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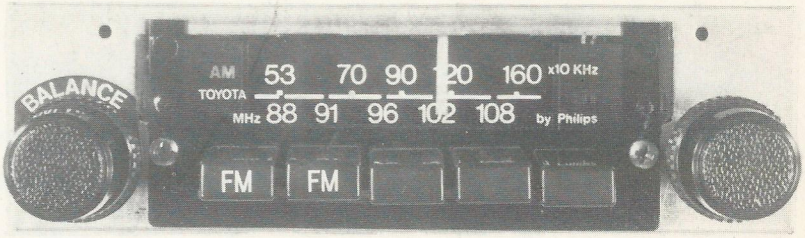



# Service Manual

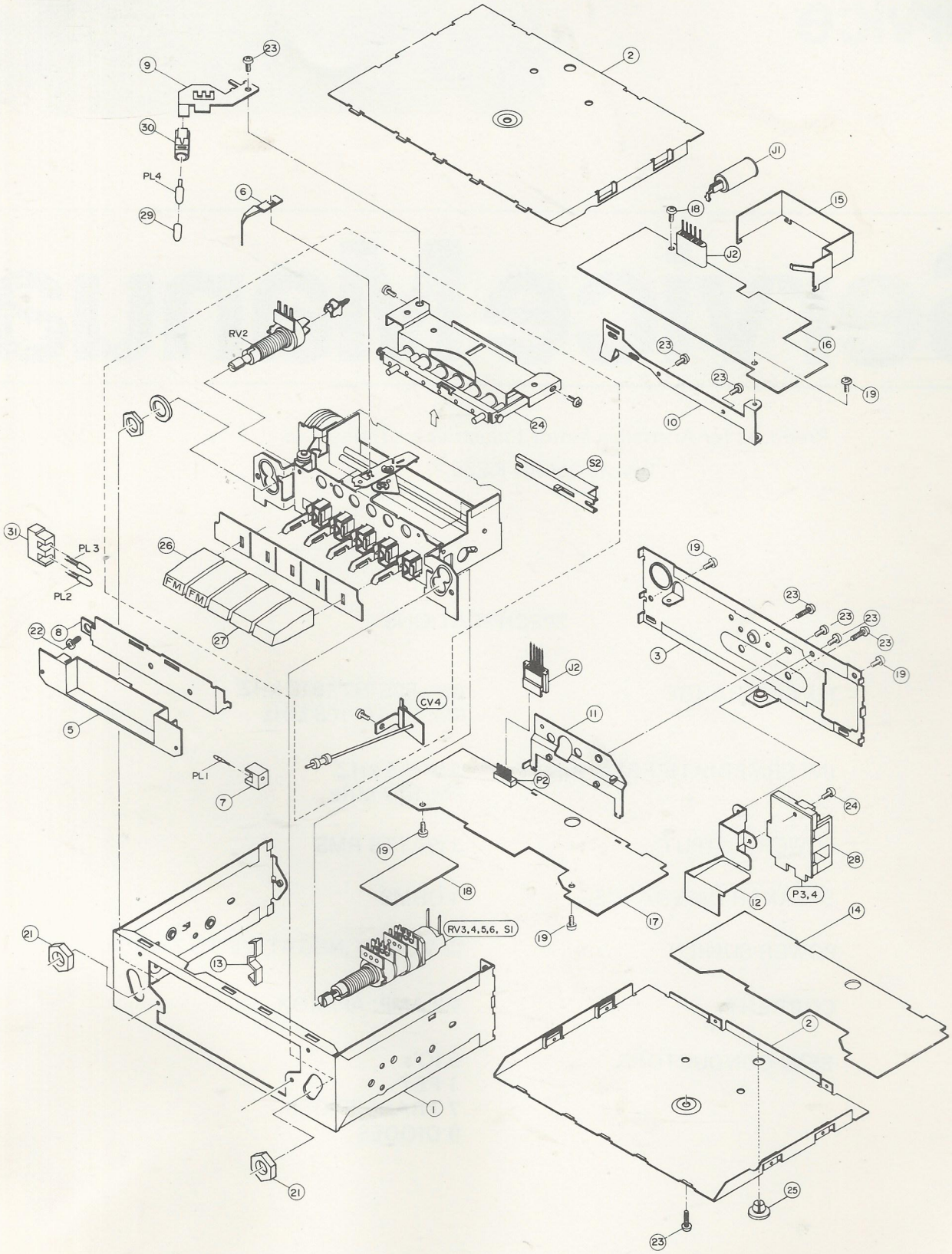
Produced for Australian Motor Industries for Fitment to
Toyota Corolla KE55.

12 V

## SPECIFICATIONS

| | |
|---|---|
| TUNING RANGE | AM: 525 TO 1615 kHZ<br>FM: 88 TO 108 MHz |
| INTERMEDIATE FREQUENCY | AM 455 kHZ<br>FM 10.7 MHz |
| POWER OUTPUT | 3 WATTS RMS |
| SPEAKER IMPEDANCE | 4 OHMS |
| POWER SUPPLY | 12 VOLTS NEGATIVE TO EARTH |
| CURRENT | 1.2 AMP. APPROX. |
| SEMI CONDUCTORS | 5 IC's<br>1 FET<br>7 TRANSISTORS<br>9 DIODES |

# EXPLODED VIEW



# AM ALIGNMENT

## 〔1〕 IF Alignment

(1) Measuring Equipment and Connections

a. Equipment: Sweep Generator, Oscilloscope

b. Connections:

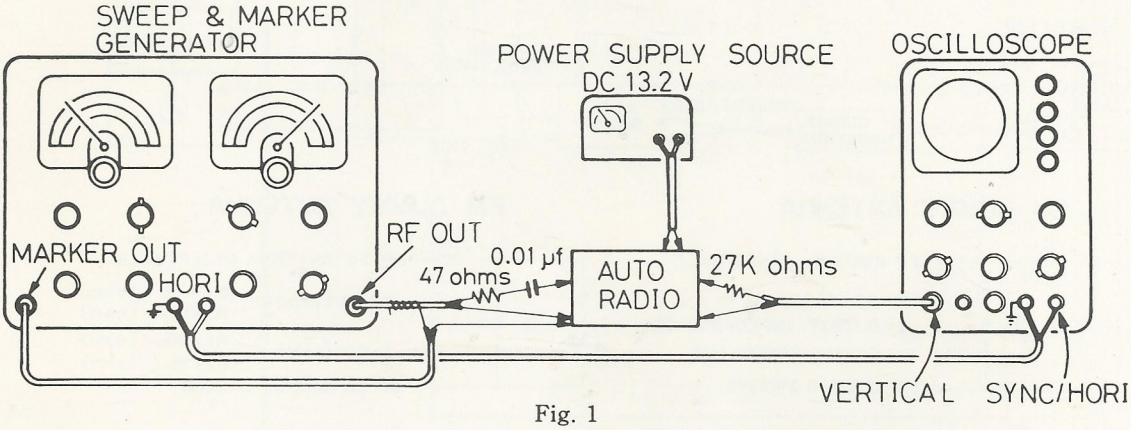



Fig. 1

Set the frequency of sweep generator at 455 kHz.

| PURPOSE | SWEEP GENERATOR OUTPUT | VERTICAL INPUT | HORIZONTAL INPUT |
|---|---|---|---|
| IF curve | Connect TP1 in Fig. 7 through 0.01μF & 47 ohm | Connect TP2 in Fig. 7 through 27k-ohm resistor | Connect with HORIZONTAL terminal of sweep generator |

(2) Preparations for alignment

a. Power supply: 13.2 VDC

b. Switch: Band selector for AM

c. Controls: Volume for minimum
Tone for high

d. Dial pointer: Near 1,000 kHz and no signal exists

(3) Alignment (Refer to Fig. 7 for ADJUSTMENT POINTS.)

| STEP | ADJUSTMENT POINTS | PROCEDURE |
|---|---|---|
| 1 | $T_{4,5,6,7}$ | Get maximum IF curve and best symmetry on both sides. |
| 2 | See STEP 1 | Repeat above procedure two or three times. |

## 〔2〕 Tracking Alignment

(1) Measuring Equipment and Connections

a. Equipment: Signal generator (output level adjustable)
AC Voltmeter (VTVM or circuit tester)

b. Connections:

# AM ALIGNMENT (cont.)

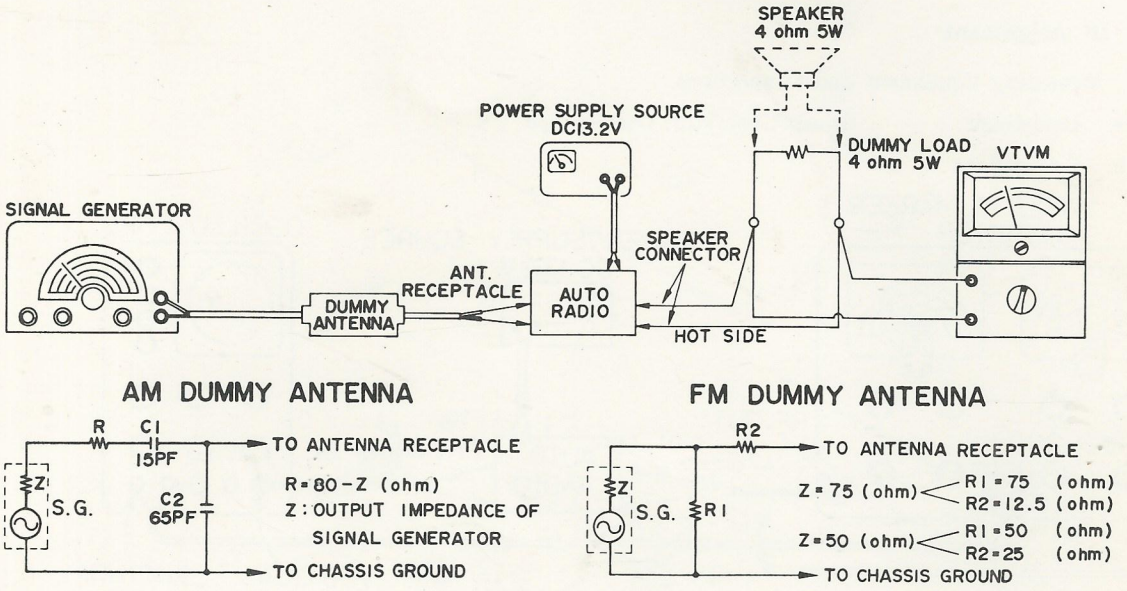



Fig. 2

(2) Preparations for alignment

a. Power supply: 13.2 VDC

b. Switch: Band selector for AM

c. Controls: Volume for maximum
Tone for high

(3) Alignment (Refer to Fig. 7 for ADJUSTMENT POINTS.)

| STEP | PURPOSE | GENERATOR FREQUENCY | DIAL POINTER | ADJUSTMENT POINTS | PROCEDURE |
|---|---|---|---|---|---|
| 1 | Tuning range | 505 kHz modulated | Low-end stop | $T_3$ | Adjust so that output amplitude maximum |
| 2 | | 1,635 kHz modulated | High-end stop | $CV_6$ | |
| 3 | Repeat STEP 1 to 2 three or four times. | | | | |
| 4 | Tracking | 1,400 kHz modulated | Tune in SG frequency accurately | $CV_5$ | Adjust so that output amplitude maximum |
| 5 | | | | $CV_4$ | |

**NOTE:** Always readjust antenna trimmer $CV_4$ when radio or antenna reinstalled, tuning in a weak station around 1,400 kHz and get maximum volume.

# FM ALIGNMENT

## 〔1〕 IF Alignment

(1) Preparations for alignment

a. Connections (Refer to Fig. 1)

| SWEEP GENERATOR OUTPUT | OSCILLOSCOPE VERTICAL INPUT | OSCILLOSCOPE HORIZONTAL INPUT |
|---|---|---|
| Connect TP3 in Fig. 7 through 0.01 μF capacitor & 47 ohm resistor | Connect TP4 in Fig. 7 through 27k-ohm resistor | Connect with HORIZONTAL terminal of sweep generator |

b. Power supply : 13.2 VDC

c. Switch : Band selector for FM

d. Controls : Volume for minimum
Tone for high

(2) Alignment (Refer to Fig. 7 for ADJUSTMENT POINTS.)

| STEP | PURPOSE | SWEEP GENERATOR FREQUENCY | SET TUNER TO | ADJUSTMENT POINTS | PROCEDURE |
|---|---|---|---|---|---|
| 1 | IF circuit | Center frequency varies according to the color of the ceramic filter (Refer to chart given below) | Near 98 MHz no signal exists | $T_1$, $T_2$ | S-curve adjust for full gain and length of at linears. (See Fig. 4) |
| 2 | | | | | |
| 3 | Detector circuit | | | | Keep S-curve straight at the center, and adjust waveform for best symmetry of S-curve against the axis as much as possible. (See Fig. 4) |
| 4 | Repeat STEP 1 to 3 until no further gain output can be obtained. | | | | |

| COLOR | CENTER FREQUENCY |
|---|---|
| Black | 10.64 MHz ± 30 kHz |
| Blue | 10.67 MHz ± 30 kHz |
| Red | 10.70 MHz ± 30 kHz |
| Orange | 10.73 MHz ± 30 kHz |
| White | 10.76 MHz ± 30 kHz |

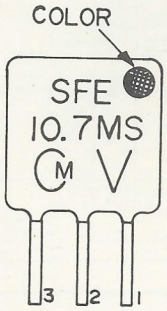



Fig. 3

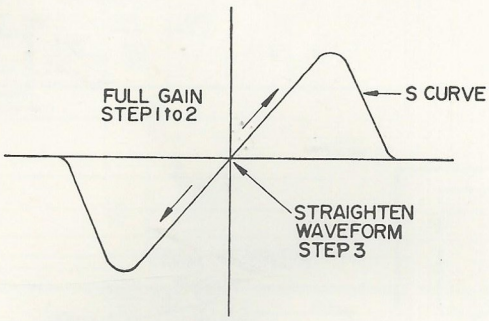



Fig. 4

(3) **Points to watch in replacing ceramic filter**

In the FM circuit there are two ceramic filters. It is important that both filter have the same color (i.e the same center frequency).

a. Readjustment is not necessary if a defective ceramic filter is replaced with one of the same color.

b. Both filters should be changed to the same color if one of them must be replaced with a different colored filter. Readjustment will be necessary because of the changed center frequency.

## 〔2〕 Tracking alignment (Refer to Fig. 7 for ADJUSTMENT POINTS.)

(1) Measuring Equipment and Connections

a. Equipment: Signal generator (output level adjustable)
AC Voltmeter (VTVM or circuit tester)

b. Connections: See Fig. 2

(2) Preparations for Alignment

a. Power supply : 13.2 VDC

b. Switch : Band selector for FM

c. Controls : Volume for maximum
Tone for high

(2) Alignment (Refer to Fig. 7 for ADJUSTMENT POINTS.)

| STEP | PURPOSE | GENERATOR FREQUENCY | SET TUNER TO | ADJUSTMENT POINTS | PROCEDURE |
|---|---|---|---|---|---|
| 1 | Tuning range | 87.5 MHz (400 Hz, 30%, FM modulated) | Low-end stop | $CV_3$ | Adjust for maximum meter indication. |
| 2 | | 108.5 MHz (400 Hz, 30%, FM modulated) | High-end stop | | 108.5 MHz must be received. |
| 3 | Tracking | 95 MHz (400 Hz, 30%, FM modulated) | Just tune in SG frequency | $CV_2$ | Adjust for maximum meter indication. |
| 4 | | | | $CV_1$ | |
| 5 | Be sure to confirm lower frequency of FM band is not received below 87 MHz. Readjust $CV_3$ as described STEP 1, if necessary. | | | | |

### LIMITING SENSITIVITY ADJUSTMENT

For Test set up refer to Fig. 1.

(a) Set the signal generator to 100 MHz. 94 dB. 400 Hz 30% modulated. (0 dB = 1$\mu$V)

(b) Tune the receiver to 100 MHz and adjust the tone control for maximum treble.

(c) Adjust the volume control to give an output of 0.5 W (1.4 V into 4 ohms)

(d) Reduce the signal generator output to 13 dB

(e) Adjust RV1 to reduce the receiver output by 3 dB to .25 W (1 V)

With the above adjustment completed, noise output should be approximately 1 V with no signal input and the volume and tone controls at maximum.

**NOTE:** The receiver will not operate with RV1 turned fully clockwise.

### STEREO DETECTOR ADJUSTMENT

The IC used as a STEREO DETECTOR eliminates the need for any adjustment.

**NOTE:** If IC 3 has to be replaced check the following points:—

(a) With no signal input to the receiver, a frequency counter connected to pin 4 should indicate 19 KHz ± 100 Hz

(b) Switch the receiver to FM STEREO and check that the STEREO lamp is illuminated.

# REPLACEMENT PARTS

| Ref. No. | Description | Service Code |
|---|---|---|

## CAPACITORS

NOTE: All Capacitors are standard ceramic, mylar or polycarbonate types unless specified otherwise.

| | | | |
|---|---|---|---|
| C27 | 33μF | 10V Electro | 4802 124 47013 |
| C28 | 47μF | 10V Electro | 4802 124 47016 |
| C38.71.72 | .47μF | 50V Electro | 4802 124 47065 |
| C48.62.65 | 4.7μF | 25V Electro | 4802 124 47034 |
| C56 | 22μF | 16V Electro | 4802 124 47021 |
| C60 | 100μF | 16V Electro | 4802 124 47049 |
| C68 | 220μF | 16V Electro | 4802 124 47018 |
| C75.76 | 100μF | 10V Electro | 4802 124 47002 |
| C77.78 | 47μF | 10V Electro | 4802 124 47016 |
| C79.80 | 1000μF | 10V Electro | 4802 124 47003 |
| C81.82 | 1000μF | 16V Electro | 4802 124 47051 |
| CV1.2 | 8pF | Trimmer FM. Ant & RF | 4802 125 57062 |
| CV3 | 10pF | Trimmer FM Osc. | 4802 125 57025 |
| CV4 | 50pF | Trimmer AM. Ant | 4802 125 57063 |
| CV5 | 50pF | Trimmer AM. RF | 4802 125 57064 |
| CV6 | 50pF | Trimmer AM. Osc. | 4802 125 57038 |

## RESISTORS

NOTE: All Resistors are standard values and tolerances unless specified otherwise.

| | | |
|---|---|---|
| RV1 | 300 ohm Limiting Sensitivity | 4802 100 17036 |
| RV2 | 20K Balance Control | 4802 102 27086 |
| RV3.4<br>RV5.6.S1 | 10K+10K+Switch | 4802 102 27065 |

## SEMICONDUCTORS

| | | |
|---|---|---|
| Q1 | F.E.T. 3SK60 | 4802 130 37285 |
| Q2.3.4.5 | 2SC710-C (Use BF494) | 5322 130 44195 |
| Q6.8 | 2SC828-QR | 4822 130 40965 |
| Q7 | 2SC1317 (Use BC337) | 4822 130 40855 |
| IC1 | SN76681N | 4802 209 87178 |
| IC2 | HA1199 | 4802 209 87122 |
| IC3 | KC4007 | 4802 209 87264 |
| IC4.5 | MB.3713M | 4802 209 87259 |
| D1.2.3 | ITT73N (Use IN914) | 5322 130 30009 |
| D4 | MZ207–1 Zener 9V (Use BZX79 C6V8) | 5322 130 30768 |
| D5 | ITT410 | 4802 130 37163 |
| D6.7 | IS446 (Use OA91) | 5322 130 30281 |
| D8 | RD9RIE Zener 9V (Use BZX79 C6V8) | 5322 130 30768 |
| D9 | IS1885 | 4802 130 37123 |

*Note: When using substitute semiconductors check the base connections before assembling to the PC board.

## MISCELLANEOUS ELECTRICAL

| | | |
|---|---|---|
| CF1.2 | Ceramic Filter | 4822 242 70268 |
| J1 | Receptacle Antenna | 4802 267 37017 |
| J2 | 5P Connector | 4802 268 47031 |
| P2 | 5P Connectors. Audio Input | 4802 268 47036 |
| P3.4 | 5P Connector. Speaker and Power | 4802 265 37032 |
| PL1 | Lamp Stereo Indicator | 4802 134 47072 |
| PL2.3 | Lamp. AM/FM Indicator | 4802 134 47088 |
| PL4 | Lamp. Power Indicator | 4822 134 40301 |
| | Socket (PL4) | 4802 255 27013 |
| | Filter (PL4) | 4802 480 37022 |
| | P.B. Tuner complete | 4802 210 17105 |
| | Button AM | 4802 411 67099 |
| | Button FM | 4802 411 67101 |
| RV2 | Tuning Shaft + Bal. Control | 4802 102 27086 |

## COILS & TRANSISTORS

| | | |
|---|---|---|
| L2 | Choke 0.03μH | 4802 158 17202 |
| L3 | Choke 2.2μH | 4802 158 17203 |
| L5 | Choke 0.03μH | 4802 158 17204 |
| L6 | Choke 6.8μH | 4802 158 17205 |
| L7 | Choke 68μH | 4802 158 17098 |
| L9 | Choke 6.2μH | 4802 158 17198 |
| L13 | Choke 4.7μH | 4802 158 17104 |
| L14.15.17 | Choke 0.74μH | 4802 158 17077 |
| L16 | Filter 2.7mH | 4802 158 17076 |
| LT1 | Coil, Trap 10.7MHz | 4802 158 17206 |
| T1 | FM.IF 10.7 MHz (Orange) | 4802 153 57089 |
| T2 | FM.IF 10.7 MHz (Black) | 4802 153 57077 |
| T3 | AM. Osc. (Red) | 4802 153 17204 |
| T4 | AM.IF. (White) | 4802 153 17205 |
| T5 | AM.IF (Yellow) | 4802 153 17166 |
| T6.7 | AM.IF (Pink) | 4802 153 17165 |

## MISCELLANEOUS MECHANICAL

| | | |
|---|---|---|
| 5 | Backplate (Pointer) | 4802 466 77034 |
| 6 | Pointer | 4802 450 87113 |
| 18 | P.C. Board Volume | 4802 466 17066 |

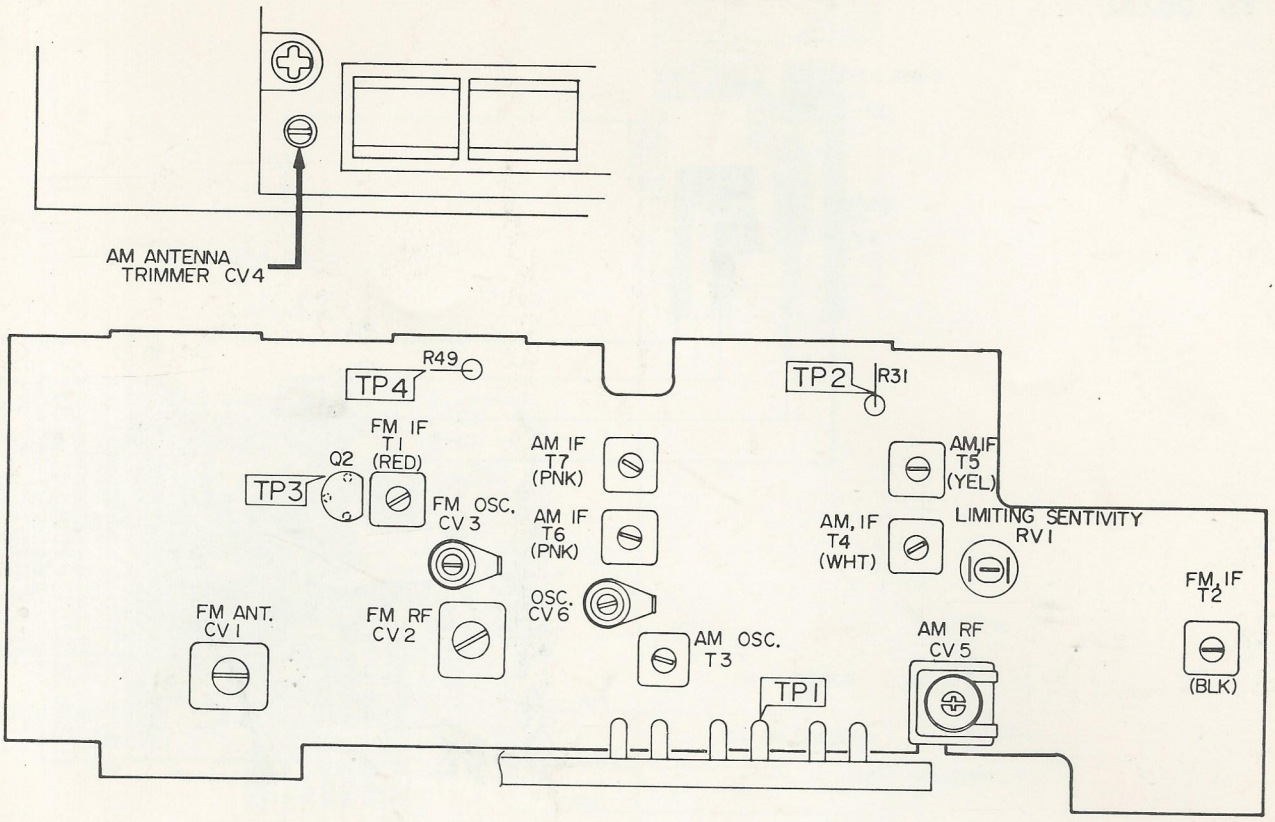
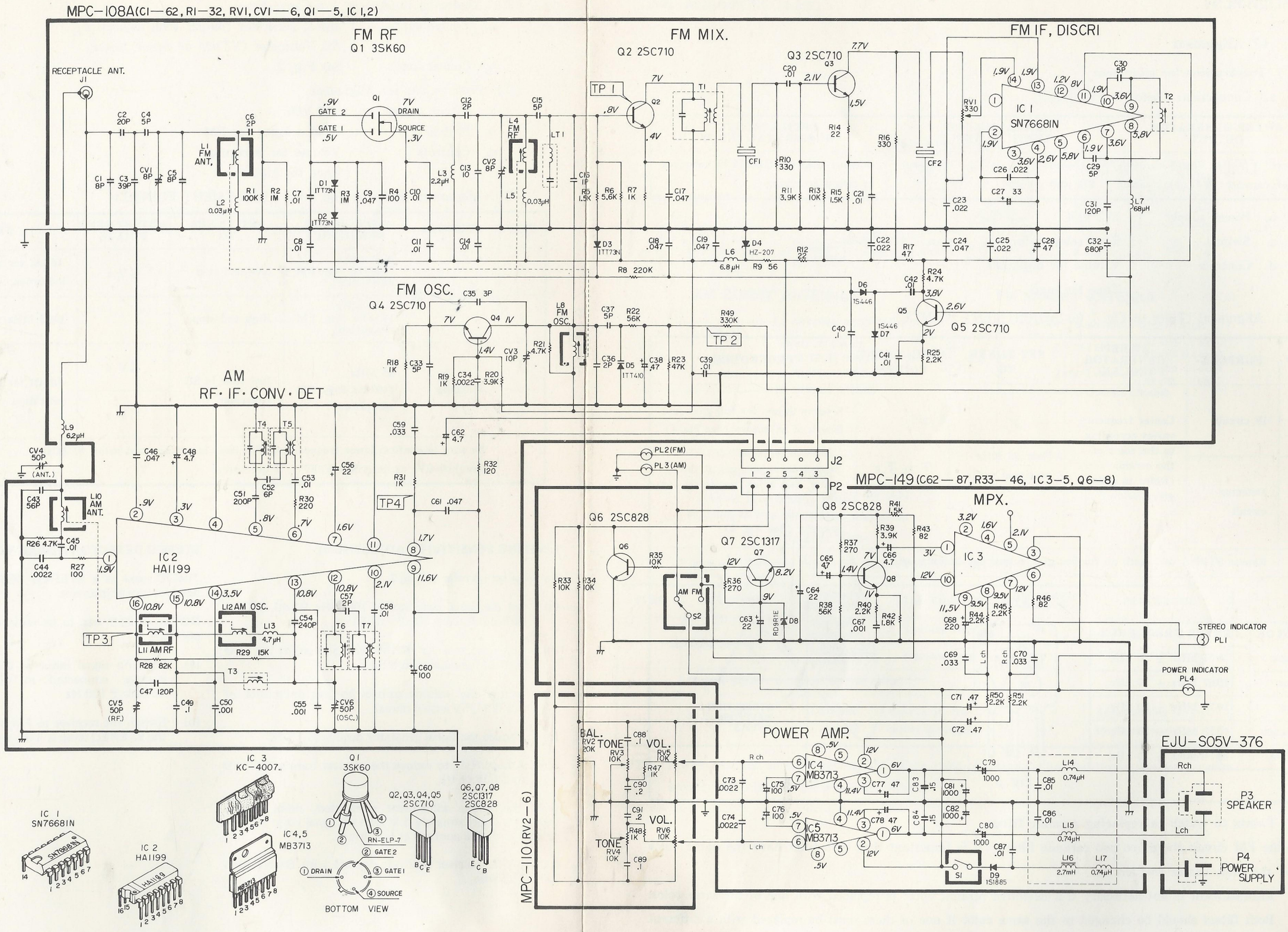



Fig. 7 (ADJUSTMENTS POINTS)

# SCHEMATIC




**NOTE:** 1. All resistance in ohms, K=$10^3$, M=$10^6$

2. All capacitance in $\mu$F, P=$\mu\mu$F

3. DC voltages against the chassis measured with 100k ohms/volt meter, power supply set at +13.2 VDC, no signal input.

Fig. 5

# WIRING ON PC BOARD

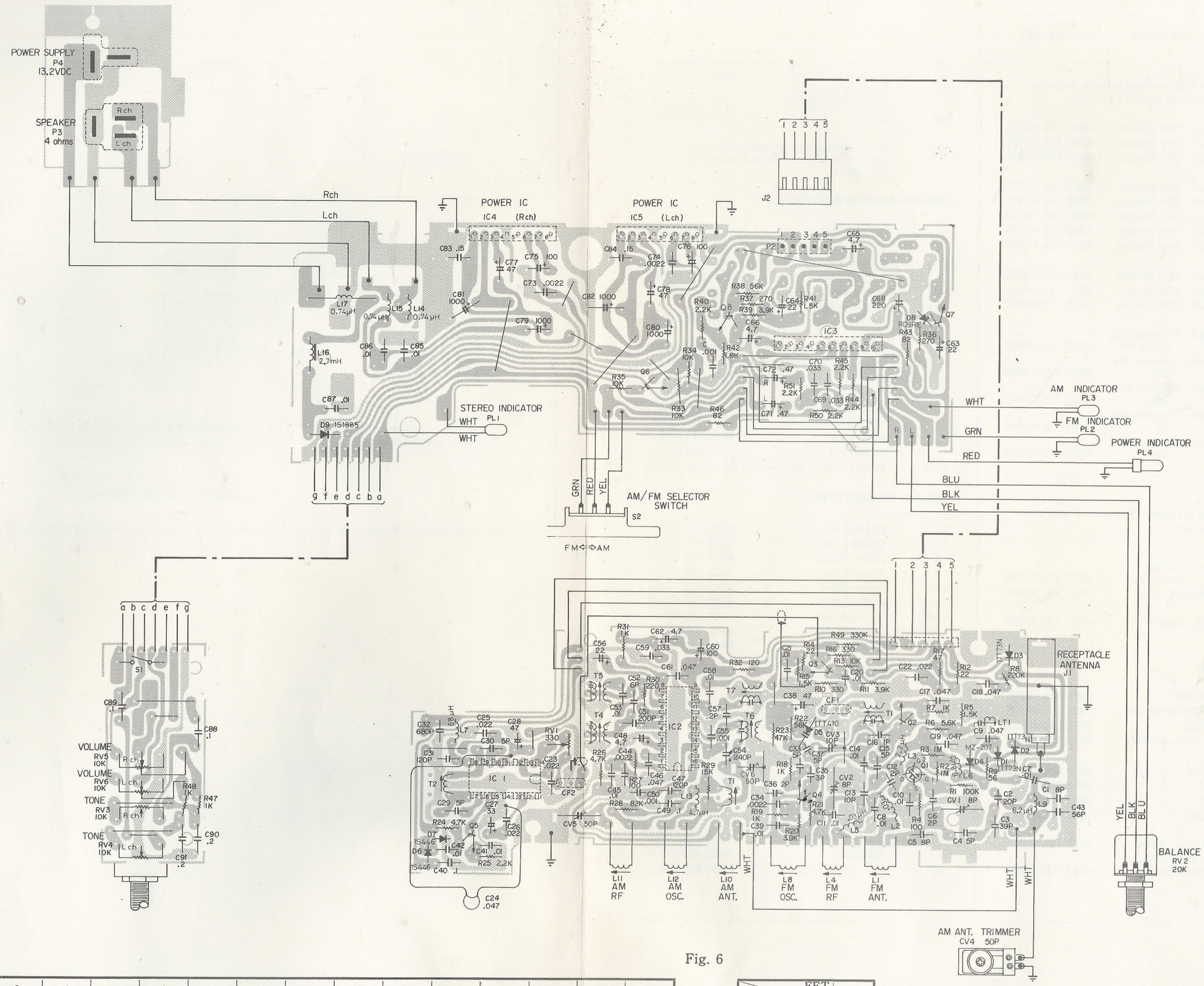



Fig. 6

| IC No. \ Pin No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC 1 | 4.4V | 1.9V | 3.6V | 0V | 2.6V | 1.9V | 3.6V | 5.8V | 3.6V | 1.9V | 8.0V | 1.2V | 1.9V | 1.9V | | |
| IC 2 | * 2.0V | * 0.9V | * 0.3V | * 0V | * 0.8V | * 0.7V | * 1.6V | * 1.7V | *11.6V | * 2.1V | * 0V | *10.8V | *10.8V | * 3.5V | *10.8V | *10.8V |
| IC 3 | 3.0V | 3.2V | 0V | 1.6V | 2.1V | 12.0V | 9.5V | 9.5V | 12.0V | | | | | | | |
| IC 4, 5 | 6.0V | 12.0V | 11.4V | 0V | — | — | 0.5V | 0.5V | | | | | | | | |

| Pin No. \ FET | Q 1 |
|---|---|
| ① DRAIN | 7.0V |
| ② GATE 2 | 0.9V |
| ③ GATE 1 | 0.5V |
| ④ SOURCE | 0.3V |

| Pin No. \ Tr. No. | Q 2 | Q 3 | Q 4 | Q 5 | Q 6 | Q 7 | Q 8 |
|---|---|---|---|---|---|---|---|
| E | 0.4V | 1.5V | 1.0V | 2.0V | 1.0V | 8.2V | 1.0V |
| B | 0.8V | 2.1V | 1.4V | 2.6V | 1.4V | 9.0V | 1.4V |
| C | 7.0V | 7.7V | 7.0V | 3.8V | 7.0V | 12.0V | 7.0V |