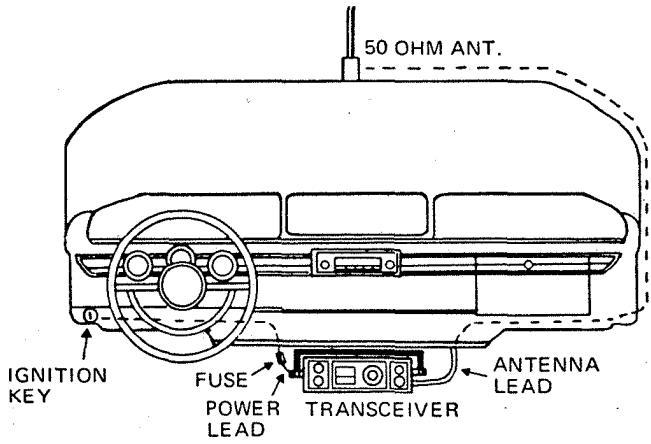
The combination meter provides you with the following functions:

During receive mode ..... it indicates the incoming signal strength.

During transmit mode ..... it indicates the output power.

## MOBILE INSTALLATION

Mounting bracket and screws are supplied for mounting the transceiver underneath the dashboard. Microphone hanger and screws are also supplied. For electrical connection, first make sure that the transceiver is turned off. Connect the red wire to the ACC terminal of the ignition switch or + terminal of battery and ground the black wire to the chassis of the rehicle. The black wire should be grounded as short as possible to minimize noise interference. This transceiver is designed for use with the negative ground system.




Connect the antenna plug to the antenna jack with an SWR-Meter inserted into the antenna cable.

Connect the microphone to the microphone jack.

Switch the transceiver ON.

The receiving, meter and the channel lamp, shall light up.

Turn the squelch control to min. (ANL OFF)

Ture the Volume control to max. Until you hear a rushing sound from the speaker.

Swith the channel selector to CH. 1.

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.

NOTE: In case the SWR is too high, the Automatic protection circuit will switch off the transmitter.

If the SWR is less than 1 to 2 continue checkout. if it is more than 1 to 2 repair or replace your antenna.

Check that the meter needle is near the red mark during transmitting. Talk into the microphone. The meter needle shall move a little. Release the transmit button and switch the channel selector to channel 1,2 etc. until you receive a station.

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 back-ground noise during non transmitting periods.

## OPERATING INSTRUCTONS

The transceiver is ready to operate when it is installed with an antenna properly connected. Note that the communication range differs depending upon the environment where the transceiver is operated.

You may reach 30 or 40 kilometers where no obstacle exists, but the range may be limited to 5 or 6 kilometers in cities where many high buildings disturb the communication.

1) Turn the set on by switching the LOW CH-OFF-HIGH CH. snap switch to the desired channel range and the channel dial will be lighted. Turn the volume control clockwise to increase the audio sound. Note that the volume control knob is only for adjusting the audio volume, not to increase the transmitting power.
2) Set the DELTA-TUNE for best reception.
3) Turn the squelch control clockwise until incoming noise is eliminated. Do not turn it excessively as the sensitivity may be reduced.
4) Turn the squelch control counter-clockwise to switch off the ANL (Automatic Noise Limiter).
5) Turn the channel selector knob to the desired channel.
6) For transmitting, press the button on the microphone and speak into it normally. Release the button for receiving.

## METER

The meter reading indicates the signal strength at receiving, and functions as an output indicator at transmitting, and the meter pointer should be within the red zone under the normal conditions.

## CIRCUIT PROTECTION INDICATION LAMP

The lamp is on when the antenna is mismatched, and the transmitting circuit will be cut off.

## LIST OF CHANNEL FREQUENCIES

| CH. NO. | LOW CH. (MHZ) | HIGH CH. (MHZ) | CH. NO. | LOW CH. (MHZ) | HIGH CH. (MHZ) |
|---|---|---|---|---|---|
| 1 | 26.965 | 27.365 | 21 | 27.165 | 27.565 |
| 2 | 26.975 | 27.375 | 22 | 27.175 | 27.575 |
| 3 | 26.985 | 27.385 | 23 | 27.185 | 27.585 |
| 4 | 26.995 | 27.395 | 24 | 27.195 | 27.595 |
| 5 | 27.005 | 27.405 | 25 | 27.205 | 27.605 |
| 6 | 27.015 | 27.415 | 26 | 27.215 | 27.615 |
| 7 | 27.025 | 27.425 | 27 | 27.225 | 27.625 |
| 8 | 27.035 | 27.435 | 28 | 27.235 | 27.635 |
| 9 | 27.045 | 27.445 | 29 | 27.245 | 27.645 |
| 10 | 27.055 | 27.455 | 30 | 27.255 | 27.655 |
| 11 | 27.065 | 27.465 | 31 | 27.265 | 27.665 |
| 12 | 27.075 | 27.475 | 32 | 27.275 | 27.675 |
| 13 | 27.085 | 27.485 | 33 | 27.285 | 27.685 |
| 14 | 27.095 | 27.495 | 34 | 27.295 | 27.695 |
| 15 | 27.105 | 27.505 | 35 | 27.305 | 27.705 |
| 16 | 27.115 | 27.515 | 36 | 27.315 | 27.715 |
| 17 | 27.125 | 27.525 | 37 | 27.325 | 27.725 |
| 18 | 27.135 | 27.535 | 38 | 27.335 | 27.735 |
| 19 | 27.145 | 27.545 | 39 | 27.345 | 27.745 |
| 20 | 27.155 | 27.555 | 40 | 27.355 | 27.755 |

## . .CROPHONE JACK

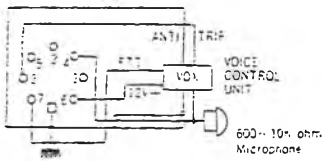
The 7-pin DIN standard accessory jack has the following internal connections:

1. Internal speaker
2. AF out for selective call.
3. Audio output (Z 8 ohm-10K ohm)
4. Microphone input (Z 600-10K ohm)
5. N.C
6. +12V for VOX unit etc.
7. Transmit/Receive switching.

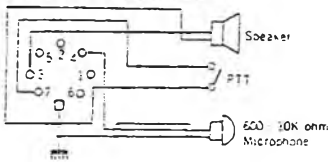
Case = ground

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

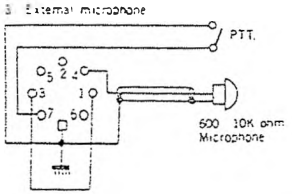
1. Microphone with VOX



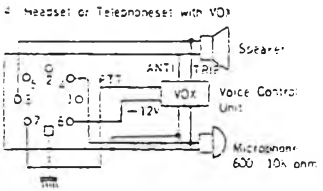

2. Headset or Telephoneset with PTT



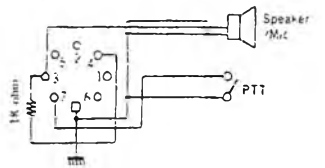

3. External microphone



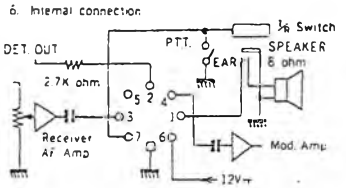

4. Headset or Telephoneset with VOX



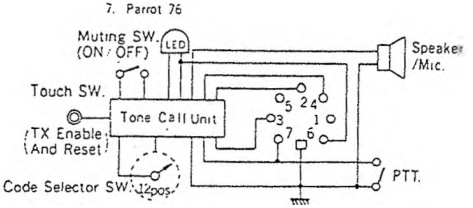

5. External microphone/speaker with PTT



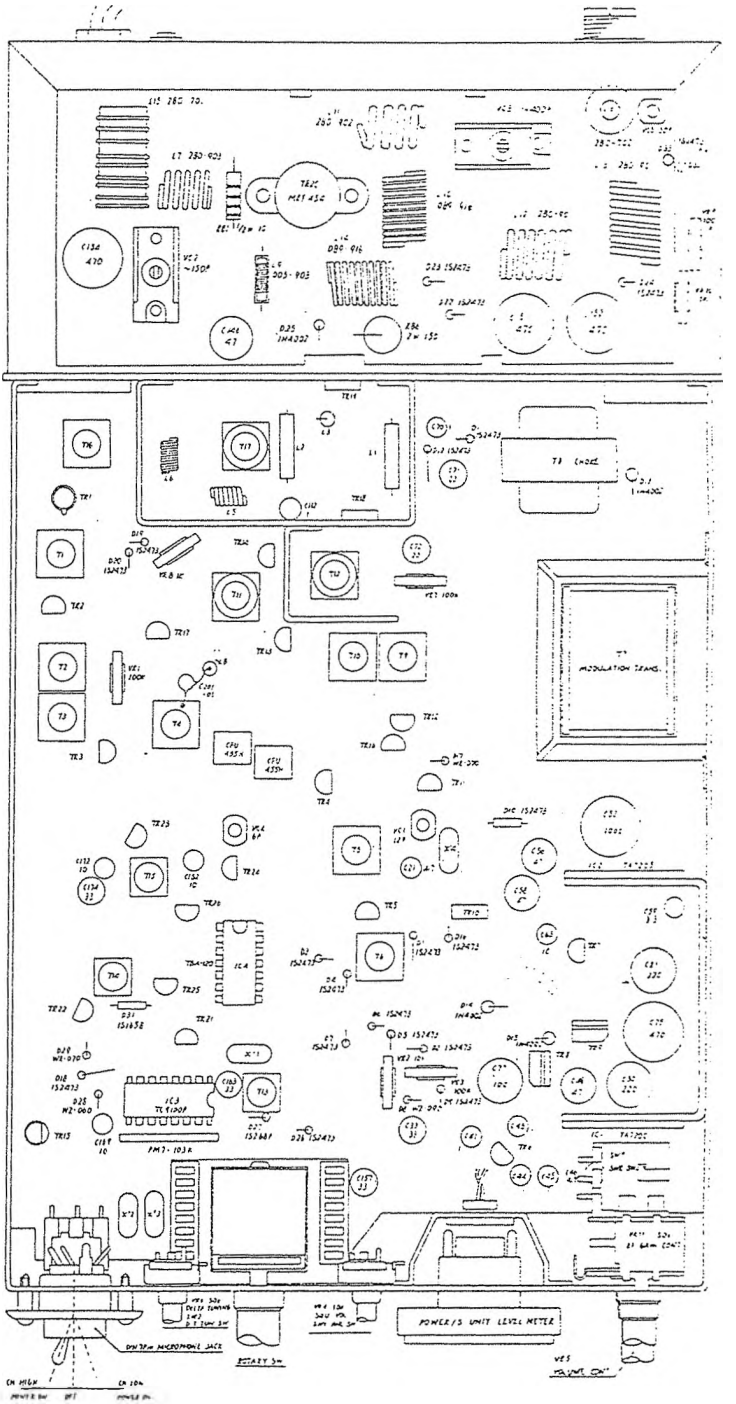

6. Internal connection



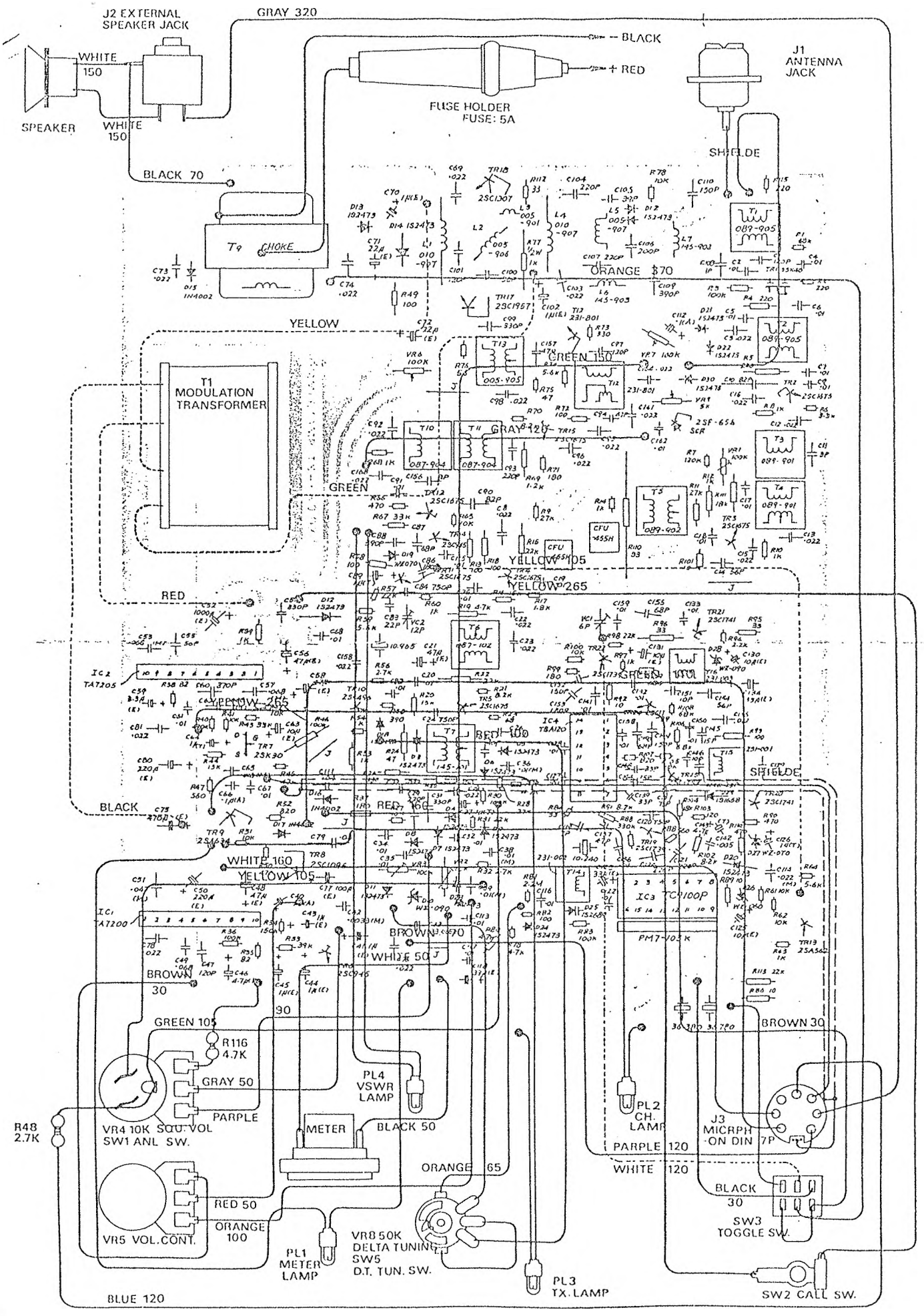

7. Parrot 76



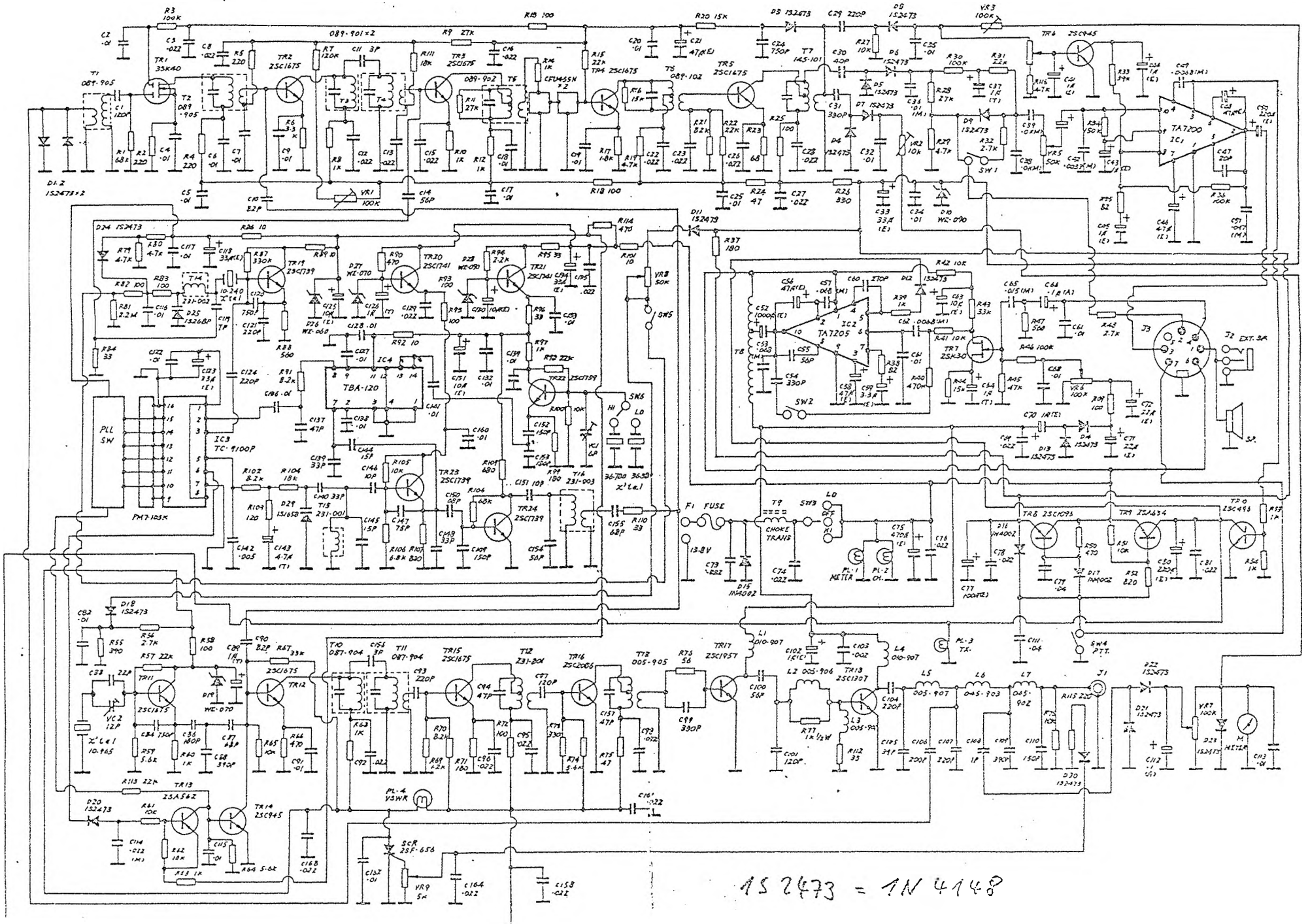
# COMPLETE PARTS LAYOUT



PRINTED CIRCUIT BOARD PARTS LAYOUT TS 680 DX



CIRCUIT DIAGRAM TS 680 DX



# PARTS LIST for TS-680DX

| DESIGNATION | PARTS NAME | PARTS NO. |
|---|---|---|
| MP-201 | Front Frame | 483014-S |
| MP-202B | Chassis Frame | 502035 |
| MP-203B | Back Parnel | 504297 |
| MP-105 | Cabinet Cover (Upper) | 483016 |
| MP-124 | Cabinet Cover (Lower) | 514346 |
| MP-107 | Mounting Bracket | 484085 |
| | Front Plate (L) | 524392 |
| MP-304 | Front Plate (R) | 494187-R |
| | Brand Plate | 524390 |
| | Back Plate | 524389 |
| MP-110 | Mouhting Bracket for Meter | 484064 |
| MP-208 | Mounting Bracket for Output Transformer | 504296 |
| MP-362 | Heatsink for IC. | 504300 |
| MP-353 | Heatsink for 2SC1307A. | 494251 |
| MP-354 | Heatsink for 2SC1307 B. | 494252 |
| MP-211 | Meter Lamp Reflection Plate. | 484063 |
| MP-111 | Call Switch Contact. | 484086 |
| MP-112 | Call Switch Spring. | 484087 |
| MP-307 | Knob for Delta tune Control. | 494199 |
| MP-117 | Knob for Channel Selector. | 484116 |
| MP-17 | Knob for Vol./squ. Control. | 474011 |
| MP-118 | Nut for Channel Selector. | 484073 |
| MP-120 | Screw for Mounting Bracket. | 484098 |
| | Channel Indicator Plate | 514372 |
| MP-356 | Heatsink for 2SC496 (2SC1957) | 494250 |
| MP-19 | Call Button. | 484057 |
| MP-5 | Mounting Bracket for Speaker. | 504335 |
| MP-109 | Mic Jack Mounting Supporter. | 484056 |
| MP-500 | PLL. Unit Cover (Upper) | 524376 |
| MP-501 | PLL Unit Cover (Lower) | 524386 |
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# PARTS LIST for TS-680DX

| DESIGNATION | PARTS NAME | PARTS NO. |
|---|---|---|
| IC1 | Integrated Circuit. | TA-7200P |
| IC2 | Integrated Circuit. | TA-7205P |
| IC3 | Integrated Circuit. | TC-9100P |
| IC4 | Integrated Circuit. | TBA-120 |
| TR1 | FET. | 3SK-40 |
| TR7 | FET. | 2SK-30 |
| TR2, 3, 4, 5, 11, 12, 15 | Transistor. | 2SC-1675 |
| TR6, 14 | Transistor. | 2SC-945 |
| TR8 | Transistor. | 2SC-1096 |
| TR10 | Transistor. | 2SC-496 |
| TR16 | Transistor. | 2SC-2086 |
| TR17 | Transistor. | 2SC-1957 |
| TR18 | Transistor. | 2SC-1307 |
| TR19, 22, 23, 24 | Transistor. | 2SC-1739 |
| TR20, 21 | Transistor. | 2SC-1741 |
| TR9 | Transistor. | 2SA-634 |
| TR13 | Transistor. | 2SA-562 |
| SCR | SCR. | 2SF-656 |
| D1~14, 18, 20~24, 30 | Silicon Diode. | 1S2473 |
| D15, 16, 17 | Silicon Diode. | 1N4002 |
| D25 | Varicap Diode | 1S2689 |
| D29 | Varicap Diode. | 1S1658 |
| D26 | Zener Diode. | WZ-060 |
| D19, 27 | Zener Diode. | WZ-070 |
| D10, 28 | Zener Diode. | WZ-080 |
| CF | Ceramic Filter. | CFU-455H |
| | | |
| J2 | Ext Speaker Jack. | SJ-296 |
| J1 | Antenna Jack. | MRM/INCH |
| J3 | Microphone Jack. DIN Type 7p. | CS279 |
| | | |
| | | |
| | | |
| | | |
| | | |

## PARTS LIST for T[illegible] 680DX

| DESIGNATION | PARTS NAME | PARTS NO. |
|---|---|---|
| VR1, 3 | Semi Variable Resistor 100K ohm. | SVR100K S2 |
| VR2 | Semi Variable Resistor 10K ohm. | SVR010K S2 |
| VR6, 7 | Semi Variable Resistor 100K ohm. | SVR100K S3 |
| VR9 | Semi Variable Resistor 5K ohm. | SVR005K S3 |
| VR5 | Variable Resistor (Volume) 50K ohm. | VR1650KB |
| VR4 | Variable Resistor (Squelch) 10K ohm. | VR16 10K BS |
| VR8 | Variable Resistor (D Tune) 10K ohm. | VR1310K BS |
| | | |
| T1, 2 | RXRF Tuning Coil. | 089-905 |
| T3, 4 | IFT 10.7 MHz | 089-901 |
| T5 | IFT 455 KHz | 089-902 |
| T6 | IFT 455 KHz | 087-102 |
| T7 | IFT 455KHz | 145-101 |
| T8 | Modulation Trans. | TS-660 |
| T9 | Power Filter Trans. | EI-24 |
| T10, 11 | TX Mixer Coil. | 087-904 |
| T12 | TX 27MHZ Filter Coil. | 231-801 |
| T13 | TX 27MHZ Buffer Tuning Coil. | 005-904 |
| T14 | 10.24 MHZ OSC Coil. | 231-002 |
| T15 | PLL VCO Coil. | 231-001 |
| T16 | VCO AMP Coil. | 231-003 |
| L1, 4 | TX Power Choke. | 010-907 |
| L2 | TX Driver Tuning Coil. | 005-906 |
| L3 | TX Final Choke Coil. | 005-901 |
| L5 | TX Final Tuning Coil. | 005-907 |
| L6 | TX $\pi$ Matching Coil. | 145-903 |
| L7 | TX $\pi$ Matching Coil. | 145-902 |
| | | |
| F1 | Fuse 5A | F-5A |
| M | Meter | 510052 |
| SP | Speaker | 77P-06 |
| PL1~4 | Pirot Lomp 14V-80mA | PL-14-80 |
| SW3, 6 | Toggle Switch | 8A-2021 |
| SW4 | PLL Rotary Switch | SRH-101U |
| MIC. | Microphone Complete | 22-256-28 |