

1-4. CIRCUIT DESCRIPTION

IC301 (Microcomputer)

IC301 (TCP4621BP-6502) is a microcomputer IC.
The terminal functions are as follows:

Main Functions:

- Key input detection
- Fluorescent indicator tube (FIP301) indication output
- Data transmission to PLL OSC SYNTHESIZER IC (IC302: CX778A) (16 bit serial data)
- Control of function switch IC (IC502: CX770A) control signal

IC301 Terminal Functions

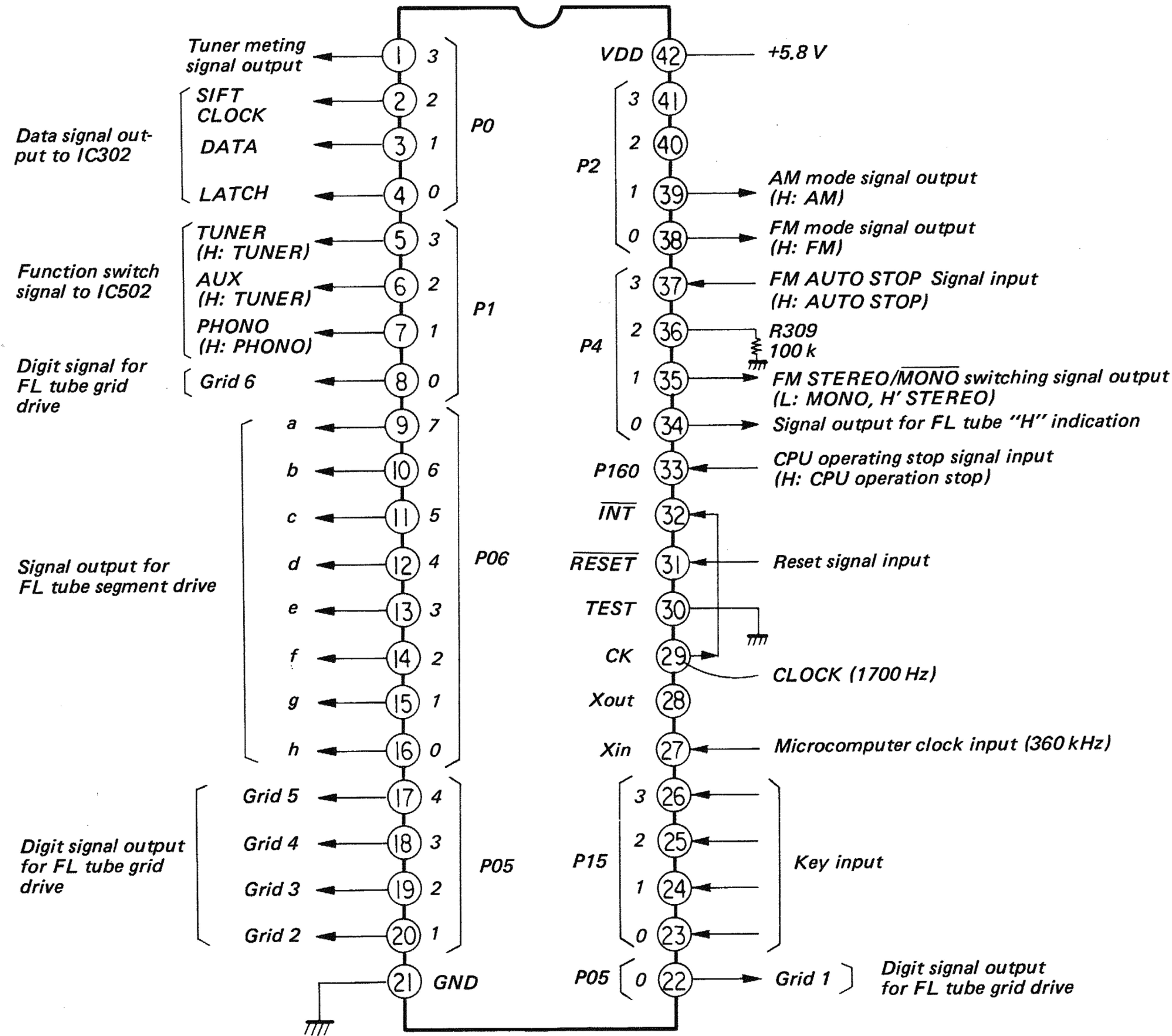


Fig. 1

FL tube --- Fluorescent Indicator Tube

Fluorescent Indicator Tube (FL Tube)

The FL tube performs indication of frequency received and function. The indication is done by the segment drive signal (see Fig. 2) and grid drive signal (see Fig. 3) output from IC301 (microcomputer).

The indication method is as follows. The grid is turned on in order (G1 – G6), by time sharing, by the grid drive signal, and the a-h segment drive is sent out in conjunction with this.

For the “H” indication during “PHONO” indication, considering the “H” portion only, the “A” indication segment drive signal is output from IC301, and a high pulse is output from IC301 pin 34, timed with ‘a’ segment drive, and applied to Q304 base. Therefore, Q304 goes off and ‘a’ segment does not light up, but becomes “H” indication.

(see Fig. 2)

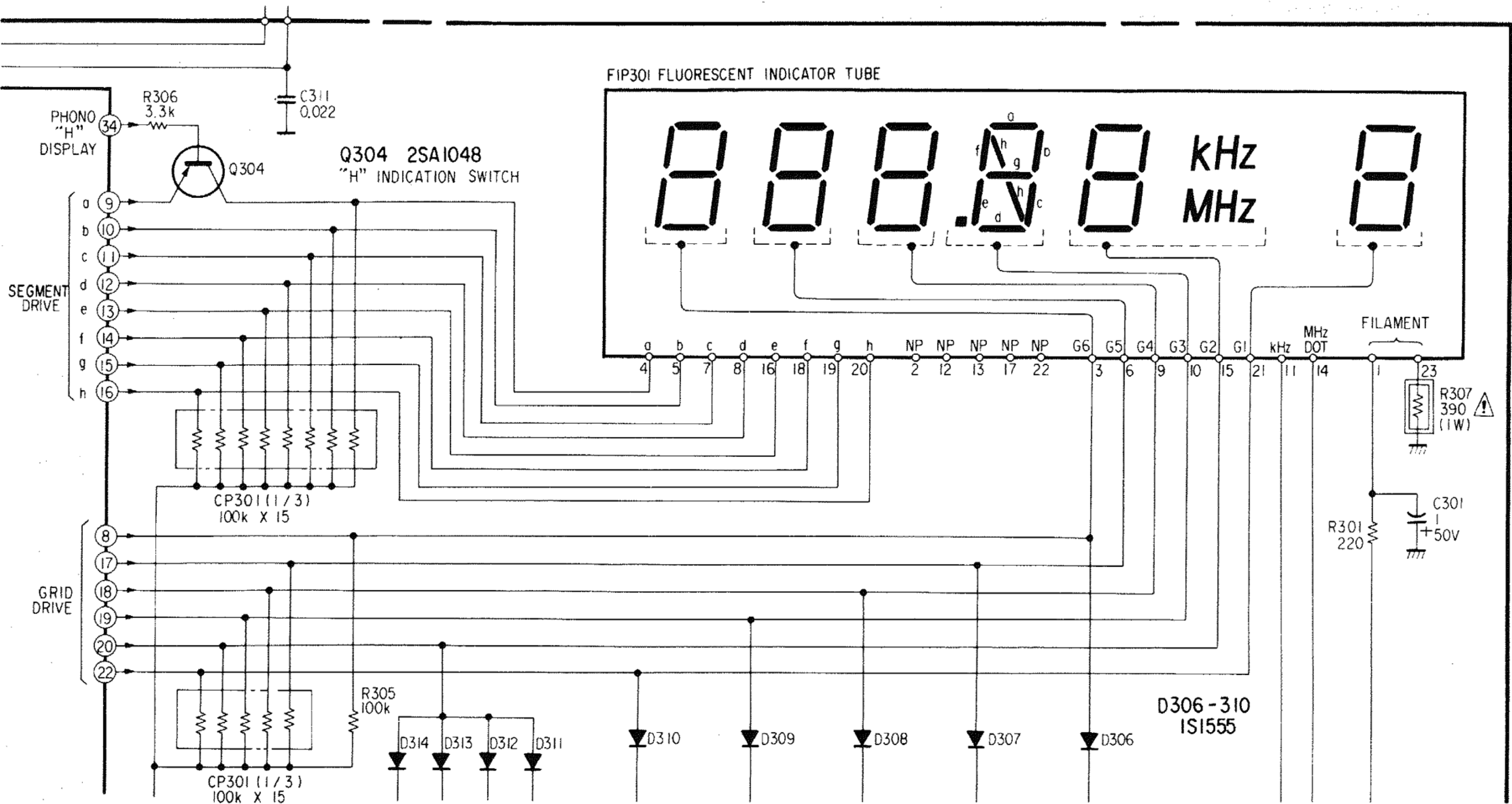


Fig. 2

“H” Indication during “PHONO” Indication and Segment Waveforms for “PHONO” Indication

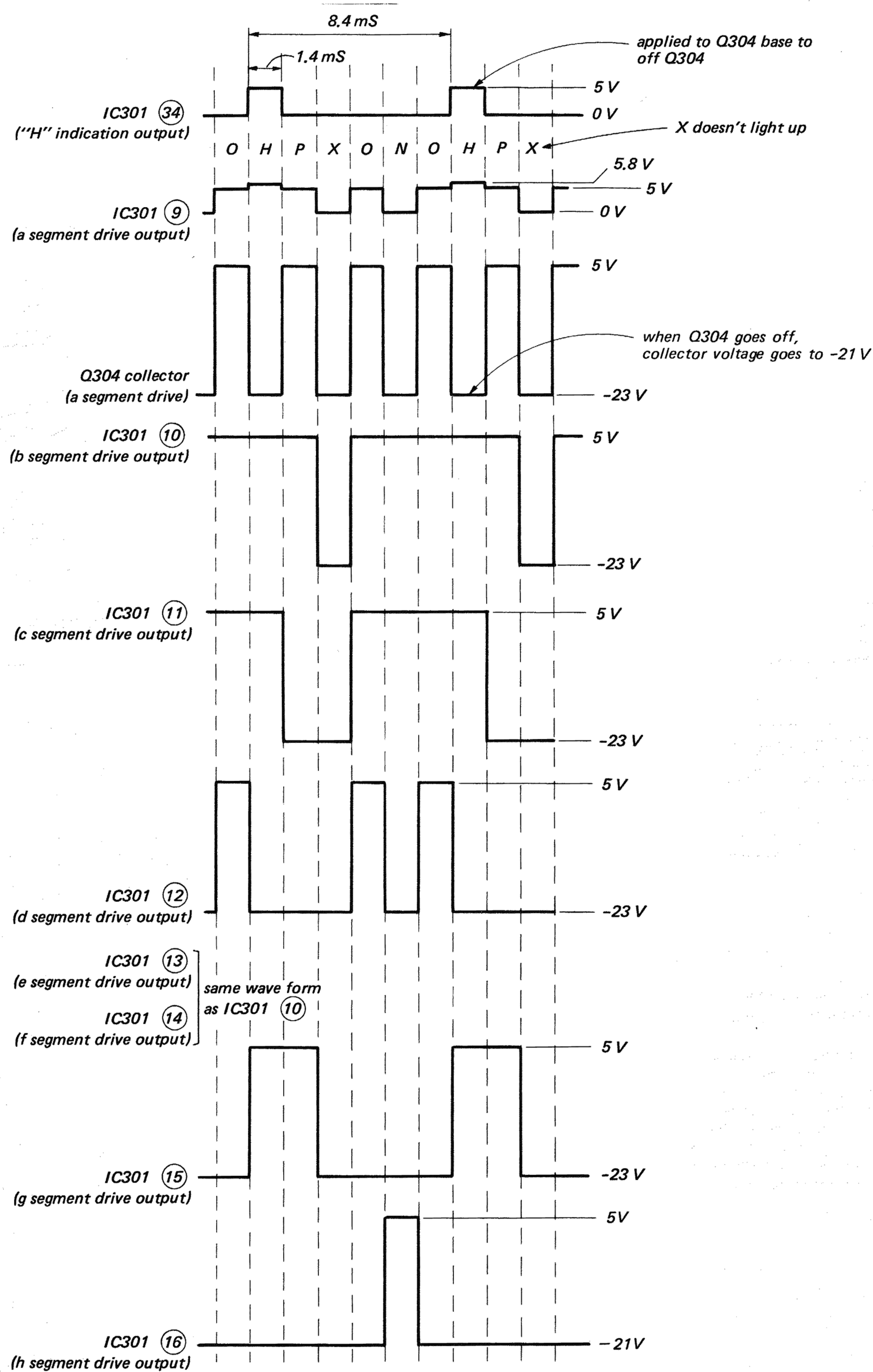


Fig. 3

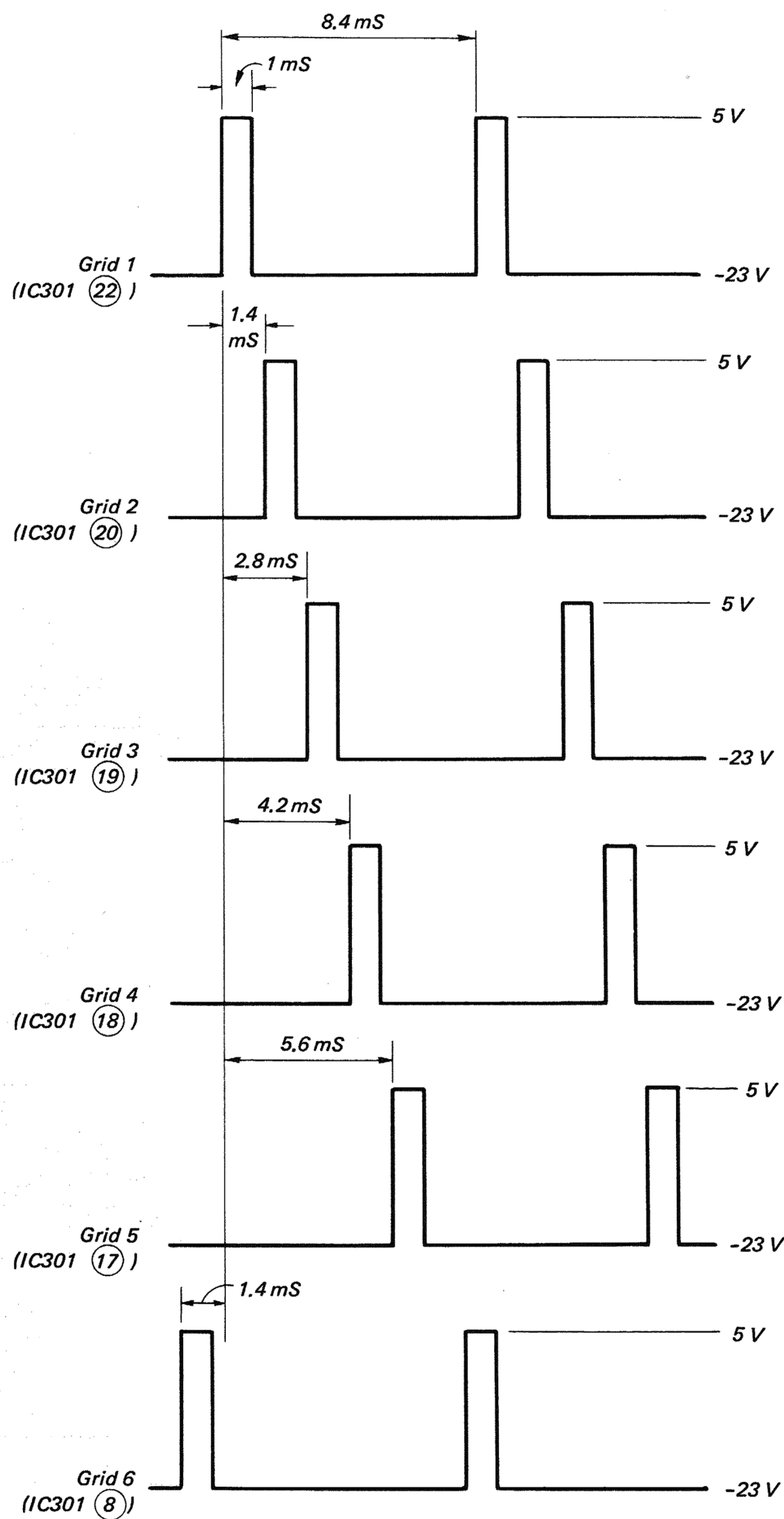
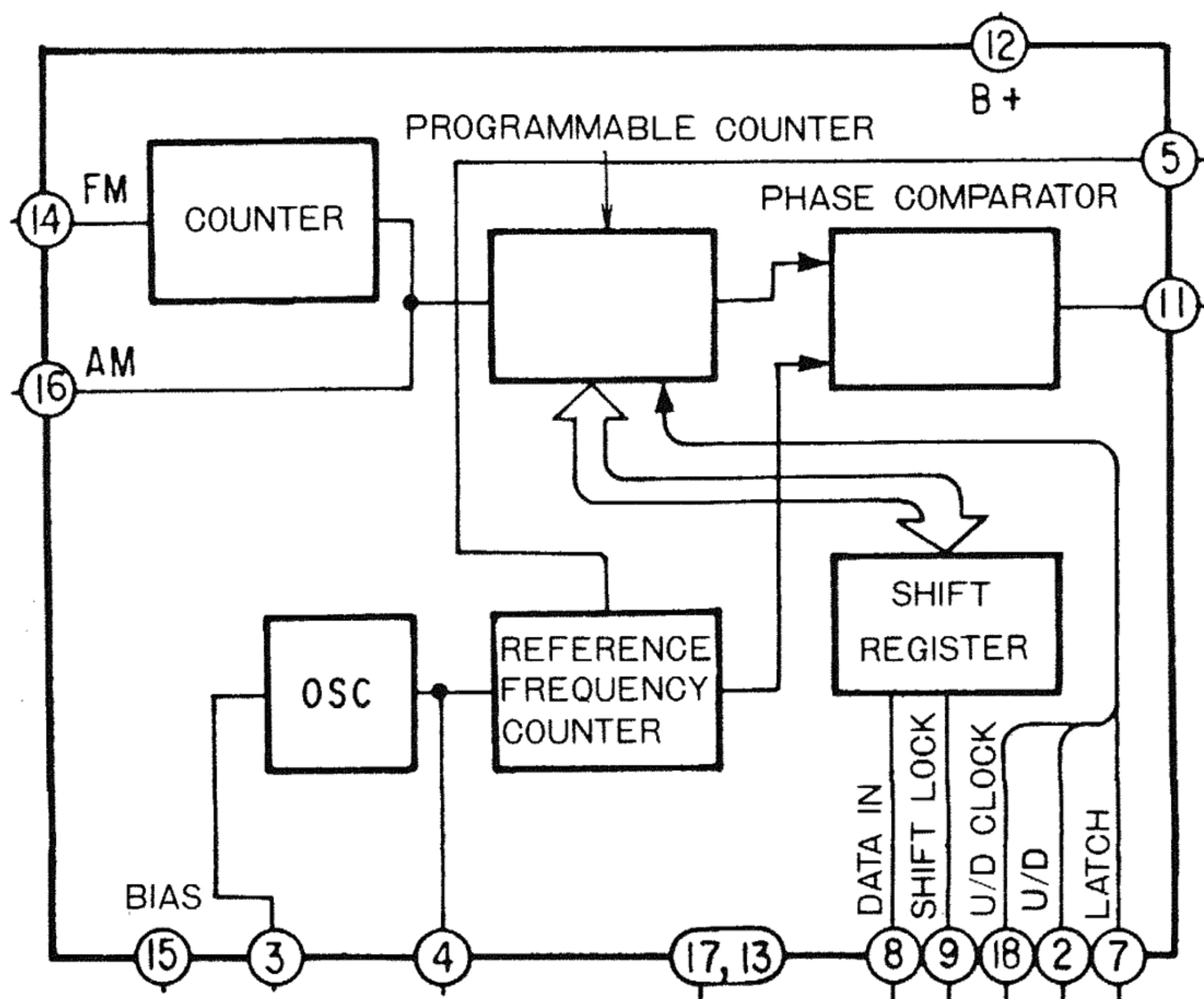


Fig. 4

IC302 is the PLL synthesizer to control local oscillator frequency by comparing it with reference frequency. As the local oscillator output is directly (without any additional prescaler) supplied to the programmable counter section, reference frequency is as high as the channel spacing frequency. The benefits owing to this are the stable and almost ripple-less local oscillation and reduced spurious radiation.

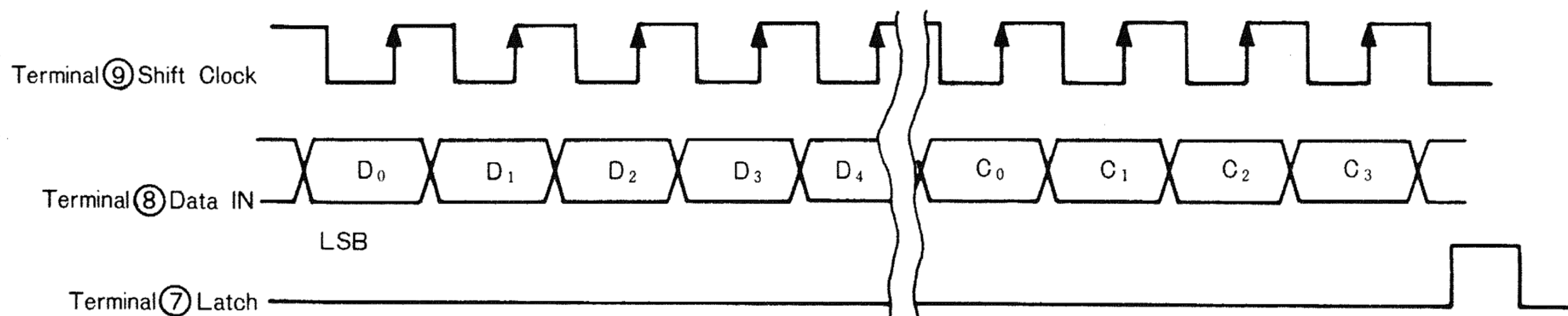


Pin No.	Mark	Function
1	Data Check	not used in this set
2	U/D	input terminal for selecting mode of built-in UP/DOWN counter HIGH level: UP mode LOW level: DOWN mode
3, 4	X ₁ , X ₀	terminal for connecting crystal oscillator (7.2MHz)
5	Sys CLK	output terminal for system clock in phase comparator 360kHz
6	Fref	output terminal for reference frequency
7	Latch	input terminal for signal to let the shift register latch the data Data is latched at HIGH level
8	Data IN	input terminal for data
9	Shift CLK	input terminal for clock to let data input in 16-bit serial manner
11	PD	output terminal for phase comparator (tristate)
12	V _{DD}	power supply (+5V)
13	Fout	output terminal for divided signal from the programmable counter
14	FM IN	input terminal for signal from FM local oscillator
15	Sub	substrate
17	GND	ground
18	U/D CLK	input terminal for UP/DOWN clock of UP/DOWN counter

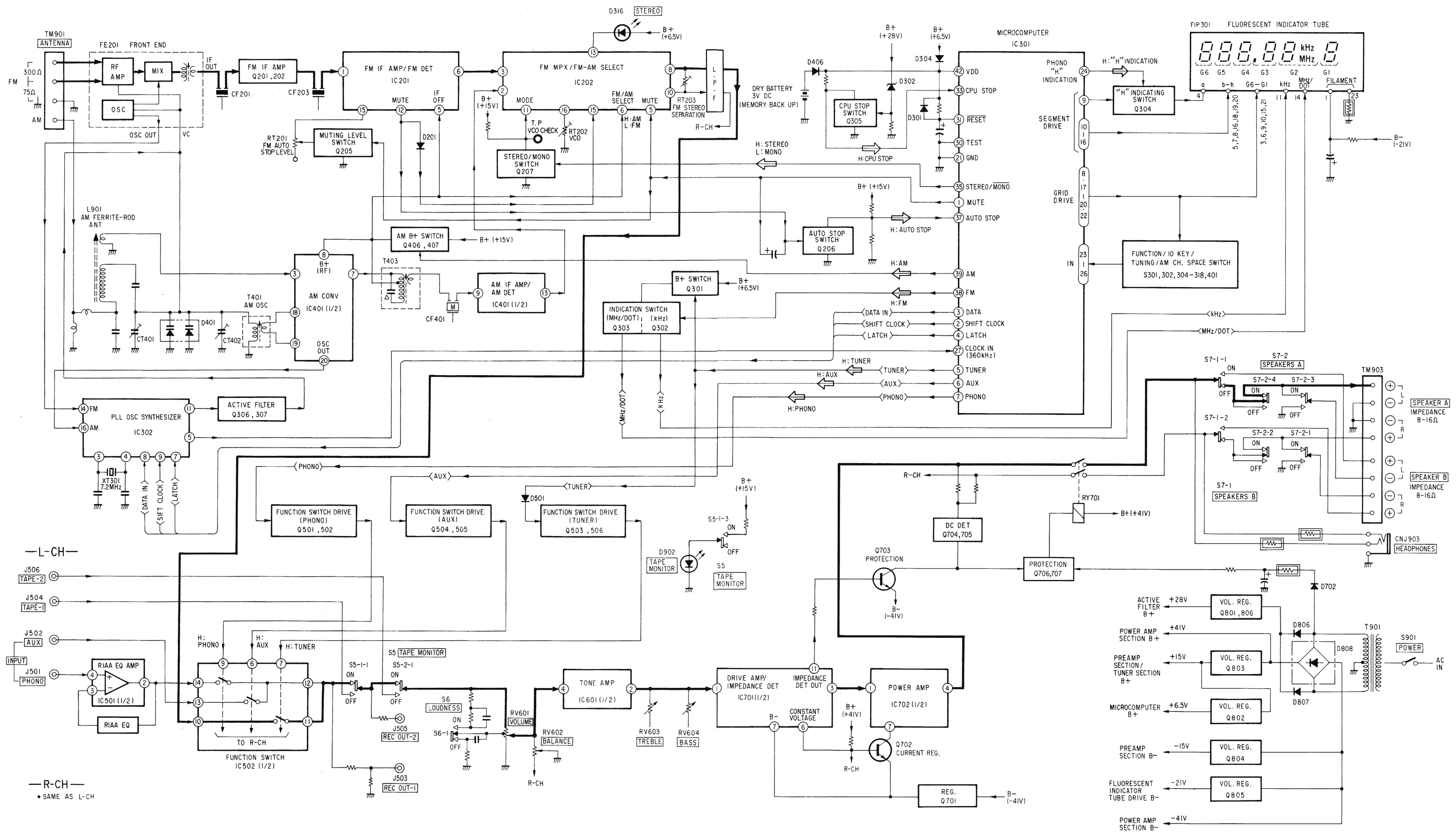
Data Input Procedure from Microcomputer:

- Setting of division ratio

setting division ratio of the programmable counter and the last 4 bits ($C_0 - C_3$) works for controlling comparison frequency. Timing chart when data are input is as follows.



1-5. BLOCK DIAGRAM

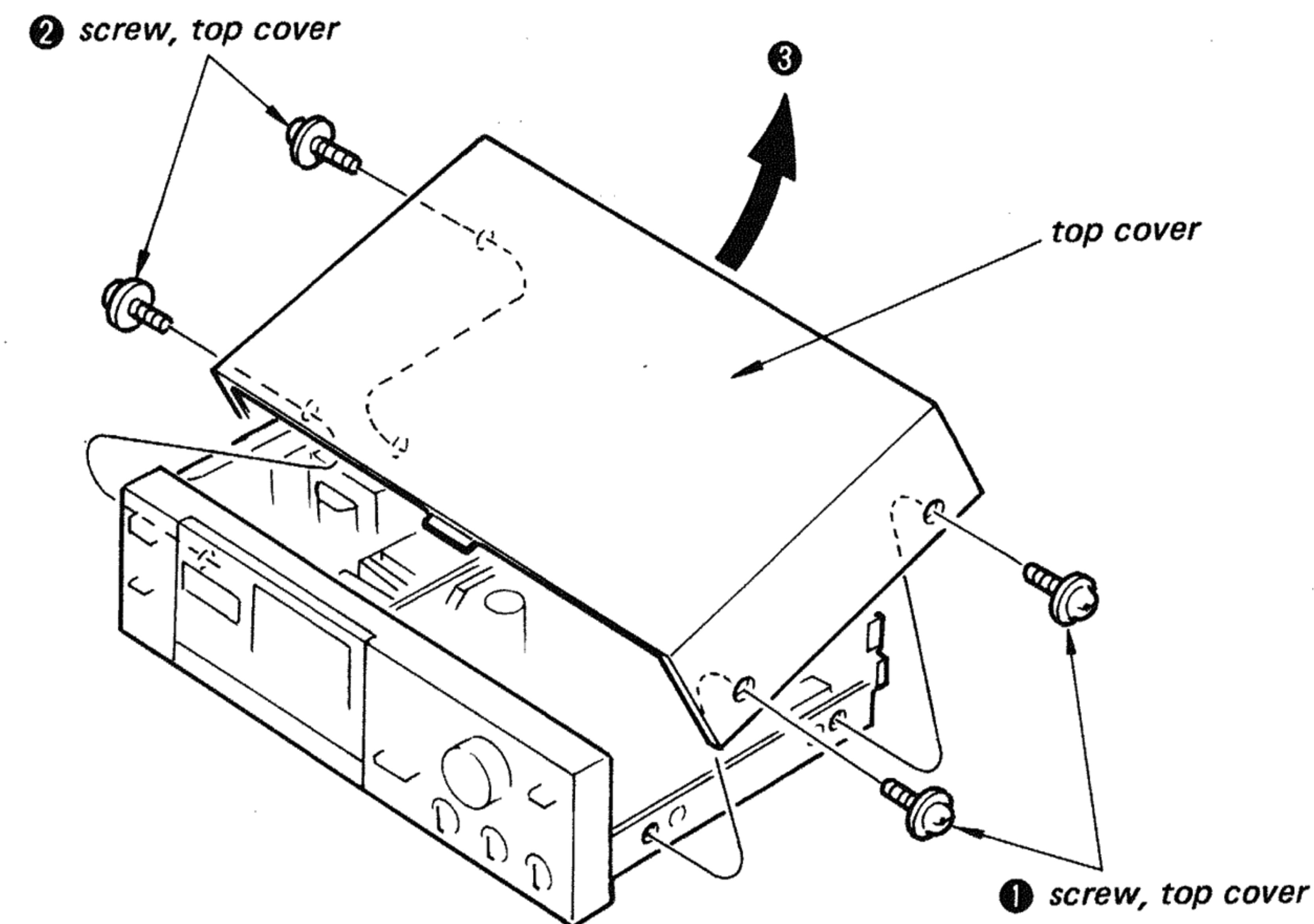


SECTION 2 DISASSEMBLY

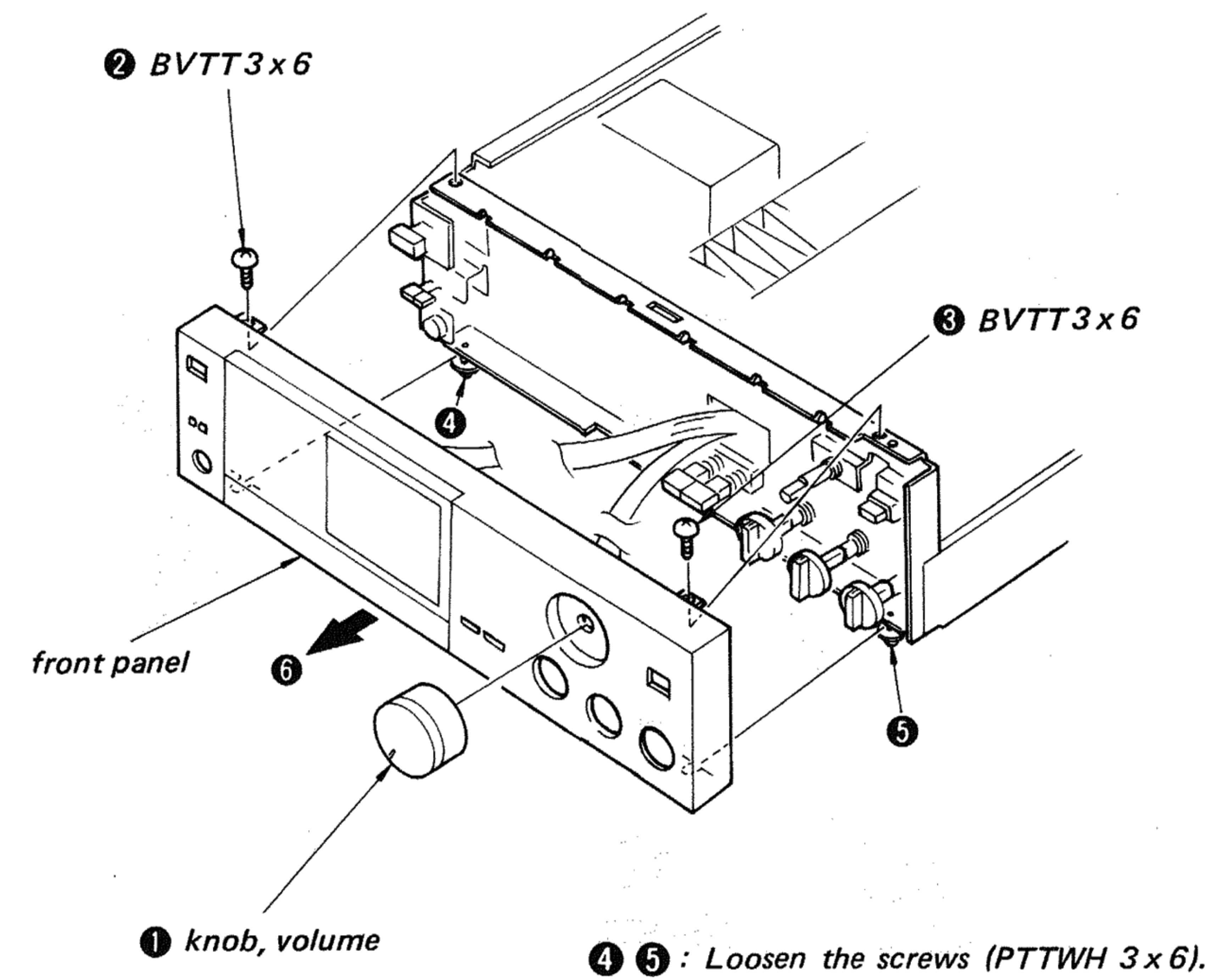
2-1. REMOVAL

Note: Follow the disassembly procedure in the numerical order given.

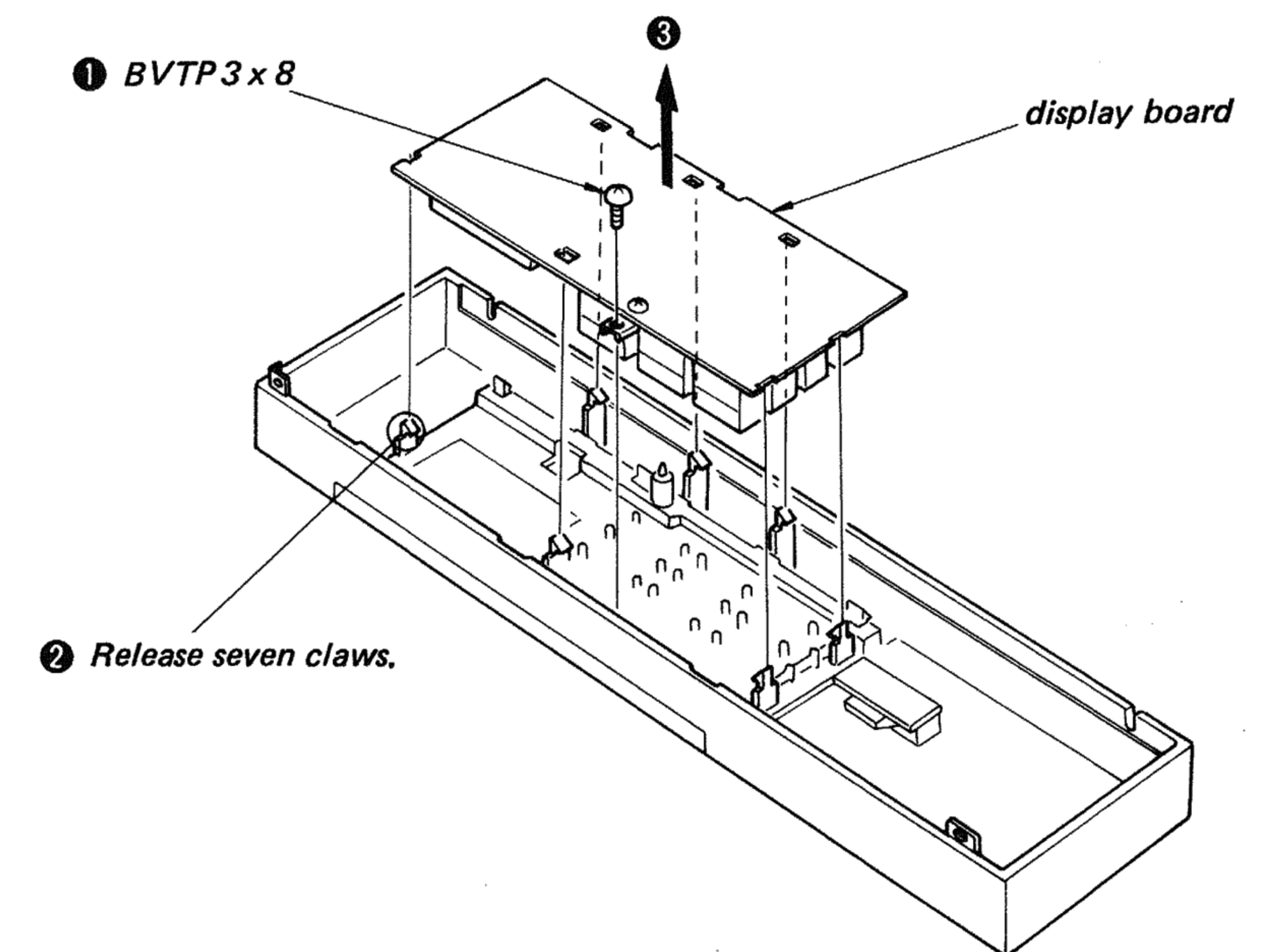
Top Cover



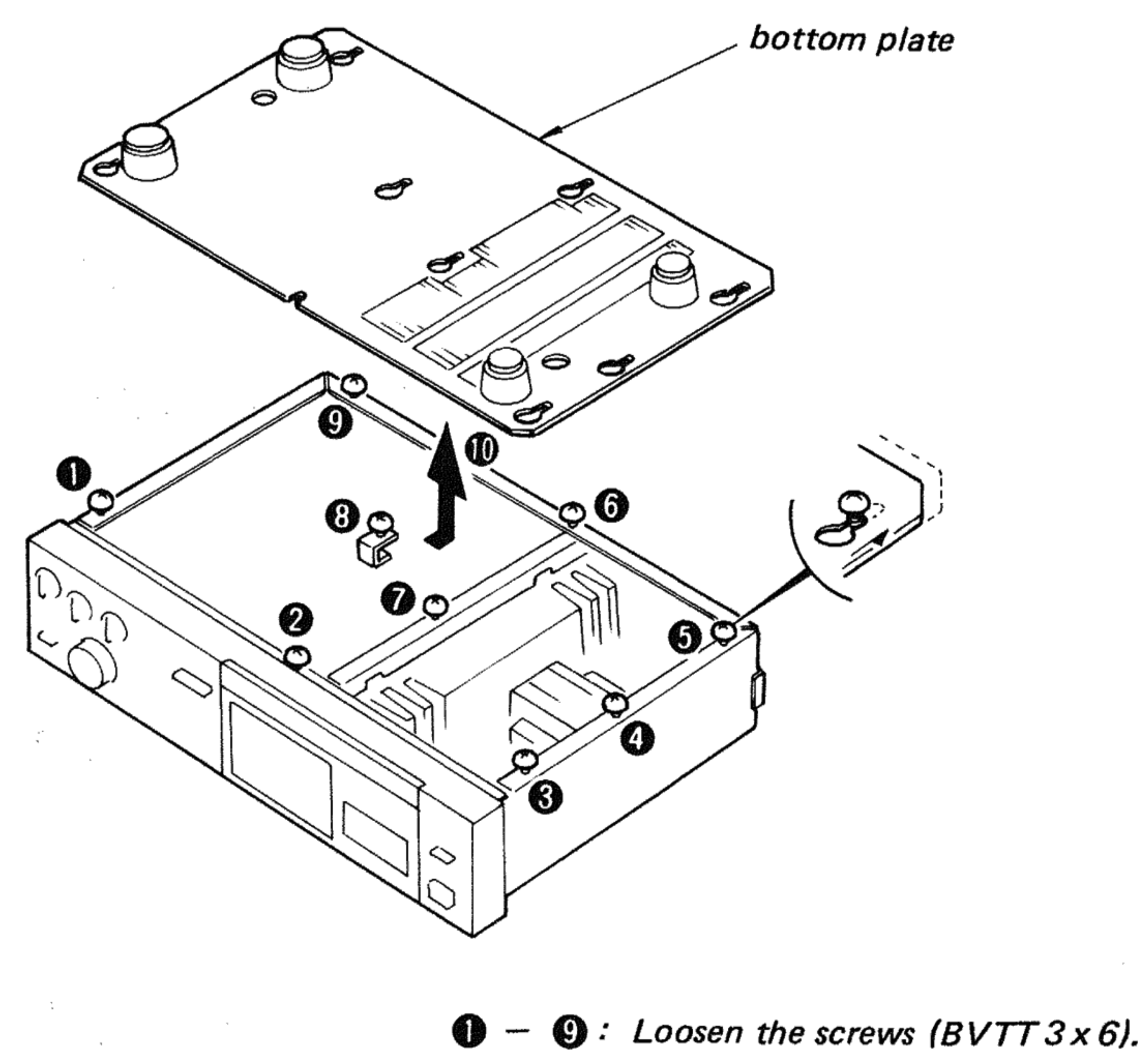
Front Panel



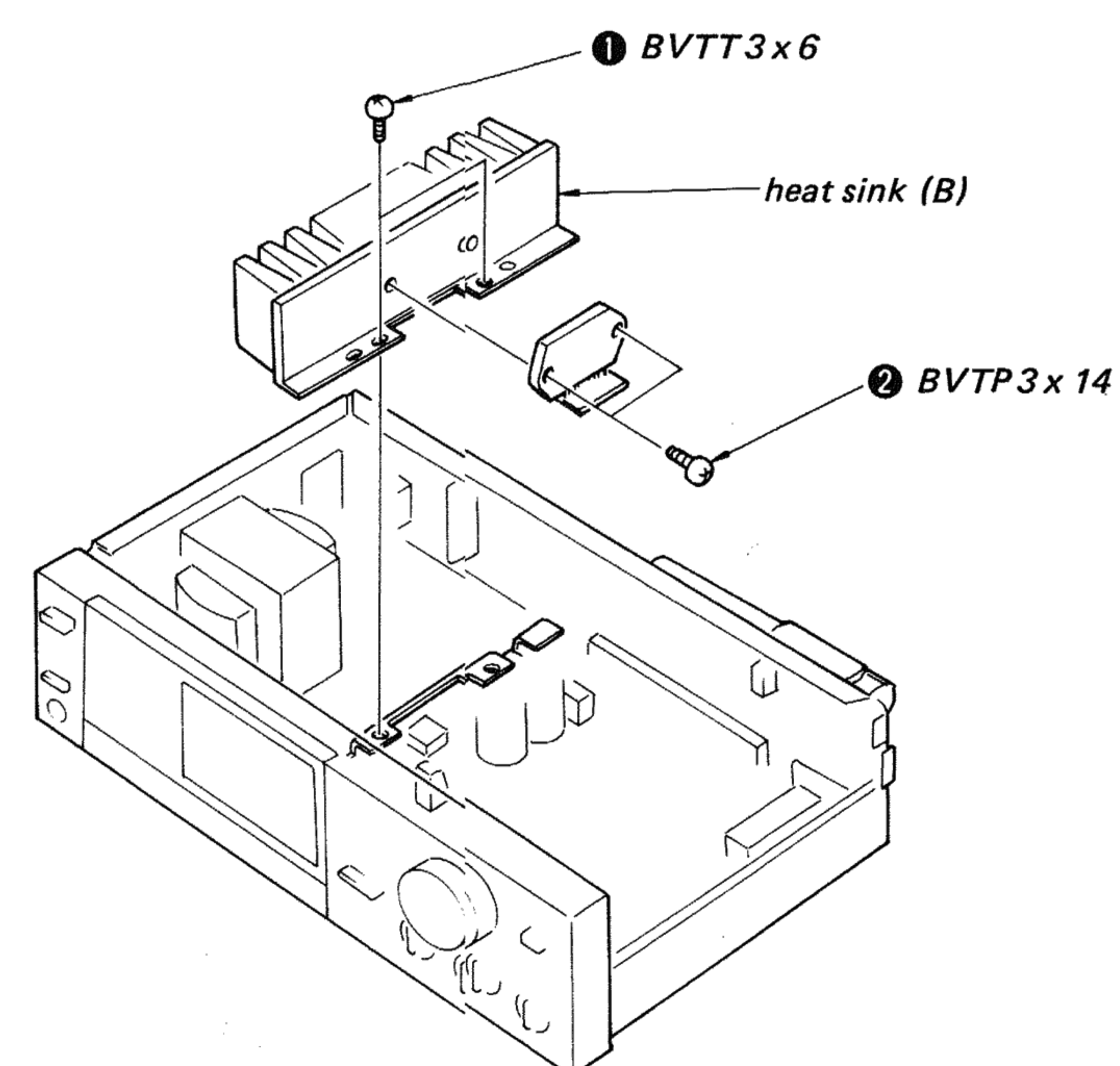
Display Board



Bottom Plate



Heat Sink (B)

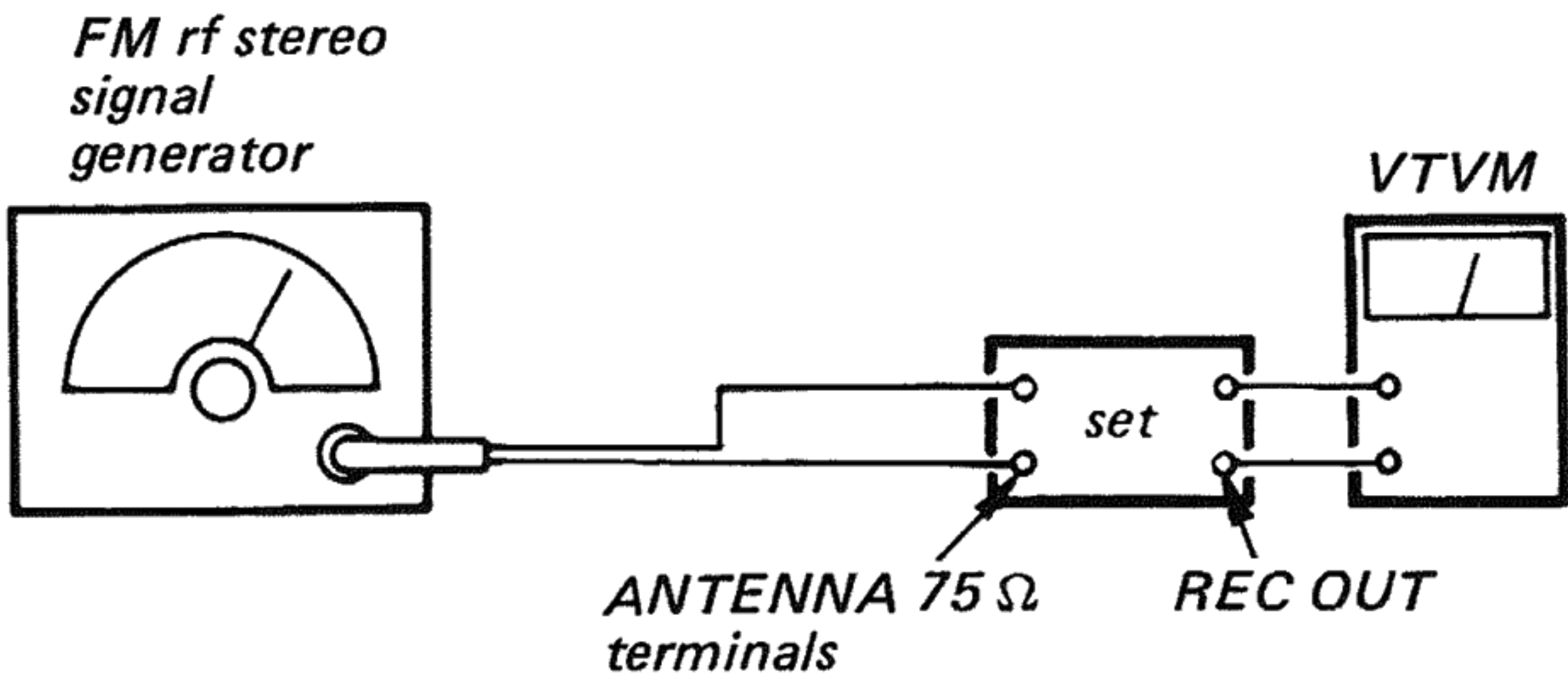


SECTION 3
ADJUSTMENTS

FM SECTION

FM Stereo Separation Adjustment

Procedures:



Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Modulation
Audio 400 Hz: 33.75 kHz deviation (45%)
Sub channel 38 kHz: 33.75 kHz deviation (45%)
Pilot signal 19 kHz: 7.5 kHz deviation (10%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	(A)
R-CH	L-CH	(B) Adjust RT203 for minimum reading.
R-CH	R-CH	(C)
L-CH	R-CH	(D) Adjust RT203 for minimum reading.

L-CH Stereo separation: (A) – (B)
R-CH Stereo separation: (C) – (D)

The separations of both channels should be equal.

The FM front-end is carefully adjusted at the factory and is supplied as one whole block for replacement.

RT203

T202 (secondary side)

T201 (primary side)

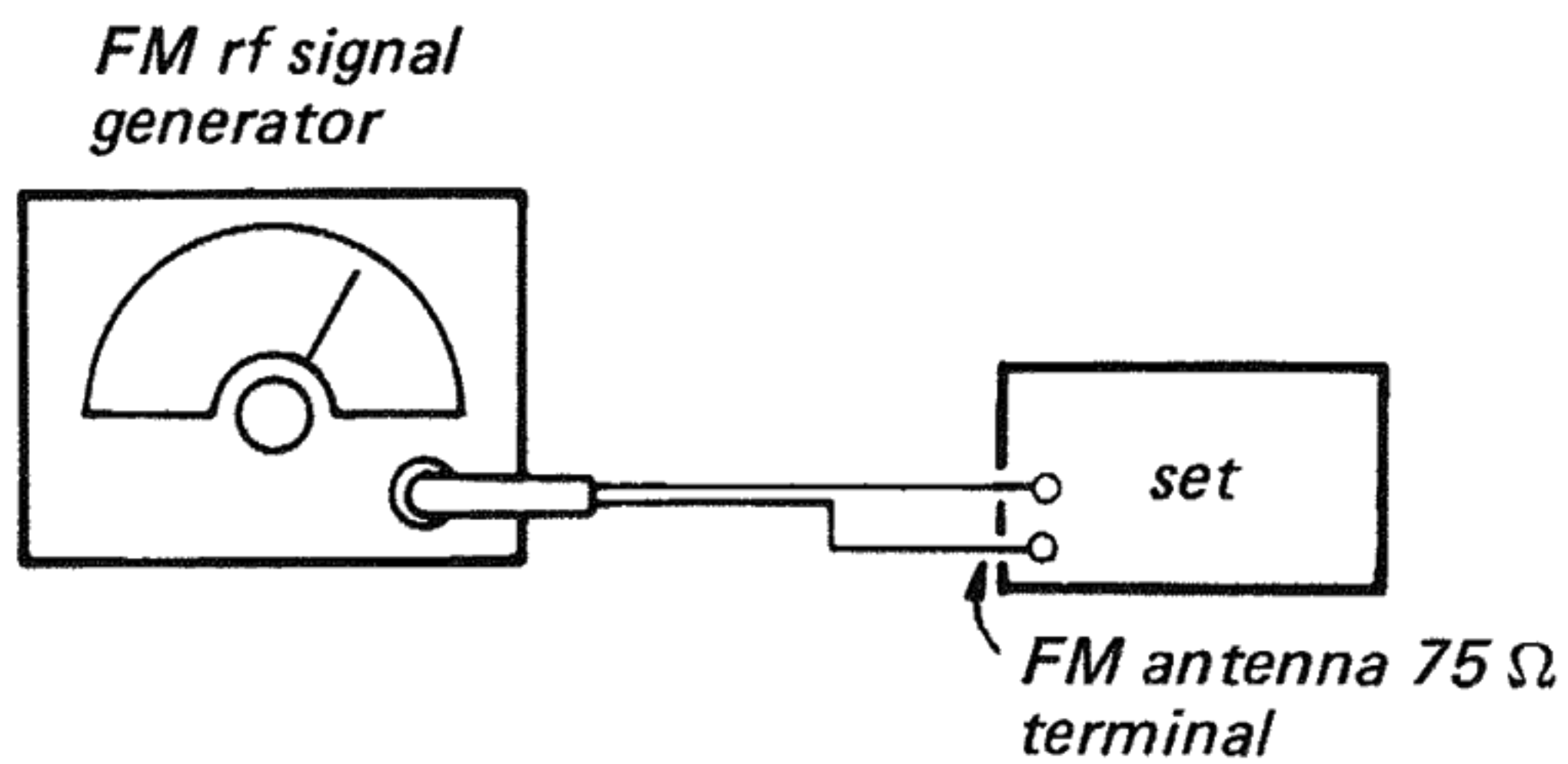
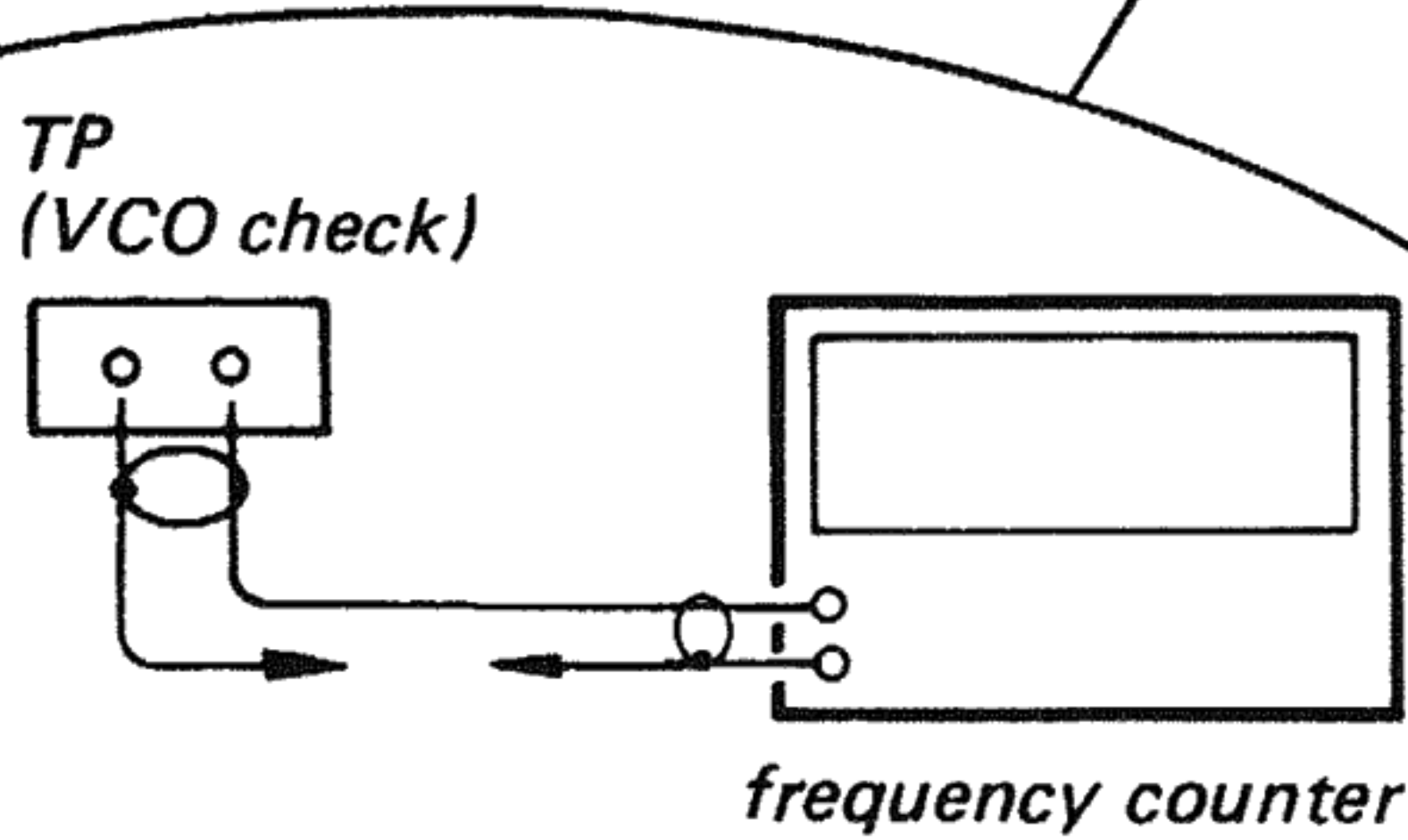
TP (NULL check)

RT202

VCO Adjustment

A) Regular Method

Procedure:



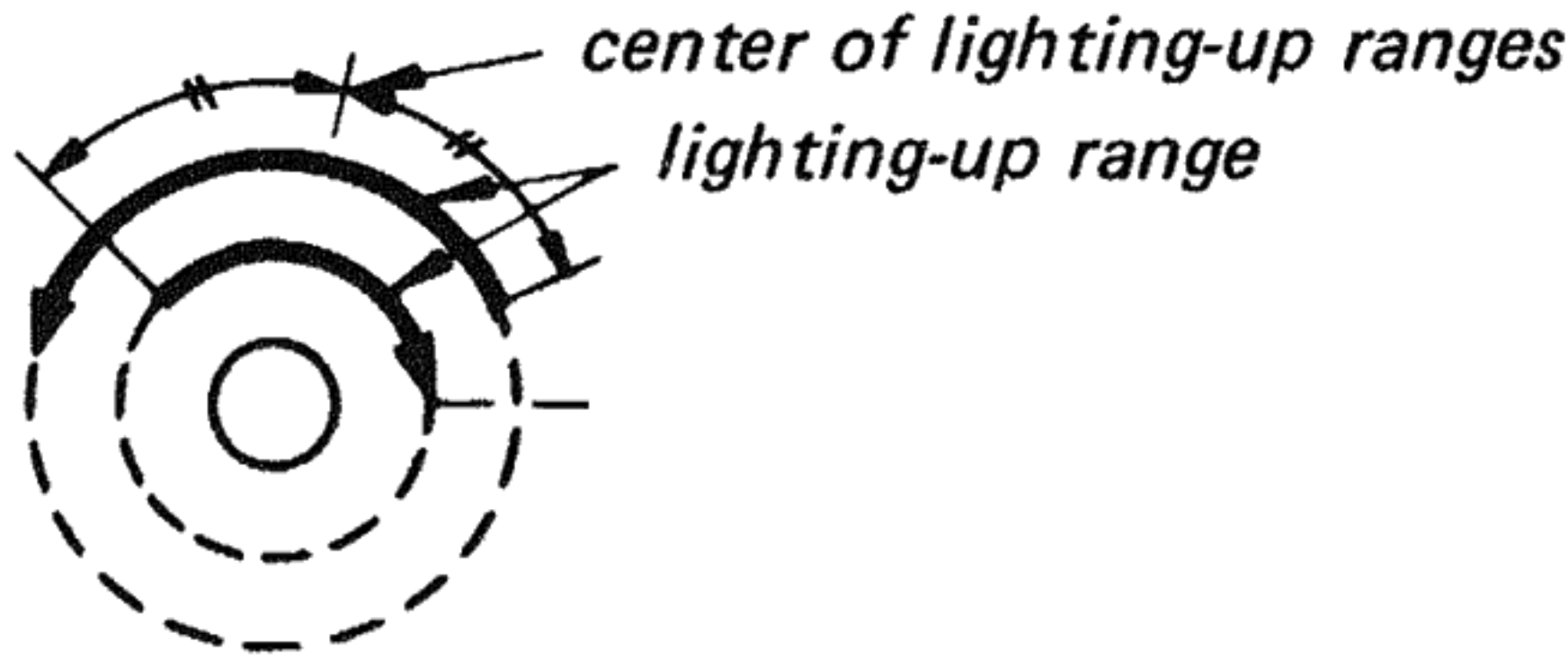
Carrier frequency: 98 MHz
Modulation: no modulation
Output level: 1 mV (60 dB)

1. Tune the set to 98 MHz.
2. Adjust RT202 for 19 kHz \pm 50 Hz on the counter.

B) Simple Method

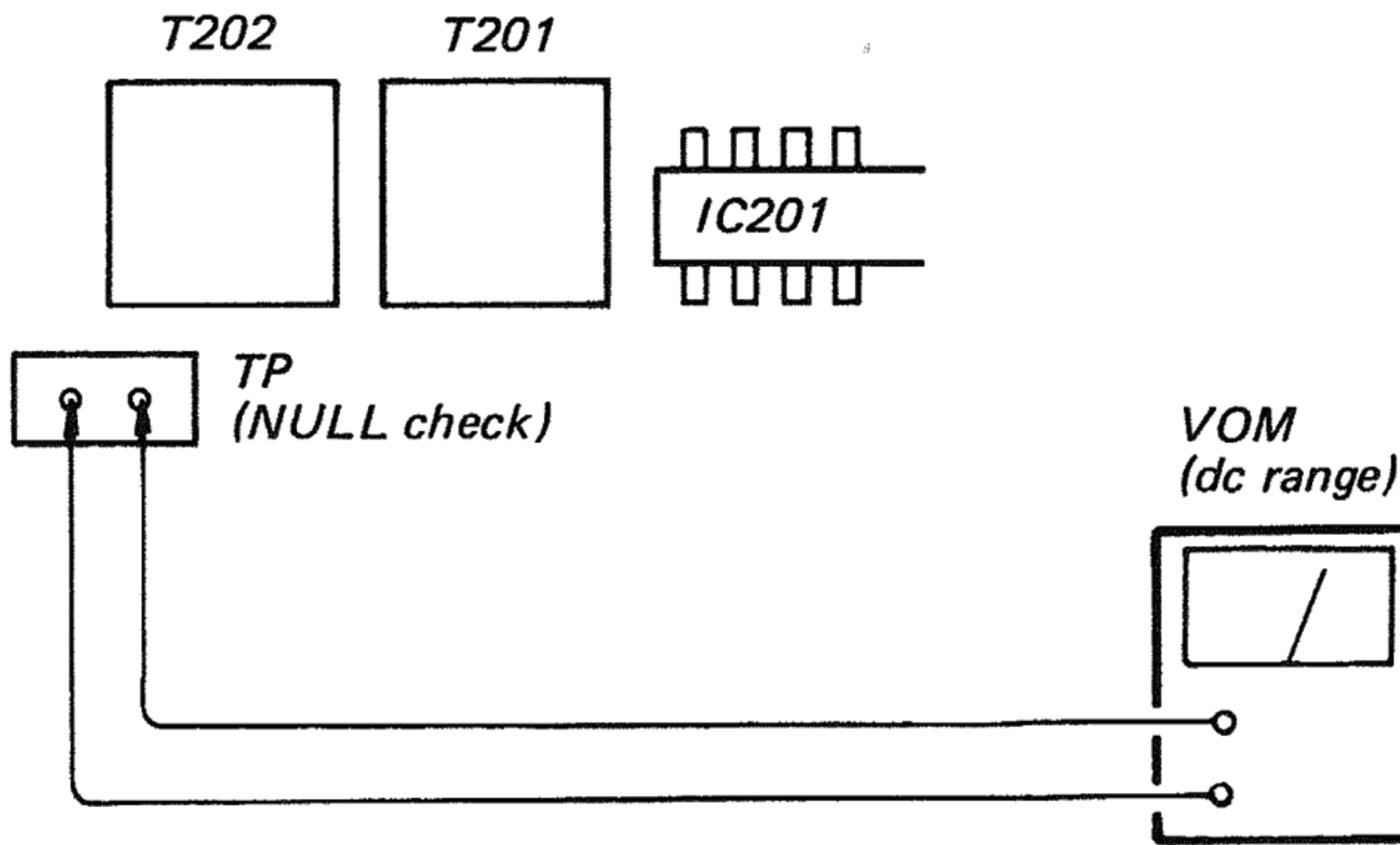
Procedure:

1. Tune the set to the FM stereo broadcasting signal.
2. Turn RT202 clockwise or counterclockwise and memorize the lighting-up range of stereo lamp.
3. Secure RT202 at the center of the lighting-up range of both turns as shown below.



FM Discriminator Alignment 1

Setting:



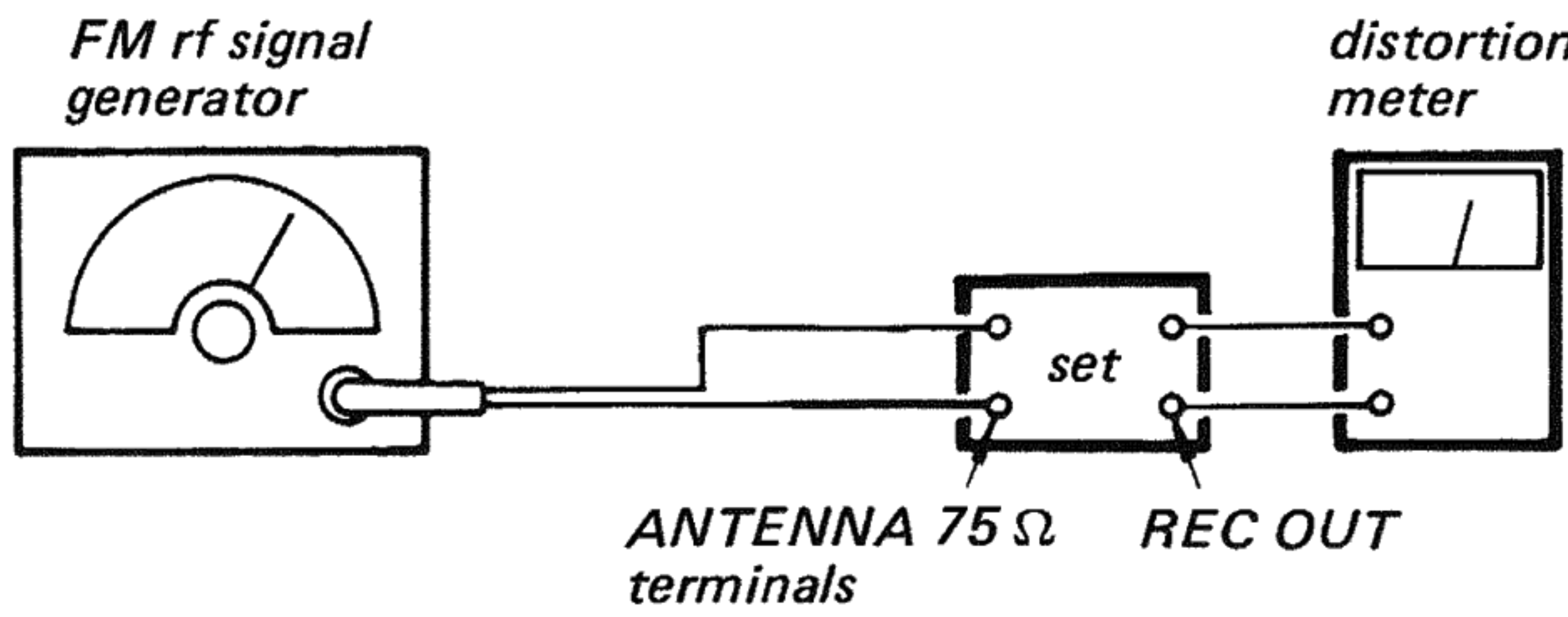
Procedure:

1. Tune the set in the strong station-signal.
2. Adjust the black core (primary-side) of T201 for 0 V reading on VOM.

Note: When replacing the ceramic filter, perform this alignment.

FM Discriminator Alignment 2

Setting:

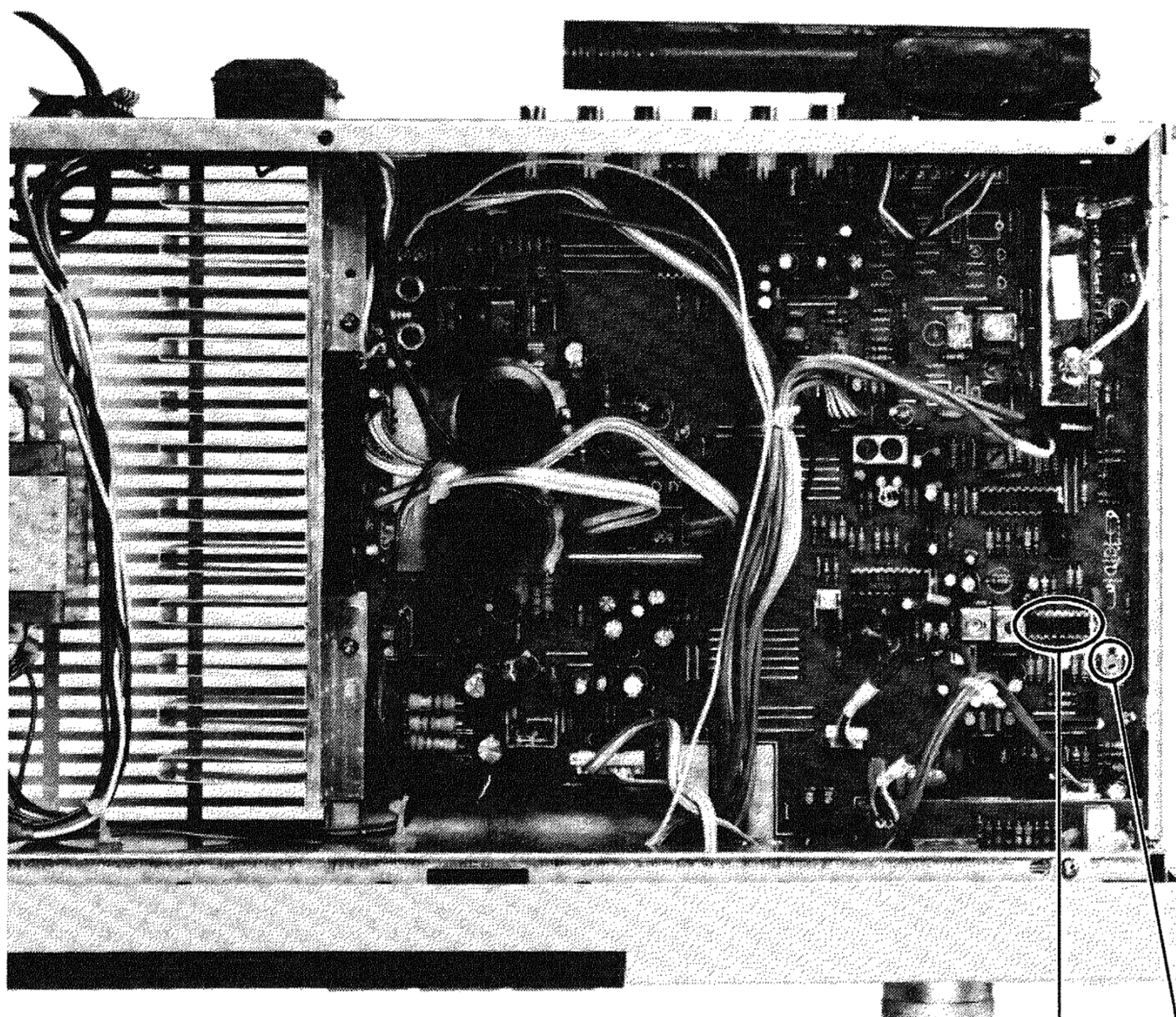


Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 10 μ V (20 dB)

Procedure:

Adjust the white core (secondary side) of T202 for minimum distortion.

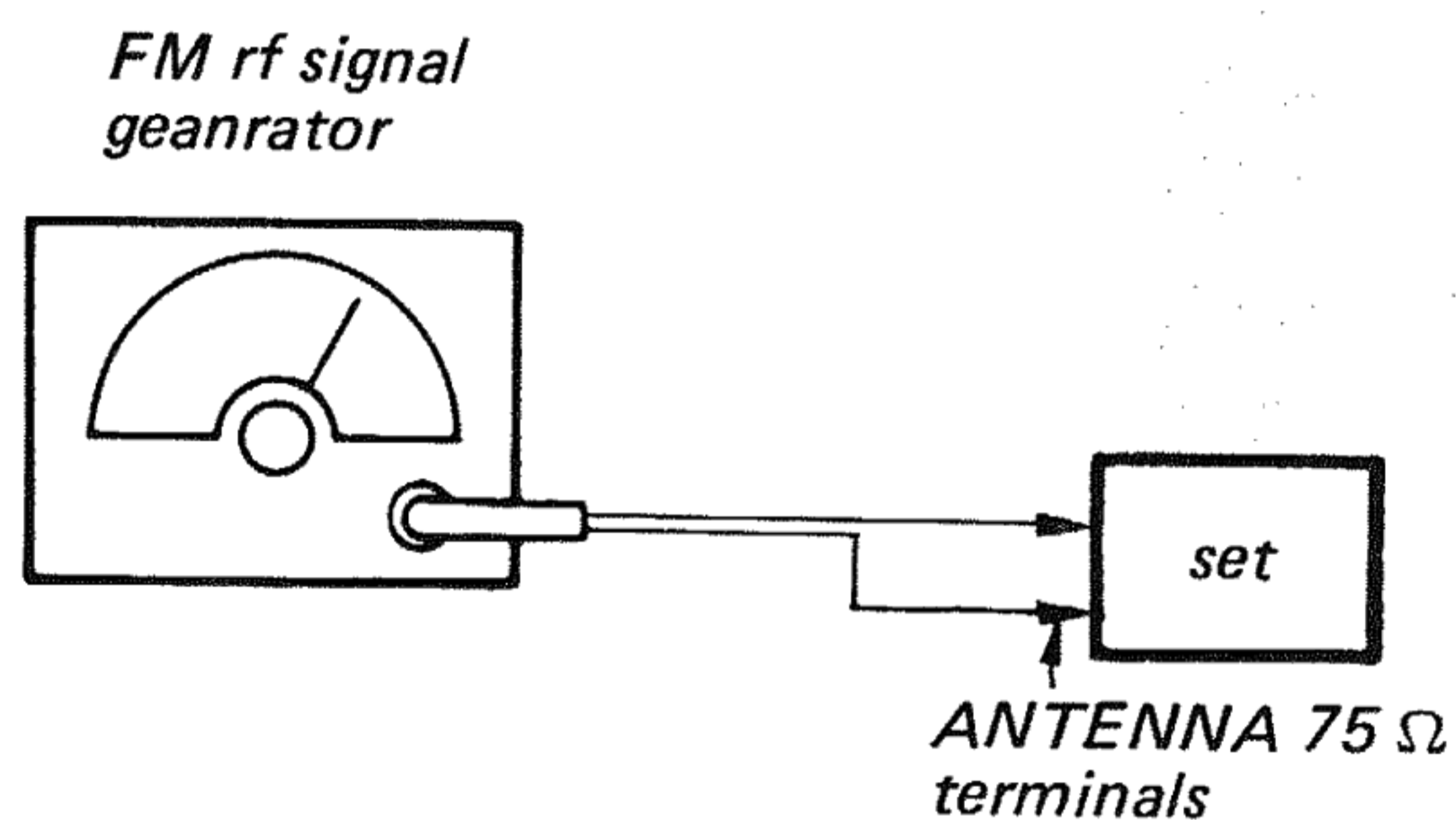
Note: When replacing the ceramic filter, perform this alignment.
Repeat the secondary-side and primary-side alignments several times.



RT201

FM Auto Stop Level Adjustment

Setting:



Procedure:

Carrier frequency: 98 MHz
 Modulation: 400 Hz, 75 kHz deviation (100%)
 Output level: 56 μ V (35 dB)

1. Tune the set to 98 MHz by pressing the TUNING buttons.
2. Set RT201 to the position where the VOM reading changes from 5.8 V to 0 V.

