TR-7500 SPECIFICATIONS

GENERAL

Semiconductor	Transistors	44
	FETs	8
	ICs	7
	Diodes	36
Frequency Range	145.000 MHz to 145.975 MHz	
Frequency Synthesizer	Digital control of phase locked VCO	
Synthesizer Stability	Less than ± 750 Hz at 25°C	
Mode	FM	
No. of Channel	40 channel (25 kHz interval)	
	Built-in channels	40
	145.000 ~ 145.975 MHz at 25 kHz Step	40
Operating Temperature	−20 to +60°C	
Power Voltage	11.5 VDC to 16.0 VDC	
	(13.8 VDC as reference)	
Grounding	Negative grounding	
Antenna Impedance	50 Ω	
DC Current	Less than 0.5A in receive with no input signal	
	Less than 3.0A in transmit (HI)	
	Less than 1.5A in transmit (LOW)	
	(at 13.8 VDC)	
Dimensions	152 mm	width
	60 mm	high
	234 mm	deep
Weight	Approx. 2.2 kg	

TRANSMIT SECTION

RF Output Power	High	10 watts (min.)
	Low approx.	1 watt (adjustable up to 5 watts)
Modulation	Variable reactance direct shift	
Max. Frequency Deviation	±5 kHz	
Spurious Radiation	Less than −60 dB	
Repeater Tone Frequency	1750 Hz	
Microphone	Dynamic microphone with PTT switch, 500Ω	

RECEIVE SECTION

Circuitry	Double superheterodyne	
Intermediate Frequency	1st IF	10.7 MHz
	2nd IF	455 kHz
Sensitivity	Less than 0.4 μV for 20 dB quieting	
	(Less than 1 μV for 30 dB S/N)	
Squelch Sensitivity	Less than 0.25 μV	
Pass Band Width	More than 12 kHz at 6 dB down	
Selectivity (2 Signal)	More than 70 dB at 25 kHz of adjacent channel	
Image Rejection	More than 70 dB	
Spurious Interference	More than 60 dB	
Intermodulation	More than 66 dB	
Audio Output	More than 1.5 watts across 8 Ω load (10% distortion)	

Note: The circuit and ratings may change without notice due to development in technology.

SECTION 1. PREPARATION FOR USE

1.1 ACCESSORIES

Carefully unpack the TR-7500 transceiver and check that the following accessories are included.

(1) Dynamic microphone equipped with 4-pin plug . . . . . 1 piece
(2) Mounting bracket . . . . . 1 piece
(3) Mounting parts
Screws, 6 mm diameter . . . . . 4 pieces
Plain washers, 6 mm diameter . . . 4 pieces
Spring washers, 6 mm diameter . . 4 pieces
Nuts, 6 mm diameter . . . . . 4 pieces
(4) Stand-off bracket . . . . . 1 piece
(5) DC power cord with plug and fuse . . . . . 1 piece
(6) Spare fuse (4A) . . . . . 1 piece
(7) Miniature plug for external speaker 1 piece
(8) Miniature plug for center meter . . . 1 piece
(9) Operating manual . . . . . 1 copy

1.2 ANTENNA

Any 50 ohm 145 MHz band antenna system may be used with your TR-7500. The 50 ohm coaxial cable should be kept as short as possible in order to minimize line loss. Attach a UHF type connector (PL-259) to the coaxial cable for easy connection to the receptable on the transceiver.

1.3 INSTALLATION CAUTION

Your TR-7500 Transceiver to be operated as a mobile station should be securely mounted under the dashboard (or similar location) using the accessory mounting bracket and bolts. Improper installation will result in damage to the transceiver and dashboard. Consideration must be given to the dashboard material prior to installation. More detailed information on installation will be found in SECTION 3.1, the "MOBILE USE", page 7.

SECTION 2. CONTROLS AND WHAT THEY DO

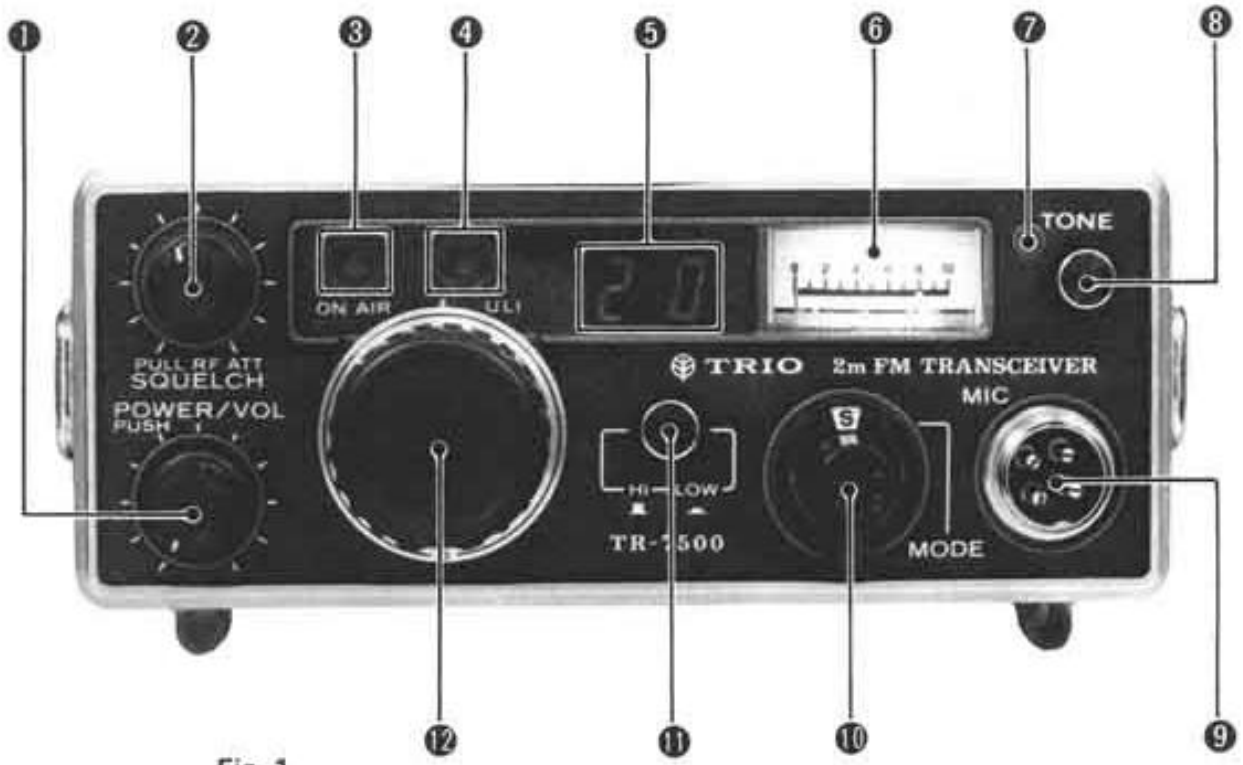


Fig. 1

2.1 FRONT PANEL (Refer to Fig. 1)

❶ **POWER/VOL Knob**
Volume control combined with pushbutton power switch. A single push of the button turns the power on and another off or vice versa. Volume is increased by turning the knob clockwise.

❷ **SQUELCH/RF ATT Control**
This control serves both for squelch control and RF attenuation switching. The SQUELCH control is used to cut off no-signal receiver hiss noise. In general, turn it clockwise until the noise threshold is reached when no signal is coming through the receiver.
The RF ATT switch, when pulled out, reduces the receive sensitivity around 10 dB. (For use of this switch, refer to page 11.)

❸ **ON AIR Indicator**
A light-emitting diode which lights during transmit.

❹ **ULI Indicator**
A light-emitting diode which indicates the unlock state. While this indicator lights, you cannot use the TR-7500 for any of the transmit and receive operations. For details, see page 10.

❺ **Channel Indicator**
Light-emitting diodes display operation channel number. (see Table 1, the "List of Channel Frequencies").

❻ **Meter**
Dual-purpose meter indicates input signal strength and antenna output. Automatic switching.

❼ **TONE BURST Indicator**
A light-emitting diode, which indicates the operation of the tone burst circuit when lighting.

❽ **TONE BURST Switch**
This switch at the "ON" position allows modulating the tone burst when the microphone press-to-talk switch is pressed in.

❾ **MIC Connector**
Connect the accessory microphone to this connector.

❿ **MODE Switch**
This switch shifts the operating frequency.

⓫ **HI/LOW Switch**
HIGH or LOW transmit output is selected, by setting the knob in the normal position or pushing the knob in.
The reduced power state (LOW) is indicated by the green light in the meter.

⓬ **Main Knob**
A channel selector knob, turned either clockwise or counterclockwise. This has 40 channel steps.
The knob has a large knotch at the "145.00" position.

2.2 REAR PANEL (Refer to Fig. 2)

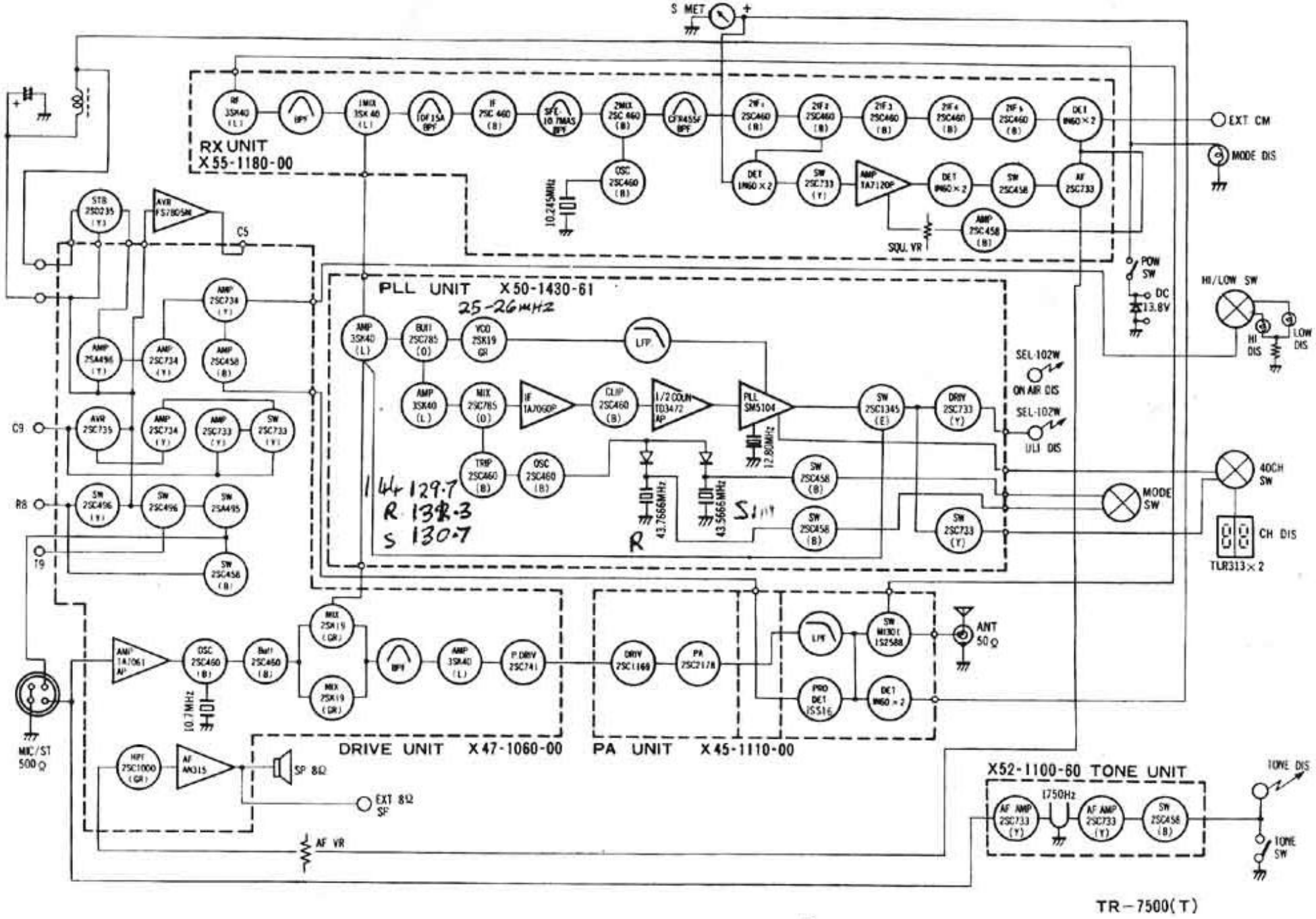
⓭ **EXT SP Connector**
External AF output (8 ohm)

⓮ **Center Meter Connector**
This connector allows an external center meter to monitor a frequency deviation of the other station.

⓯ **ANT Connector**
For connection of any 50 ohm 2-meter antenna.

⓰ **Audio Filter Switch**
This switches on or off the high-cut filter to change the receive sound tone. Turning it "ON" makes the sound soft.

⓱ **DC Power Connector**
Accepts normal DC operating voltage through the DC power cord supplied with the TR-7500.



TR-7500(T)

146 Sim 43.9
" R 44.1

SECTION 4. OPERATION

4.1 RECEIVING

1. Connect the supplied power cable to the DC power connector ⓭ and the antenna cable to the ANT connector ⓮ Select a DC power supply or battery pack having 3.0A current capacity at 13.8V.

   Caution:
   Make certain that connection of the **positive** (⊕) and **negative** (⊖) power cable leads have been connected properly.
2. Depress the POWER/VOL❶ knob on the front panel. The frequency indicator window will then indicate the number of the selected channel. Then turn the knob clockwise to obtain operating noise. Position the knob to the point at which any appropriate sound volume is obtained.
3. Set the main knob ⓯ to the appropriate position.
4. Slowly turn the squelch knob ❷ clockwise to effect the squelch until the internal noise disappears from the speaker. This adjustment should be made with no input signal.
5. The speaker will produce the sounds with the input signal. With no input signal, sound will not be heard from the speaker because of the squelch control.
   The meter ❻ will deflect with changes in the strength of the input signal.

4.2 TRANSMITTING

1. Plug the supplied microphone cable plug into the MIC Connector ⓫
2. Depress the microphone push-to-talk switch to operate the TR-7500 in the transmit mode.
   The ON AIR Indicator ❸ will light and the meter ❻ pointer will deflect to indicate the RF output power.
3. The proper separation between your mouth and microphone is 5 to 10 cm.

   Note:
   You can check the operational condition of the antenna system by observing the reading on a standing-wave ratio (SWR) meter. It is recommended that the antenna system SWR is 1.5 : 1 or less.
   The transmit power will be reduced by a protection circuit when the SWR is too high. The TR-7500 is designed so that the Meter ❻ will read "7 ~ 9" when operating high power (10 watts) into a 50 ohm load. The antenna system, therefore, is acceptable if the meter reads around this value. The meter, in this sense, acts as an SWR indicator.

4.3 HOW TO USE THE HI/LOW SWITCH

QSO between locals can be enjoyed with less interference and power consumption by reducing the output power to only the required value.
This is accomplished by depressing the HI/LOW pushbutton switch, which reduces power from the normal 10 watts to approx. 1 watt. The ON AIR lamp will remain unchanged in luminous intensity, whereas the meter indication will drop to approx. "3" on the meter.

4.4 HOW TO USE THE MODE SWITCH

This switch has three positions:

S: Set TR-7500 in simplex mode of operation where both transmit and receive operations are at same frequency.

N: Transmit frequency is same as displayed, but receive frequency is 600 kHz higher than it.

R: Reversely, receive frequency is same as displayed, but transmit frequency is 600 kHz higher than it.

Table 1 Channel Table

Pos.	Channel indicator	S		N		R	
		TX	RX	TX	RX	TX	RX
		MHz	MHz	MHz	MHz	MHz	MHz
1	0	145.000	145.000	145.000	145.600	145.600	145.000
2	1	145.025	145.025	145.025	145.625	145.625	145.025
3	2	145.050	145.050	145.050	145.650	145.650	145.050
4	3	145.075	145.075	145.075	145.675	145.675	145.075
5	4	145.100	145.100	145.100	145.700	145.700	145.100
6	5	145.125	145.125	145.125	145.725	145.725	145.125
7	6	145.150	145.150	145.150	145.750	145.750	145.150
8	7	145.175	145.175	145.175	145.775	145.775	145.175
9	8	145.200	145.200	145.200	145.800	145.800	145.200
10	9	145.225	145.225	145.225	145.825	145.825	145.225
11	10	145.250	145.250	145.250	145.850	145.850	145.250
12	11	145.275	145.275	145.275	145.875	145.875	145.275
13	12	145.300	145.300	145.300	145.900	145.900	145.300
14	13	145.325	145.325	145.325	145.925	145.925	145.325
15	14	145.350	145.350	145.350	145.950	145.950	145.350
16	15	145.375	145.375	145.375	145.975	145.975	145.375
17	16	145.400	145.400	145.400	146.000	146.000	145.400
18	17	145.425	145.425	145.425	146.025	146.025	145.425
19	18	145.450	145.450	145.450	146.050	146.050	145.450
20	19	145.475	145.475	145.475	146.075	146.075	145.475
21	20	145.500	145.500	145.500	146.100	146.100	145.500
22	21	145.525	145.525	145.525	146.125	146.125	145.525
23	22	145.550	145.550	145.550	146.150	146.150	145.550
24	23	145.575	145.575	145.575	146.175	146.175	145.575
25	24	145.600	145.600	145.600	146.200	146.200	145.600
26	25	145.625	145.625	145.625	146.225	146.225	145.625
27	26	145.650	145.650	145.650	146.250	146.250	145.650
28	27	145.675	145.675	145.675	146.275	146.275	145.675
29	28	145.700	145.700	145.700	146.300	146.300	145.700
30	29	145.725	145.725	145.725	146.325	146.325	145.725
31	30	145.750	145.750	145.750	146.350	146.350	145.750
32	31	145.775	145.775	145.775	146.375	146.375	145.775
33	32	145.800	145.800	145.800	146.400	146.400	145.800
34	33	145.825	145.825	145.825	146.425	146.425	145.825
35	34	145.850	145.850	145.850	146.450	146.450	145.850
36	35	145.875	145.875	145.875	146.475	146.475	145.875
37	36	145.900	145.900	145.900	146.500	146.500	145.900
38	37	145.925	145.925	145.925	146.525	146.525	145.925
39	38	145.950	145.950	145.950	146.550	146.550	145.950
40	39	145.975	145.975	145.975	146.575	146.575	145.975

S, N, R: Mode switch position
TX: Transmit
RX: Receive

4.5 HOW TO USE THE TONE BURST SWITCH

Pressing the TONE BURST switch turns the tone burst circuit on. The 1,750 Hz burst signal is modulated at around 0.7 second time constant while the press-to-talk switch is in for transmission.

4.6 NOTES ON THE ULI INDICATOR

Your TR-7500 has a protective circuit that stops the oscillator circuit if this fails to operate normally. This unlock feature therefore prevents possible faulty PLL operation from interferring with other stations. The unlock circuit, when operates, activates the ULI indicator, not allowing transmit nor receive operation. However, note that even if it lights in the following cases, the PLL circuit is normal, or not at fault.

1. The Main knob (rotary switch) is not at the correct click point.
2. The ULI indicator lights momentarily when the POWER switch is switched on or when the Main knob is turned.

4.7 CHANNEL TABLE

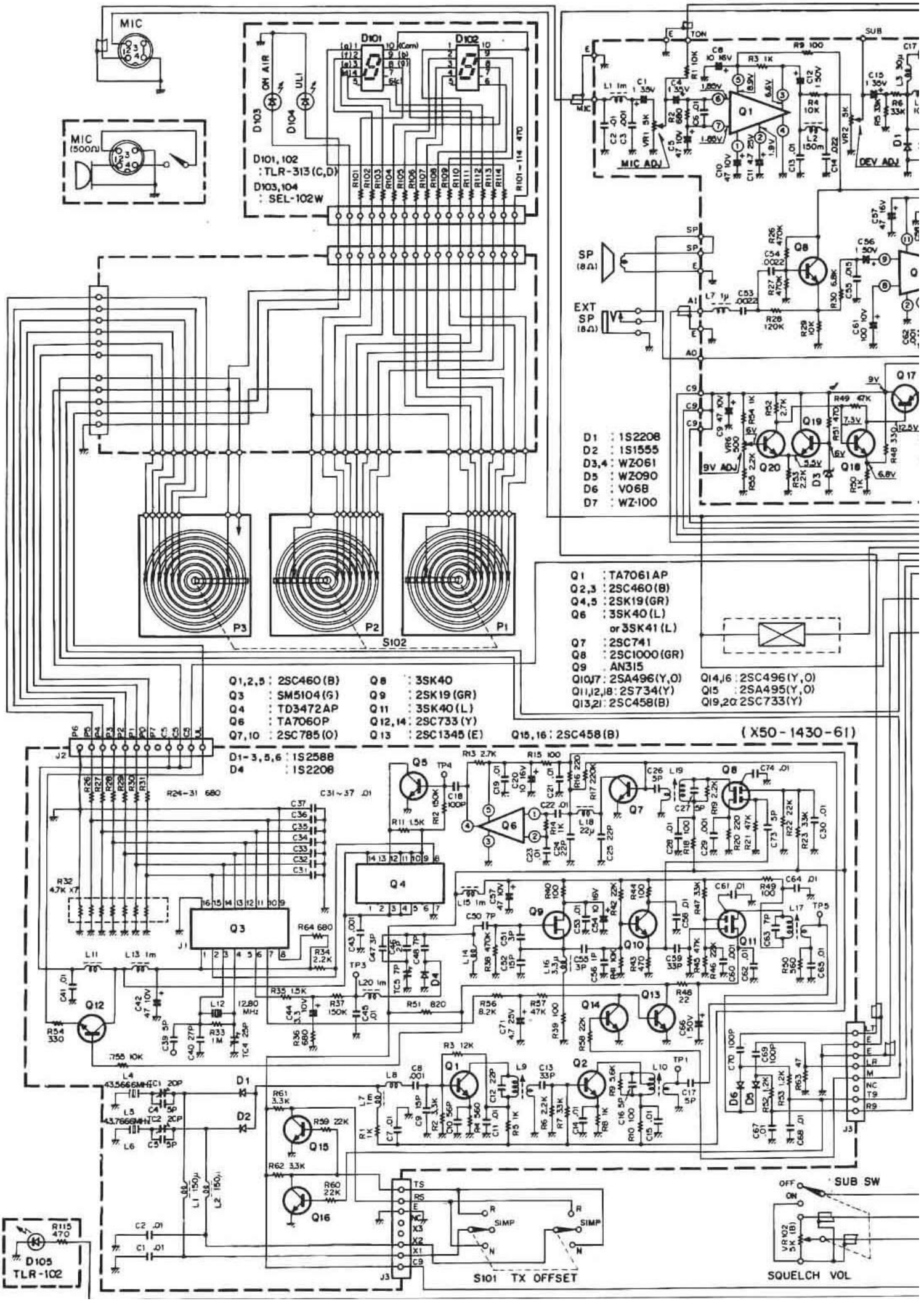
Your TR-7500 is a 40 channel FM transceiver for specific use in 145 to 146 MHz, with basic channel intervals being 25 kHz. The TR-7500 has the 40 channel built-in for frequent use (see Table 1).

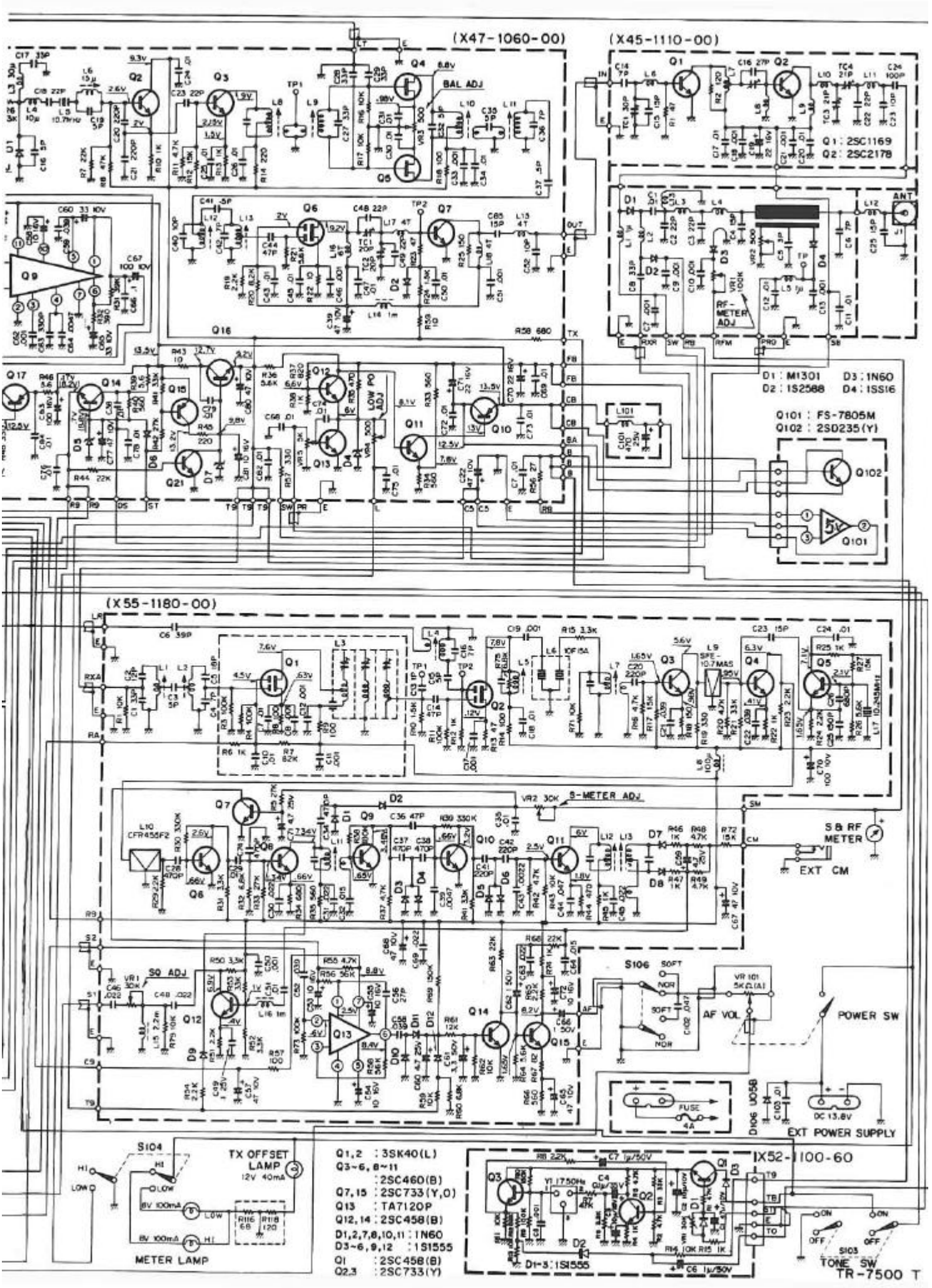
4.8 REPEATER OPERATION

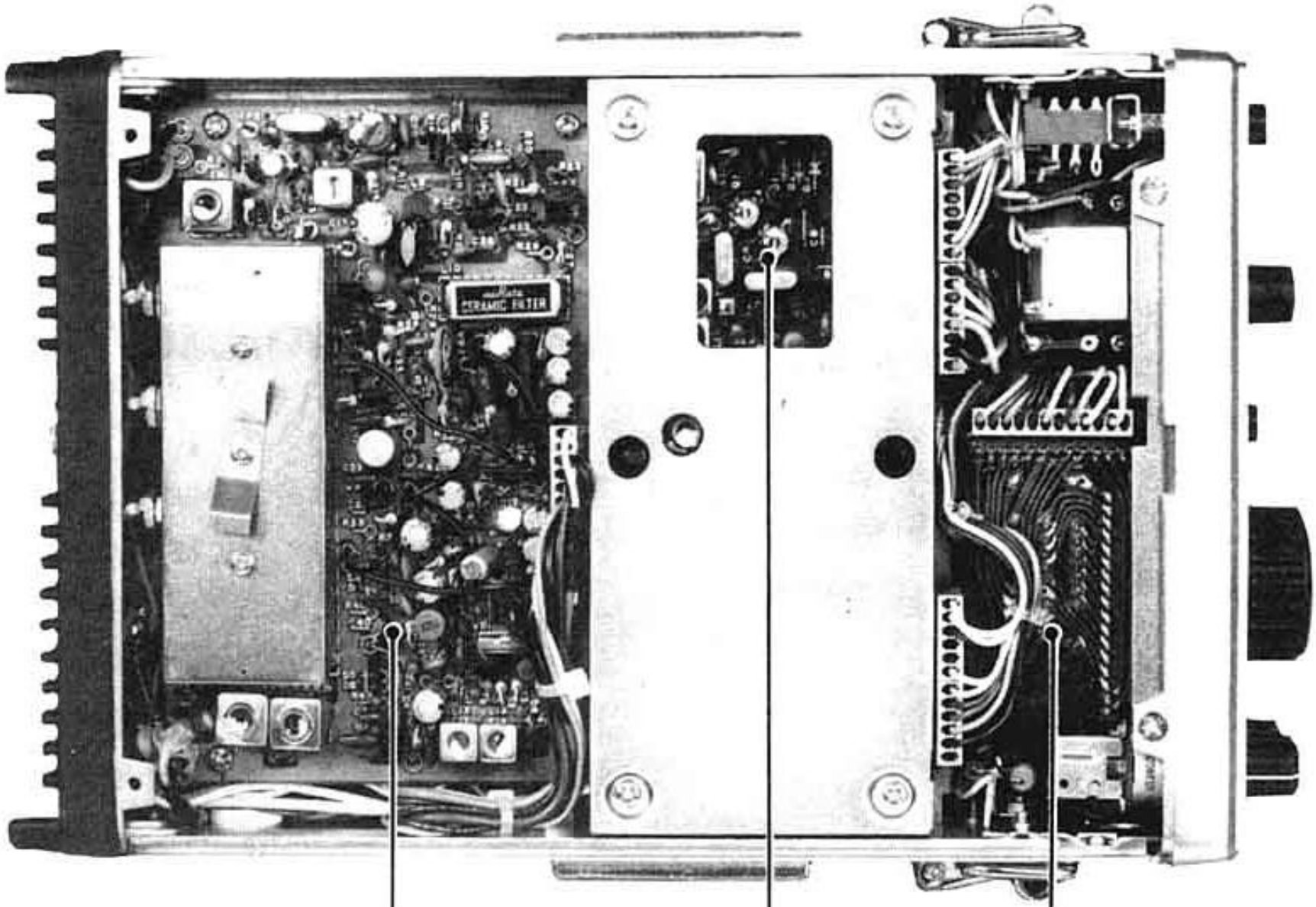
Your TR-7500 is capable of actuating the repeater, the specifications of which are is follows.

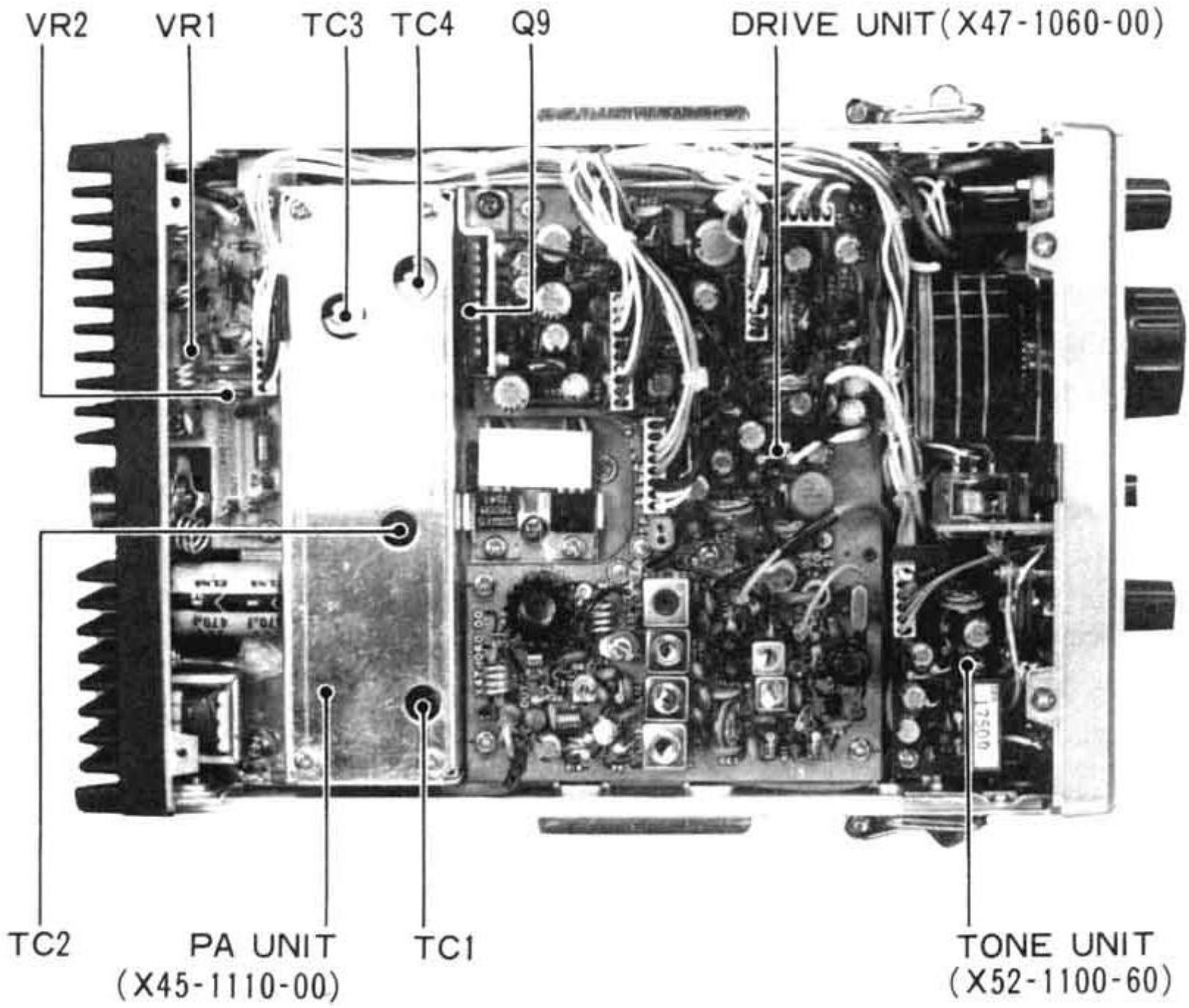
- Frequency shift: 600 kHz.
- Starting system: Carrier controlled type where action is controlled by 1,750 Hz tone signal.

When turning the TONE switch to "ON", the tone oscillator built in your TR-7500 runs and at the same time, it automatically sends out the tone signal which actuates the repeater. In the "N" mode where the receive frequency is 600 kHz higher than the transmit frequency, the frequency of the channel "0" position incoming to the repeater


MIC
MIC (500Ω)
D101, 102 : TLR-313 (C,D)
D103,104 : SEL-102W
ON AIR
ULI
D1 : 1S2208
D2 : 1S1555
D3,4 : WZ061
D5 : WZ090
D6 : V068
D7 : WZ-100
Q1 : TA7061AP
Q2,3 : 2SC460(B)
Q4,5 : 2SK19(GR)
Q6 : 3SK40(L) or 3SK41(L)
Q7 : 2SC741
Q8 : 2SC1000(GR)
Q9 : AN315
Q10,17 : 2SA496(Y,O)
Q11,12,18 : 2S734(Y)
Q13,21 : 2SC458(B)
Q14,16 : 2SC496(Y,O)
Q15 : 2SA495(Y,O)
Q19,20 : 2SC733(Y)
Q1,2,5 : 2SC460(B)
Q3 : SM5104(G)
Q4 : TD3472AP
Q6 : TA7060P
Q7,10 : 2SC785(O)
Q8 : 3SK40
Q9 : 2SK19(GR)
Q11 : 3SK40(L)
Q12,14 : 2SC733(Y)
Q13 : 2SC1345(E)
Q15,16 : 2SC458(B)
D1-3,5,6 : 1S2588
D4 : 1S2208
(X50-1430-61)
SP (8Ω)
EXT SP (8Ω)
MIC ADJ
DEV ADJ
9V ADJ
P1
P2
P3
S102
S101 TX OFFSET
SUB SW
SQUELCH VOL
D105 TLR-102


(X47-1060-00)
(X45-1110-00)
(X55-1180-00)
(X52-1100-60)
Q1 : 2SC1169
Q2 : 2SC2178
D1 : M1301
D2 : 1S2588
D3 : 1N60
D4 : 1SS16
Q101 : FS-7805M
Q102 : 2SD235(Y)
BAL ADJ
RF-METER ADJ
LOW PO ADJ
S-METER ADJ
S0 ADJ
S8 RF METER
EXT CM
AF VOL
POWER SW
EXT POWER SUPPLY
TX OFFSET LAMP
12V 40mA
METER LAMP
TONE SW
Q1,2 : 3SK40(L)
Q3~6, 8~11 : 2SC460(B)
Q7,15 : 2SC733(Y,O)
Q13 : TA7120P
Q12,14 : 2SC458(B)
D1,2,7,8,10,11 : 1N60
D3~6,9,12 : 1S1555
Q1 : 2SC458(B)
Q2,3 : 2SC733(Y)
D1~3 : 1S1555
TR-7500 T


CERAMIC FILTER
RX UNIT
(X55-1180-00)
PLL UNIT
(X50-1430-61)
Rotaly Switch
P.C Bord


VR2
VR1
TC3
TC4
Q9
DRIVE UNIT(X47-1060-00)
TC2
PA UNIT
(X45-1110-00)
TC1
TONE UNIT
(X52-1100-60)