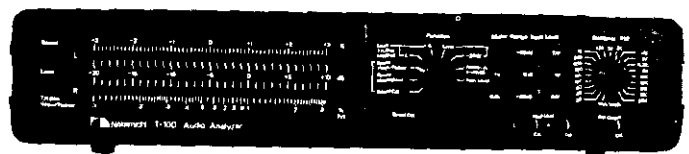




Service Manual

Nakamichi T-100

Audio Analyzer



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1. GENERAL

1.1. Control Functions

The Nakamichi T-100 control functions are shown below:

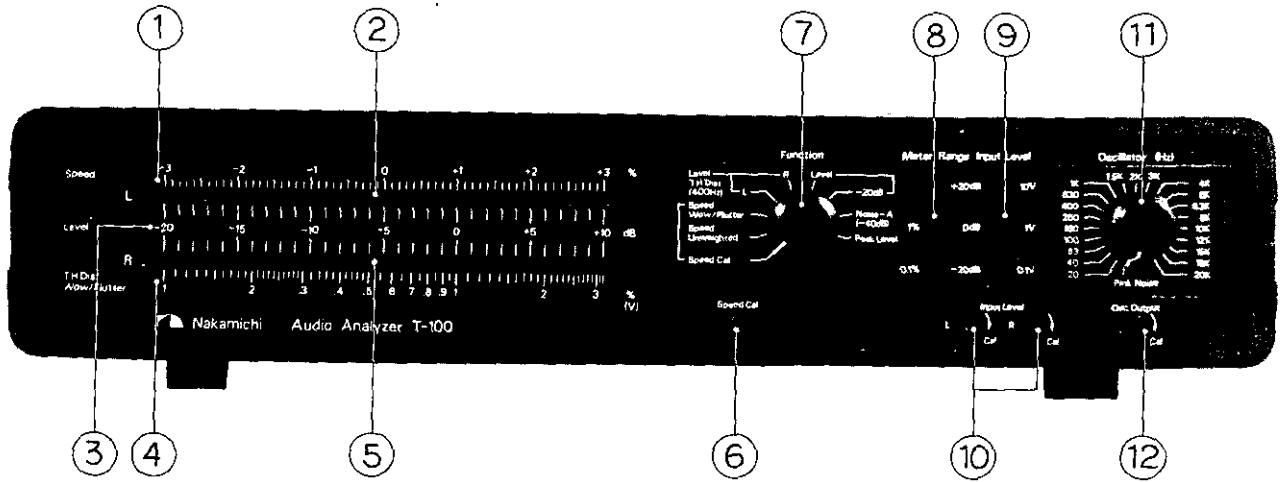


Fig. 1.1 Front View

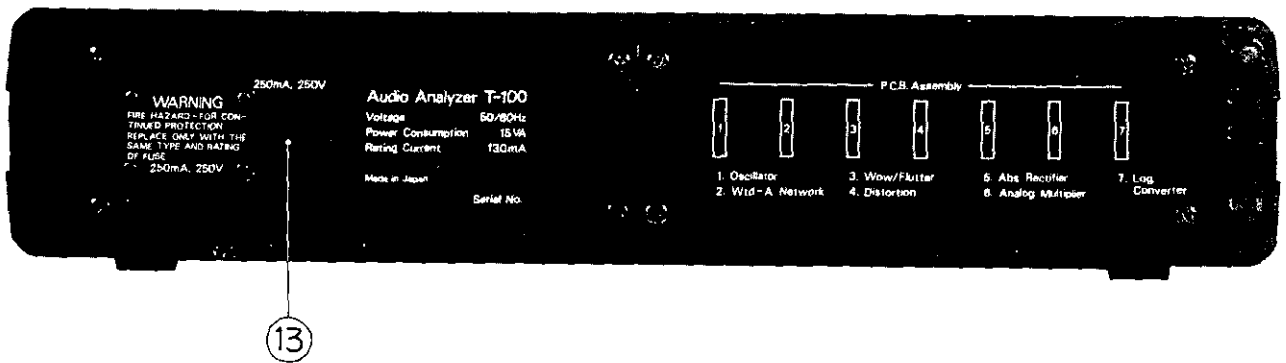


Fig. 1.2 Rear View

- Speed Deviation Scale
- Top Indicator
- Level Scale
- Bottom Indicator
- Total Harmonic Distortion/Wow & Flutter Scale
- Speed Calibration Control
- Function Control
- Meter Range Switch
- Input Level Switch
- Input Level Controls
- Oscillator Control
- Oscillator Output Control
- Fuse
- Power Switch
- AC Cord Connector
- Input Jacks
- Oscillator Output Jacks
- Scope Output Jacks

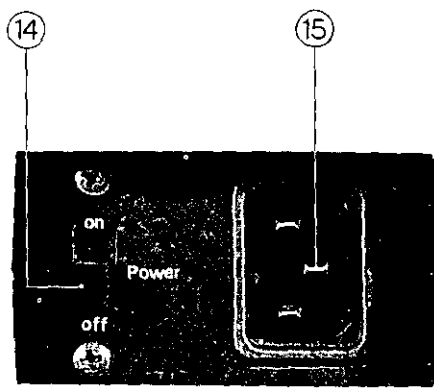


Fig. 1.3 Side View (Right)

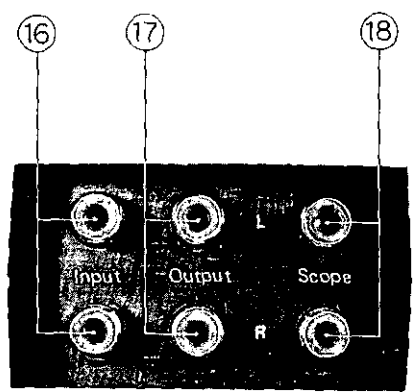


Fig. 1.4 Side View (Left)

1.2. Voltage Selector

Voltage selector is installed on the rear panel for Other Version of the Nakamichi T-100.

This voltage selector can select either 120 V or 220 - 240 V at customer's disposal.

1.3. Functions

T-100 contains 9 functions the details of which are as follows:

Figs. 1.5 - 1.13 show the signal path in each function.

(1) Speed Cal

Calibrates top indicator for zero speed deviation.

(2) Speed Unweighted

Selects speed deviation in the top indicator and unweighted wow & flutter peak on the bottom indicator.

(3) Speed Wow/Flutter

Selects speed deviation on the top indicator and weighted wow & flutter peak on the bottom indicator.

(4) Level T.H. Distortion L

Selects left channel level on the top indicator and left channel total harmonic distortion on the bottom indicator.

(5) Level T.H. Distortion R

Selects right channel level on the top indicator and right channel total harmonic distortion on the bottom indicator.

(6) Level

Selects left channel level on the top indicator and right channel level on the bottom indicator.

(7) Level -20 dB

Decreases oscillator output by 20 dB while simultaneously making the indicators 20 dB more sensitive.

Selects left channel level on the top indicator and right channel level on the bottom indicator.

(8) Noise -40 dB

Displays left channel A-weighted noise on the top indicator and right channel A-weighted noise on the bottom indicator.

Makes the display 40 dB more sensitive.

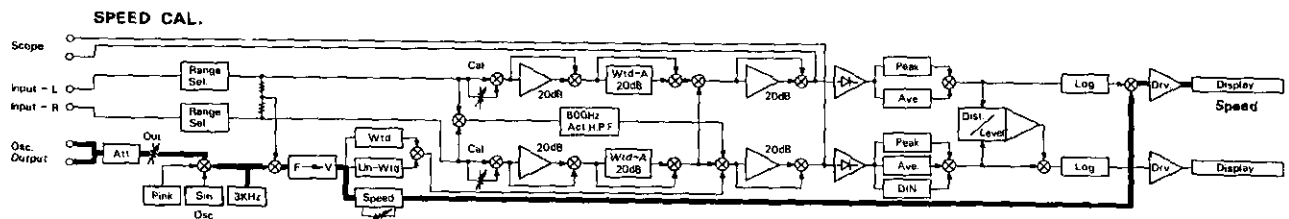


Fig. 1.5

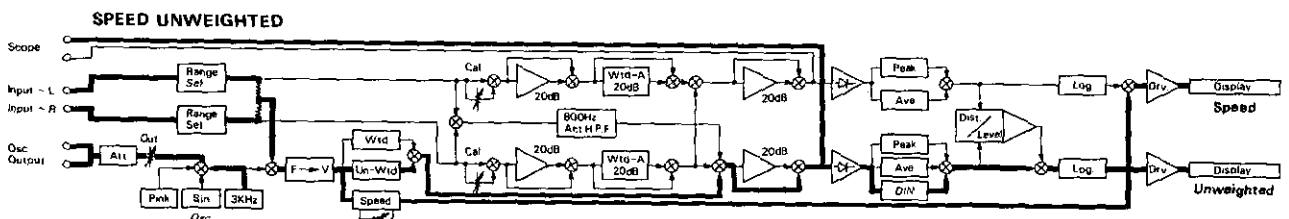


Fig. 1.6

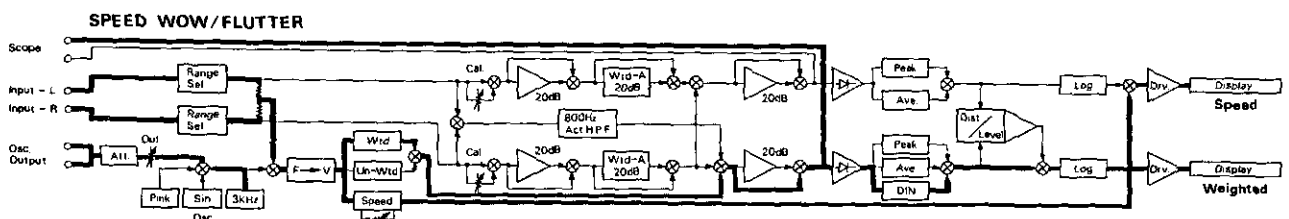


Fig. 1.7

(9) Peak

Selects peak-reading ballistics for the level display. Selects left channel level on the top indicator, right channel level on the bottom indicator. When the left and right input level controls are turned to maximum, the sensitivity of

the display is the same as when the function control is set to "level".

However, by turning the input level controls counter-clockwise, you can reduce the sensitivity to any intermediate value.

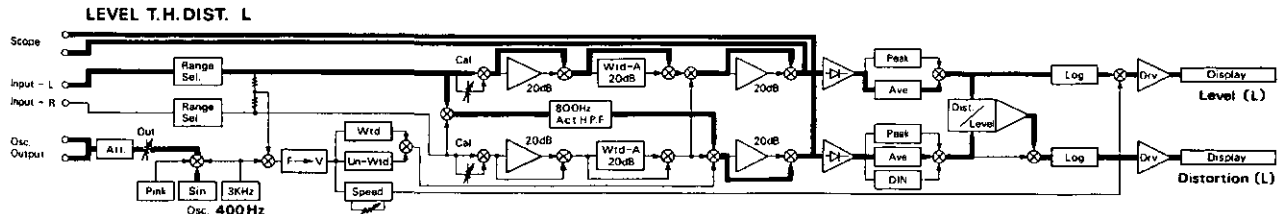


Fig. 1.8

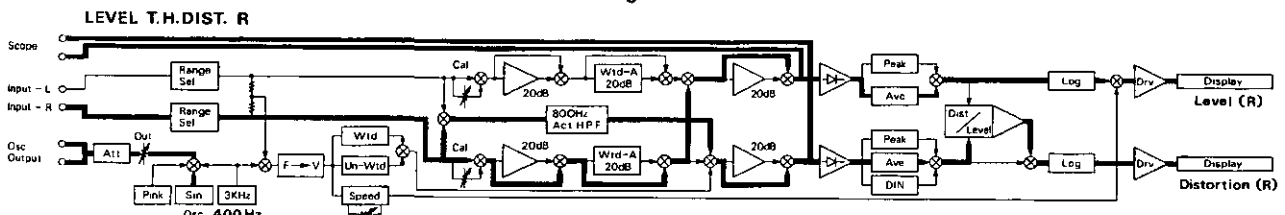


Fig. 1.9

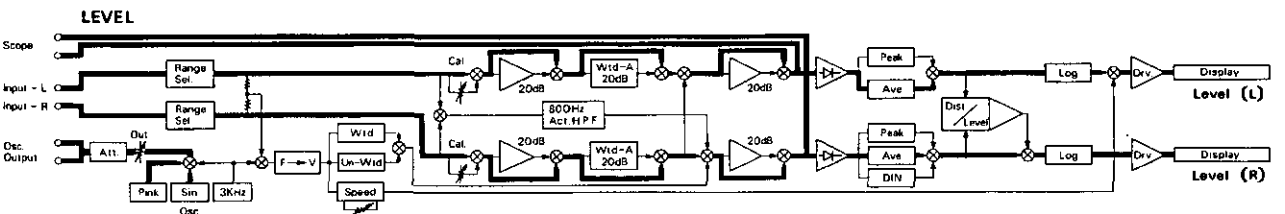


Fig. 1.10

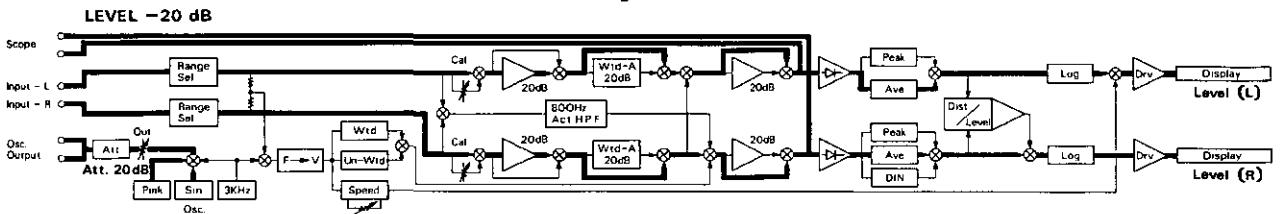


Fig. 1.11

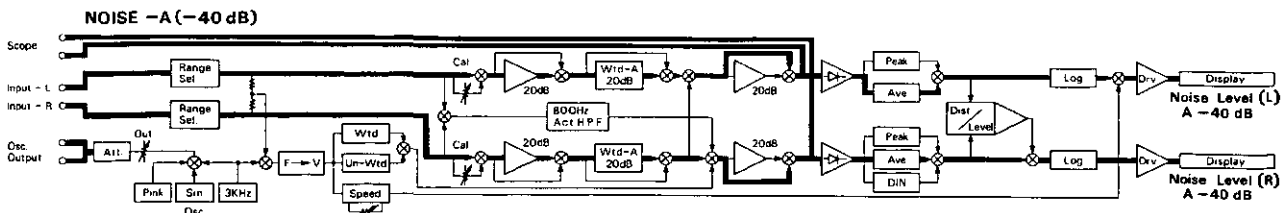


Fig. 1.12

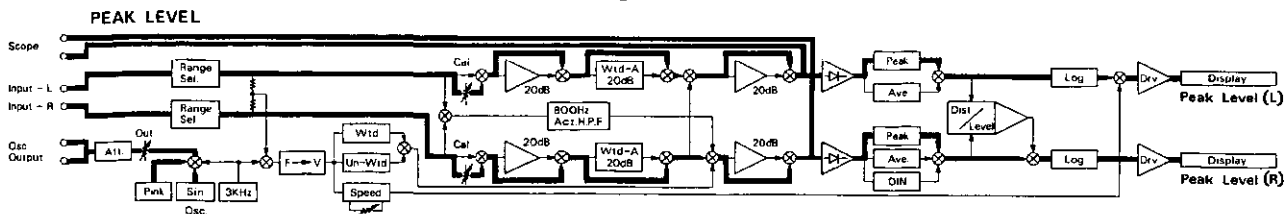


Fig. 1.13

1.4. How To Read Signals

In the Switch P.C.B. circuit, preceding 9 functions are symbolized as follows:

- A: Speed Cal.
- B: Speed Unweighted
- C: Speed Wow/Flutter (DIN WTD)
- D: Level T.H. Dist. (400 Hz) L
- E: Level T.H. Dist. (400 Hz) R
- F: Level 0 dB
- G: Level -20 dB
- H: Noise IHF-A (-40 dB)
- I: Peak Level

Functions A to I are combined and described logically such as $A + B + C$, $\overline{A + B + C}$, etc. The meaning of these signals are:

- $A + B + C$: will be "H" (i.e., will be effective) if function A OR B OR C is selected.
- $\overline{A + B + C}$: will be "L" (i.e., will be effective) if function A OR B OR C is selected.

- Notes: 1. If the function other than A, B, or C is selected, signals $A + B + C$ and $\overline{A + B + C}$ become open in the Switch P.C.B. circuit, but in the next stage -10 V or +10 V bias is applied to signal $A + B + C$ or $\overline{A + B + C}$. Thus, the "L" or "H" level is obtained.
2. "H" and "L" levels should be as follows:
 "H": +6.5 V - +10 V
 "L": -10 V - -7.5V

Fig. 1.14 shows the actual circuit. Common terminal of the Function Switch is connected to +10 V or -10 V and terminals A, B and C become inputs of DIODE OR Gate.

1.5. Semiconductor Switch

Circuits are controlled by the semiconductor switch of FET and transistor. Below shown is the table for the semiconductor switch and equivalent mechanical switch.

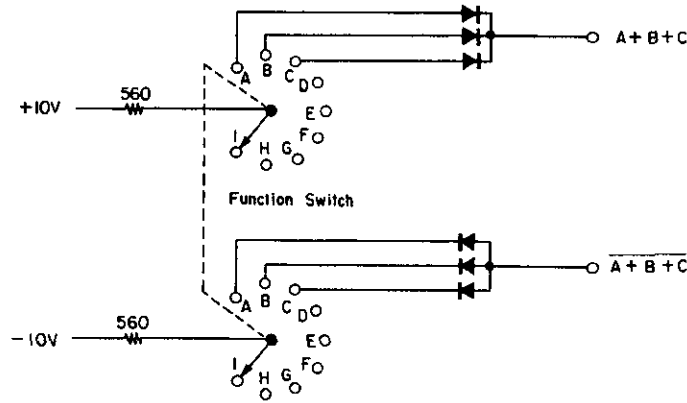


Fig. 1.14

Table 1.1

| | Circuit | Control Input | Mechanical Switch |
|------------|---------|---------------|-------------------|
| FET | | High (+10V) | ON |
| | | Low (-10V) | OFF |
| Transistor | | High (+10V) | ON |
| | | Low (-10V) | OFF |

2. REMOVAL PROCEDURES

2.1. Top Cover Ass'y, Bottom Cover Ass'y and Synthesis Mechanism Ass'y with Power Supply Ass'y

Refer to Fig. 2.1.

- (1) Remove F01, F02 and F03, then disassemble F04 (Top Cover Ass'y) and F05 (Acrylic Cover).
- (2) Remove F06 and F07, then disassemble F08 (Bottom Cover Ass'y) and F09 (Synthesis Mechanism Ass'y with Power Supply Ass'y).

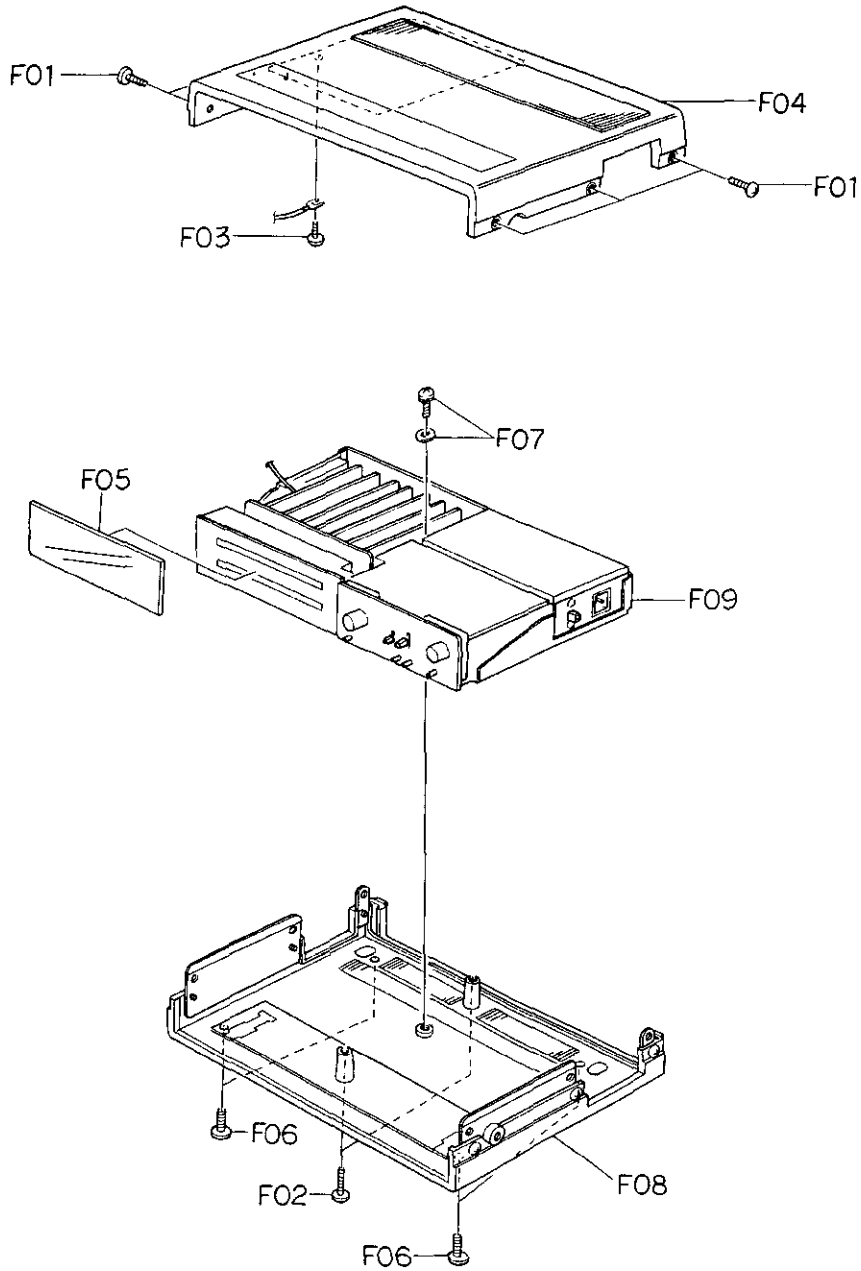


Fig. 2.1

2.2. Power Supply Ass'y

Refer to Fig. 2.2.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to item 2.1.
- (2) Remove F01, then disassemble F02 (Power Supply Box Cover).
- (3) Remove F03, F04 and F05, then disassemble F06 (Power Supply Ass'y).

2.3. Connector P.C.B. Ass'y

Refer to Fig. 2.2.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to item 2.1.
- (2) Remove F05 and F07, then disassemble F08 (Rear Panel B Ass'y).
- (3) Remove F09, then disassemble F10 (Connector P.C.B. Ass'y).

2.4. Switch Control Ass'y and Bar-graph Holder Ass'y

Refer to Fig. 2.2.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to item 2.1.
- (2) Remove F11, then disassemble F12 (Switch Control Ass'y).
- (3) Remove F13, then disassemble F14 (Bar-graph Holder Ass'y).

2.5. 6P Pin Jack Ass'y

Refer to Fig. 2.2.

- (1) Remove F10 (Connector P.C.B. Ass'y) referring to item 2.3.
- (2) Remove F15, then disassemble F16 (Shield Plate), F17 (6P Pin Jack Ass'y) and F18 (Pin Jack Name Plate).

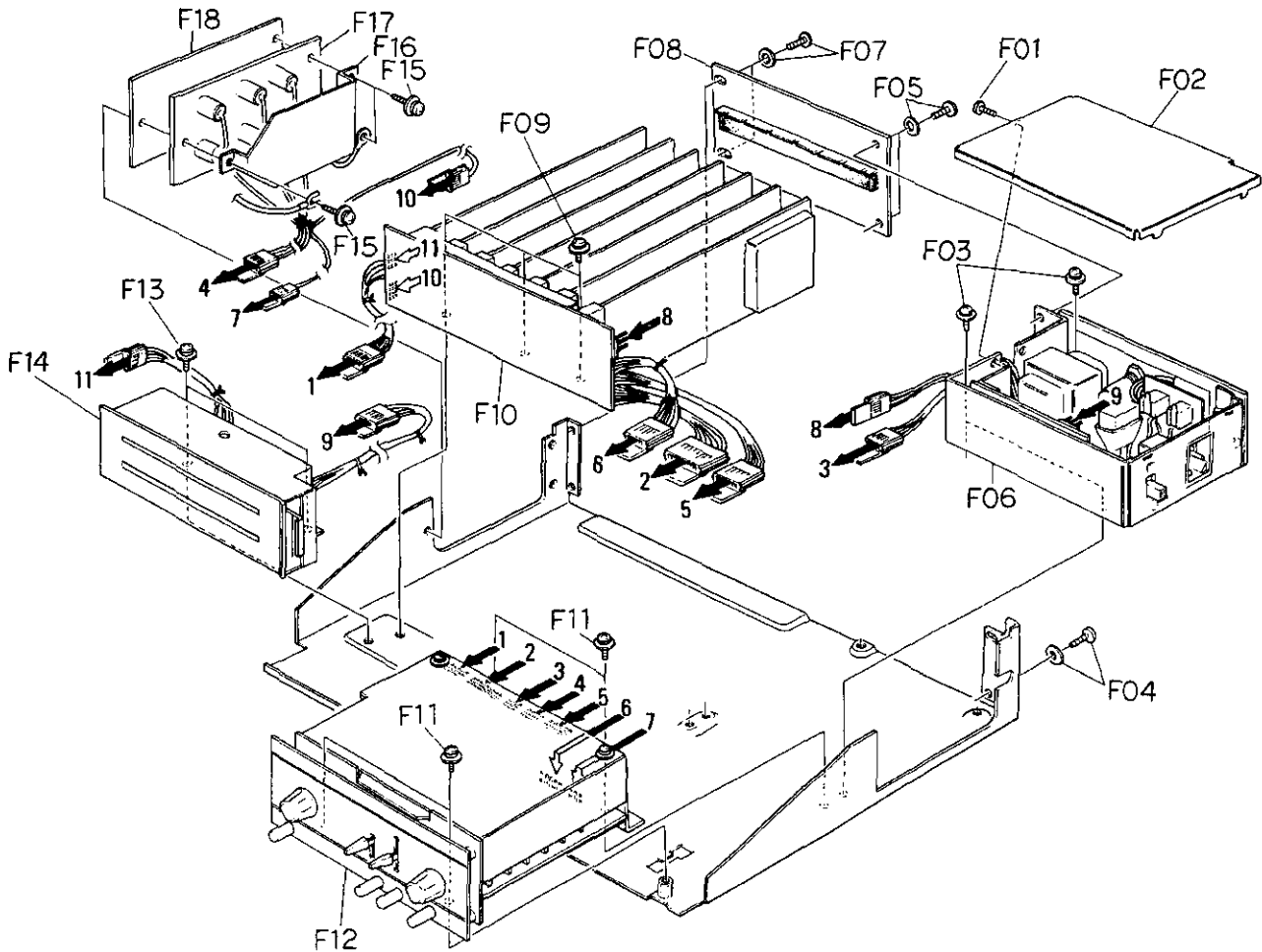


Fig. 2.2

2.6. Switch P.C.B. Ass'y and Volume P.C.B. Ass'y

Refer to Fig. 2.3.

- (1) Refer to Fig. 2.2. Remove Switch Control Ass'y referring to item 2.4.
- (2) Remove F01, then disassemble F02 (Rotary Switch Knob Ass'y).
- (3) Pull out F03 (Slide Switch Knob) and F04 (Calibration Knob).
- (4) Remove F05, then disassemble F06 (Front Panel Ass'y) and F07 (Front Panel Stud).

- (5) Remove F08, then disassemble F09 (Switch P.C.B. Insulator), F10 (Wire Holder 583) and F11 (Switch P.C.B. Holder Ass'y).
- (6) Remove F12 and F13, then disassemble F14 (Switch P.C.B. Ass'y).
- (7) Remove F15, then disassemble F16 (Volume P.C.B. Ass'y) and F17 (Switch Holder).

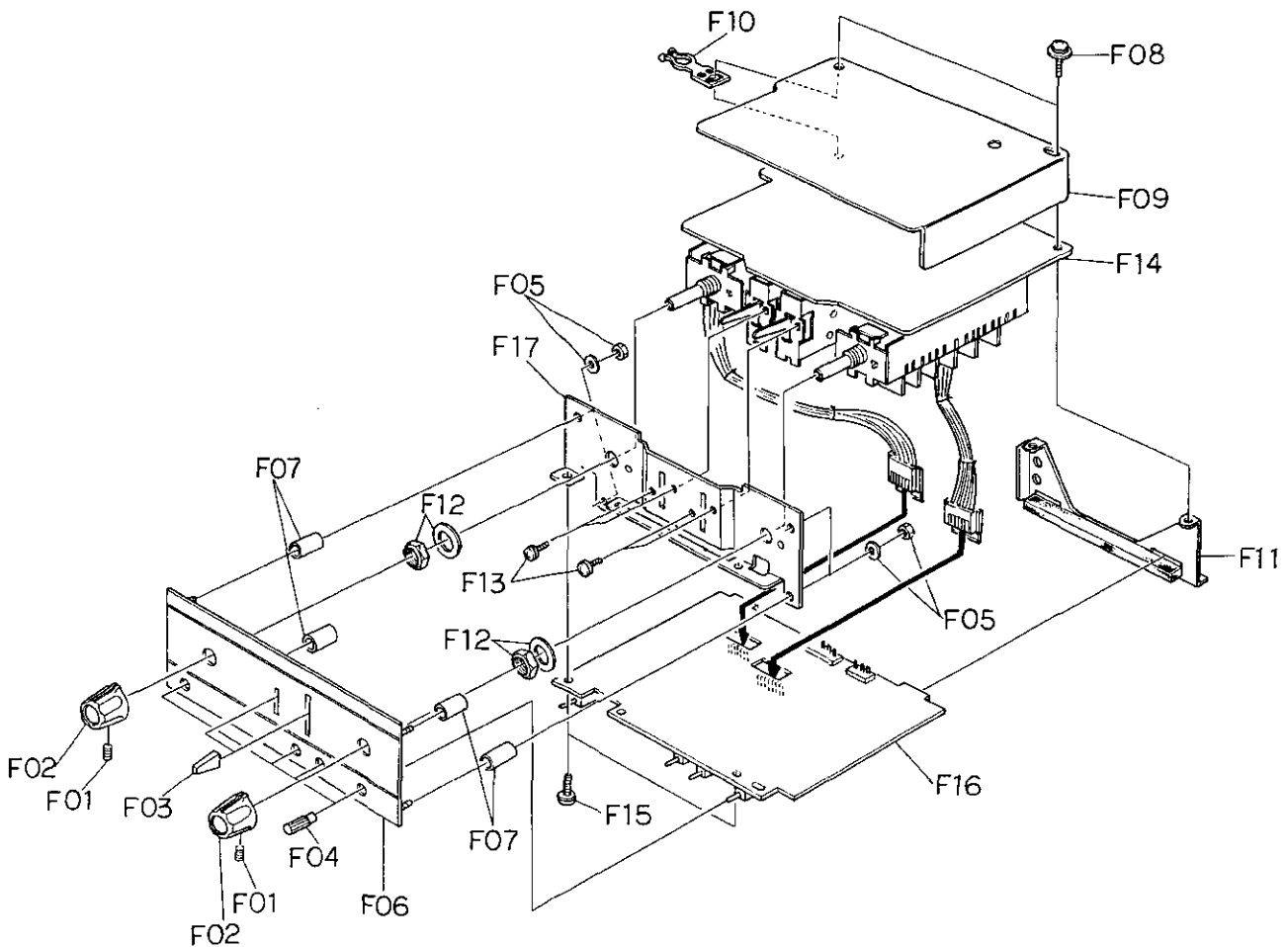


Fig. 2.3

2.7. Display P.C.B. Ass'y and Bar-graph

Refer to Fig. 2.4.

- (1) Refer to Fig. 2.2. Remove Bar-graph Holder Ass'y referring to item 2.4.
- (2) Remove F01, then disassemble F02 (Shield Cover Ass'y)
- (3) Remove F03, then disassemble F04 (Display P.C.B. Ass'y) and F05 (Display P.C.B. Insulator).
- (4) Remove F06, then disassemble F07 (Scale Panel Ass'y).
- (5) Remove F08, then disassemble F09 (8P Plug P.C.B. Ass'y).
- (6) Remove F10 and F11 (Pressure Plate Ass'y), then disassemble F12 (Bar-graph) and F13 (Bar-graph Holder Ass'y).

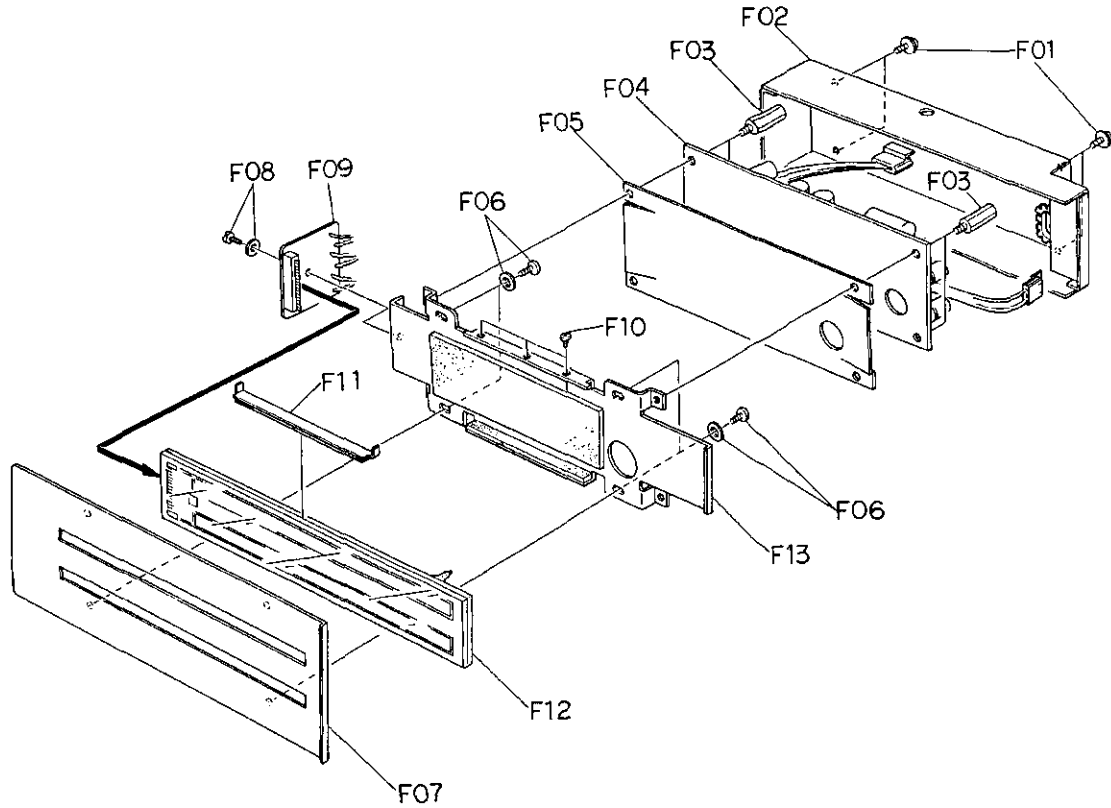


Fig. 2.4

2.8. Power Supply P.C.B. Ass'y and Power Transformer
Refer to Fig. 2.5.

- (1) Refer to Fig. 2.2. Remove Power Supply Ass'y referring to item 2.2.
- (2) Remove F01, then disassemble F02 (Power Supply P.C.B. Ass'y).
- (3) Remove F03 and F04, then disassemble F05 (Power Transformer).

2.9. Rear Panel A Ass'y, Power Switch and AC Inlet
Refer to Fig. 2.5.

- (1) Refer to Fig. 2.2. Remove Power Supply Ass'y referring to item 2.2.
- (2) Remove F06 and F07, then disassemble F08 (Rear Panel A Ass'y).
- (3) Remove F09 and F10, then disassemble F11 (Power Switch).
- (4) Remove F12 and F13, then disassemble F14 (Power Supply Name Plate).
- (5) Remove F15 and F16 (Inlet Holder), then disassemble F17 (AC Inlet).

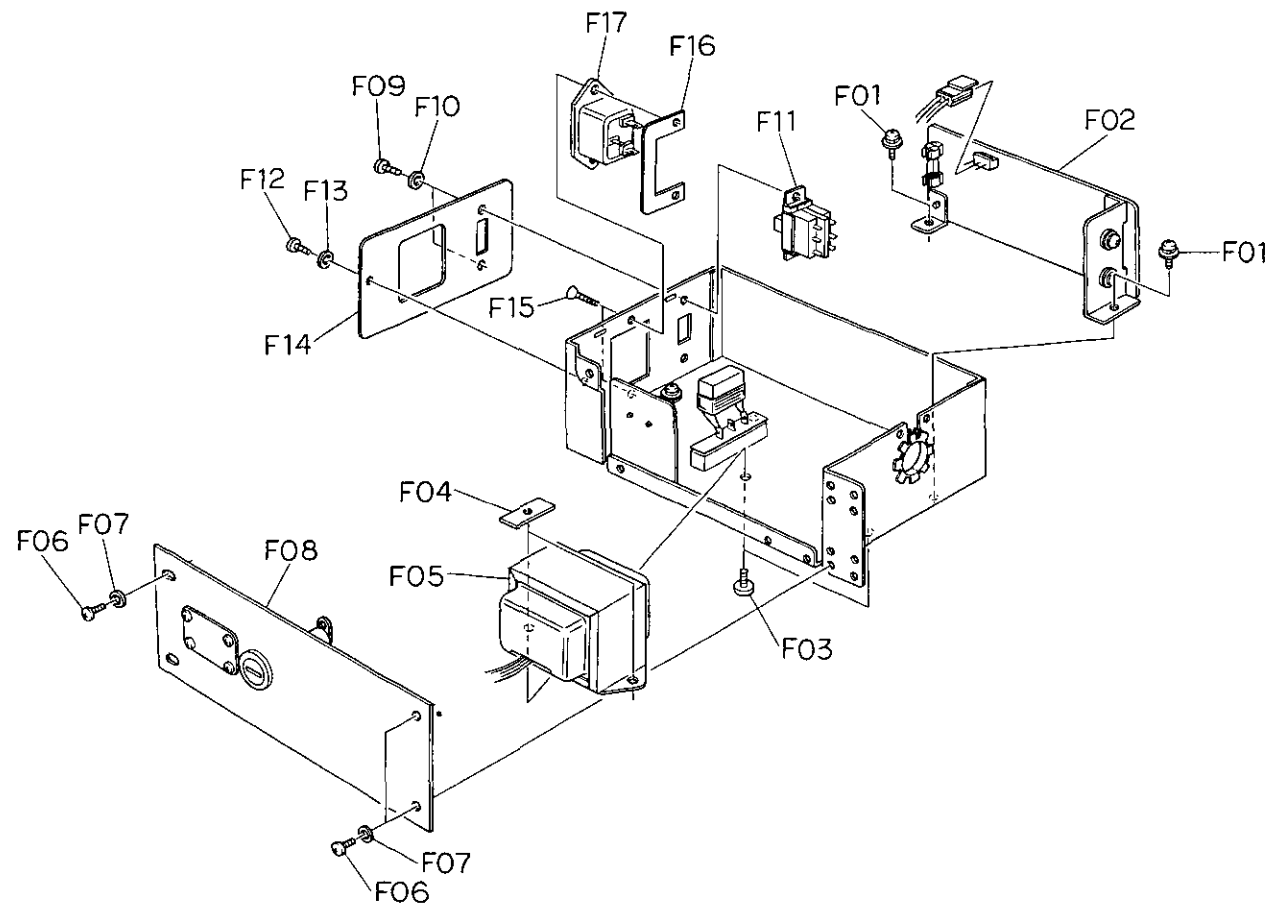


Fig. 2.5

3. MEASUREMENT INSTRUMENTS

- | | |
|--|-------------------------------|
| (1) Oscillator 20 Hz – 20 kHz | |
| Level Deviation: | ±0.1 dB or less |
| Distortion: | 0.1% or less |
| Output Voltage: | 3.16 V or more |
| (2) VTVM | |
| (3) DC Voltmeter | |
| Input Impedance: | 100 k-ohm or more |
| Accuracy: | 1% or less |
| Resolving Ability: | 0.1 mV or less |
| (4) Distortion Meter | |
| Minimum Range: | 0.01% or less (at full-scale) |
| Frequency: | 400 Hz |
| (5) Oscilloscope | |
| (6) Standard Distortion Generator | |
| Fundamental Frequency: | 400 Hz |
| Distortion Rate: | 0.1%, 0.3%, 1%, 3% |
| Output Voltage: | 3.16 V or more |
| (7) Standard Wow and Flutter Generator | |
| Center Frequency: | 3,000 Hz |
| Wow Frequency: | 4 Hz |
| Wow: | 1% (peak) |
| Output Voltage: | 100 mV or more |
| (8) Frequency Counter | |

4. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

4.1. Current Type

Note: In the current type, VR701 and VR801 on the Absolute Rectifier P.C.B. Ass'y are removed.

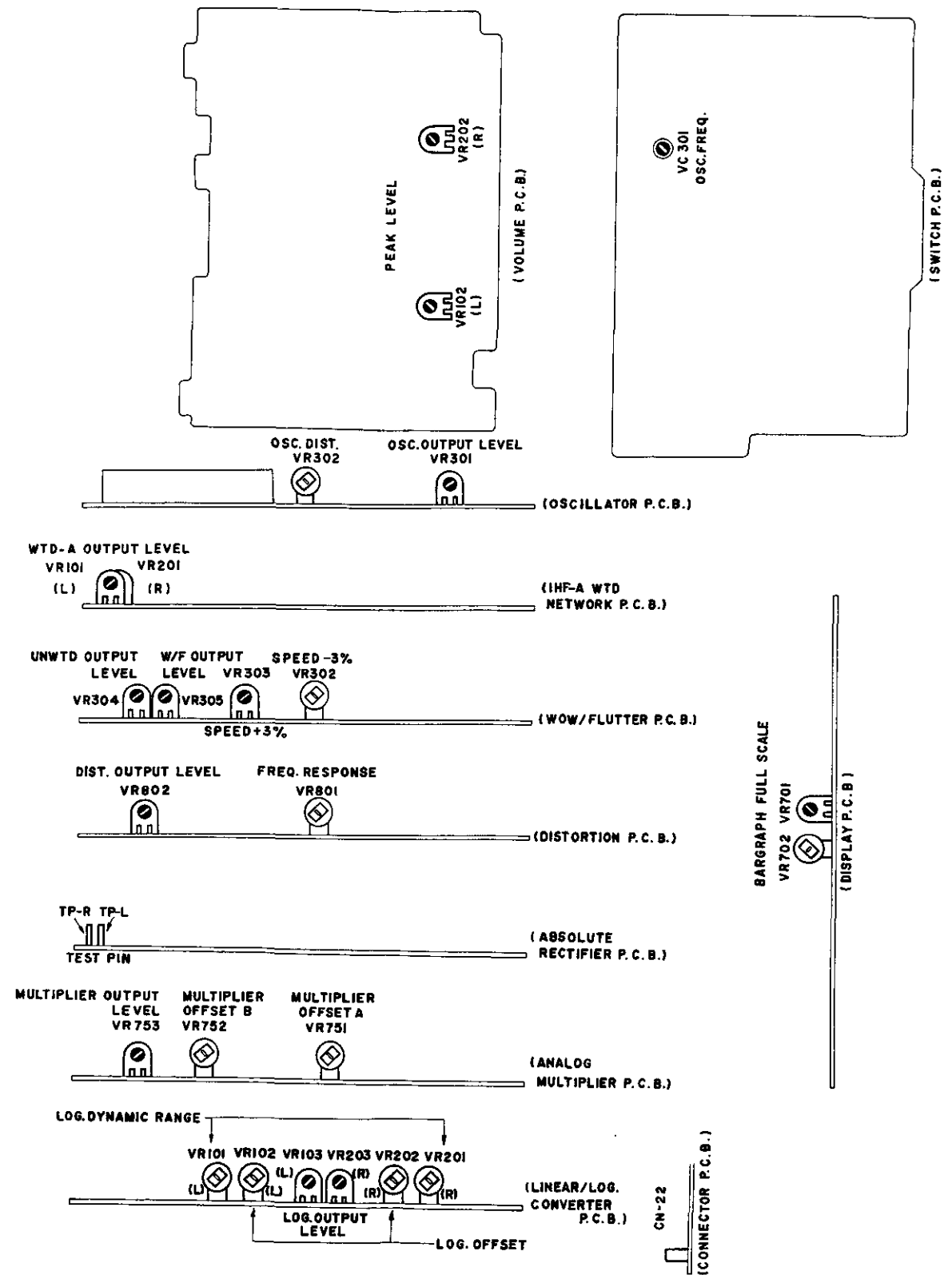


Fig. 4.1

4.2. Previous Type

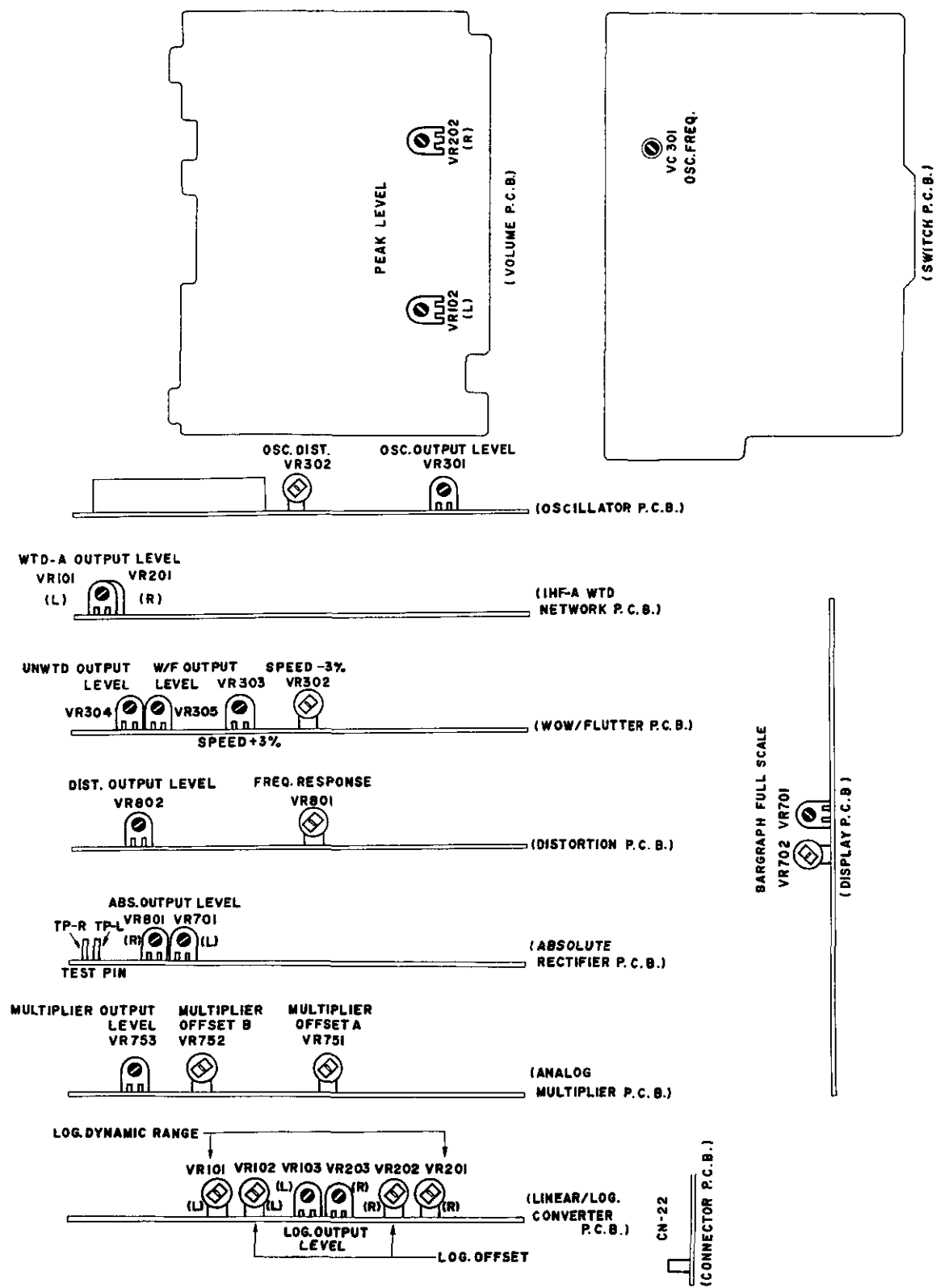


Fig. 4.2

5. ADJUSTMENT AND MEASUREMENT INSTRUCTIONS

5.1. Current Type

Note: In the current type, absolute output level adjustment is removed.

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|-------------------------|---------------------------|--|---|--|--|
| 1 | Oscillator Frequency | | Frequency Counter to Oscillator OUTPUT Jacks | Function - Level Oscillator - 400 Hz Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Switch P.C.B. VC301 | Adjust VC301 to obtain 400 Hz on the Frequency Counter. |
| 2 | Oscillator Distortion | | Distortion Meter to Oscillator OUTPUT Jack | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Osc. P.C.B. VR302 | Adjust VR302 to obtain 0.06% - 0.07% distortion. Note: Connect an Oscilloscope to the Output of the Distortion Meter and check to insure that no humming noise is included in the signal. |
| 3 | Oscillator Output Level | | VTVM to Oscillator OUTPUT Jacks | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Osc. P.C.B. VR301 | Adjust VR301 to obtain 1.2 V on the VTVM. |
| 4 | Log. Output Level | Oscillator to INPUT Jacks | DC Voltmeter to CN22-1, CN22-2 | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Linear/Log. Converter P.C.B. VR103, VR203 | Feed in 1 kHz 1 V and adjust VR103 (VR203) to obtain 2.18 V on the DC Voltmeter. |
| 5 | Bargraph Full Scale | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Display P.C.B. VR701 | Feed in 1 kHz 1 V and adjust VR701 so that the Bargraph indicates 0 dB. Note: Adjust VR702 only if circuit is repaired. |

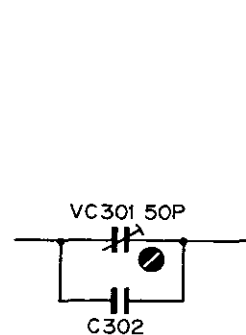


Fig. 5.1.1.
1. Oscillator Frequency

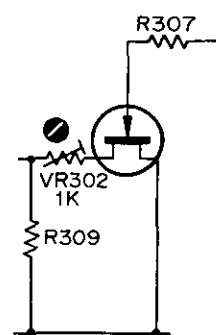


Fig. 5.1.2
2. Oscillator Distortion

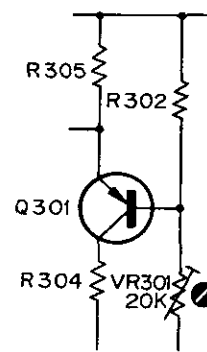


Fig. 5.1.3
3. Oscillator Output Level

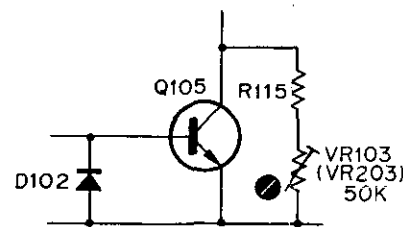


Fig. 5.1.4
4. Log. Output Level

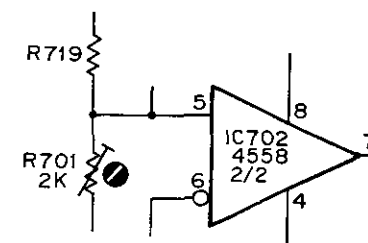


Fig. 5.1.5
5. Bargraph Full Scale

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|--|---|-------------------|---|---|--|
| 6 | Log. Output Level Log. Dynamic Range Log. Offset | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Linear/Log. Converter P.C.B. VR103, VR203 VR102, VR202 VR101, VR201 | Feed in 1 kHz +10 dB (3.16 V), 0 dB (1 V), -10 dB (316 mV), or -20 dB (100 mV) and check whether the Bargraph indicates +10 dB, 0 dB, -10 dB, or -20 dB. (Allowance of error is within ±1 segment on the Bargraph.) If above is not obtained perform the following steps: 1. Feed in +10 dB (3.16 V), and adjust VR103 for the left channel and VR203 for the right channel to obtain +10 dB on the Bargraph. 2. Feed in -10 dB (316 mV) and adjust VR102 for the left channel and VR202 for the right channel to obtain -10 dB on the Bargraph. 3. Feed in -20 dB (100 mV) and adjust VR101 for the left channel and VR201 for the right channel to obtain -20 dB on the Bargraph. 4. Repeat above steps 1 - 3 until the error between input level and indicated value on the Bargraph becomes within ±1 segment on the Bargraph in each input level. |
| 7 | Peak Level | Oscillator to INPUT Jacks | | Function - Noise-A (-40 dB) Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Volume P.C.B. VR102, VR202 | Feed in 1 kHz 0 dB (1 V) and adjust VR102 (VR202) to obtain 0 dB on the Bargraph. |
| 8 | WTD-A Output Level | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 10 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | IHF-A WTD Network P.C.B. VR101, VR201 | Feed in 1 kHz -20 dB (100 mV) and adjust VR101 (VR201) to obtain 0 dB on the Bargraph. |
| 9 | Speed | Oscillator and Frequency Counter to INPUT Jacks | | Function - Wow/Flutter Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR302, VR303 | 1. Feed in 2,910 Hz ± 1 Hz 1 V and adjust VR302 to obtain -3% speed on the Bargraph. 2. Feed in 3,090 Hz ± 1 Hz 1 V and adjust VR303 to obtain +3% speed on the Bargraph. |
| 10 | UNWTD Output Level | Standard Wow/Flutter Generator to INPUT Jacks | | Function - Unweighted Meter Range - 1% Input Level - 1V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR304 | 1. Set the Standard Wow/Flutter Generator to the following modes: Center Frequency - 3 kHz Wow Frequency - 4 Hz Wow/Flutter - 1% (peak) Output Level - 0.5 to 2 V 2. Adjust VR304 to obtain 1% wow/flutter on the Bargraph. |

Note: Turn the Speed Calibration Control fully counterclockwise, then turn it clockwise approximately 7-1/2 times to set the Control to the center position.

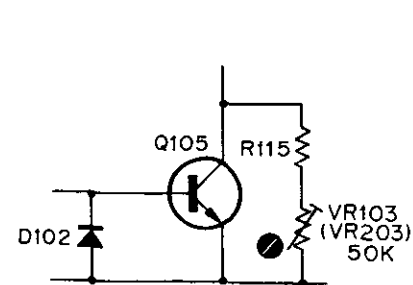


Fig. 5.1.6
6. Log. Adjustment

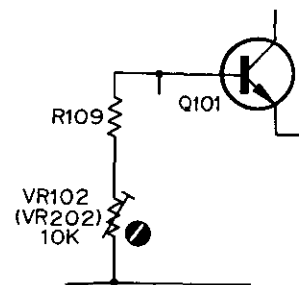


Fig. 5.1.7
6. Log. Adjustment

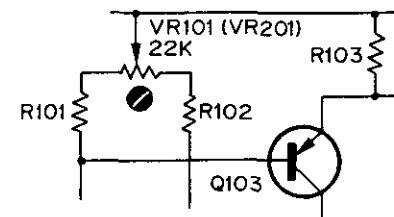


Fig. 5.1.8
6. Log. Adjustment

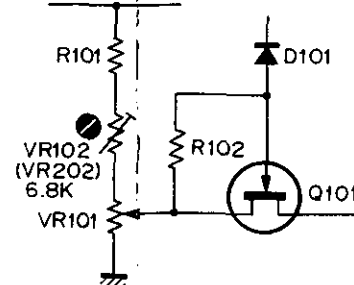


Fig. 5.1.9
7. Peak Level

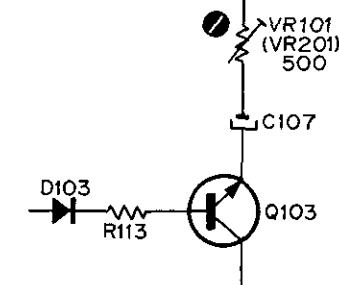


Fig. 5.1.10
8. WTD-A Output Level

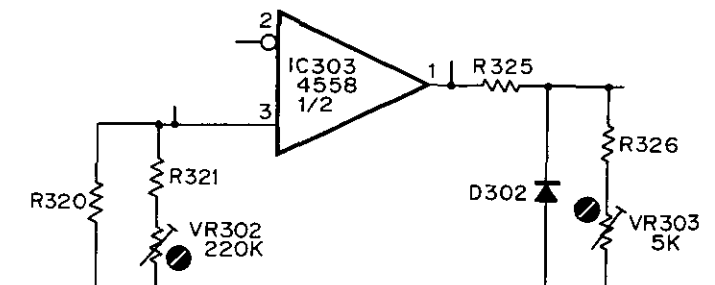


Fig. 5.1.11
9. Speed

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|--|---|---------------------------|---|---|--|
| 11 | Wow/Flutter Output Level | Standard Wow/Flutter Generator to INPUT Jacks | | Function - Wow/Flutter Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR305 | 1. Set the Standard Wow/Flutter Generator to the following modes: Center Frequency - 3 kHz Wow Frequency - 4 Hz Wow/Flutter - 1% (peak) Output Level - 0.5 to 2 V 2. Adjust VR305 to obtain 1% wow/flutter on the Bargraph. |
| 12 | Frequency Response Distortion Output Level | Oscillator and Frequency Counter to INPUT Jacks | VTVM to SCOPE OUTPUT Jack | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Distortion P.C.B. VR801, VR802 | 1. Feed in 2.5 kHz ± 10 Hz 100 mV and read the level on the VTVM. 2. Feed in 760 Hz ± 10 Hz 100 mV and adjust VR801 to obtain the same level as above step 1. 3. Repeat above steps 1 and 2 until the difference of the levels between steps 1 and 2 becomes 0. 4. Feed in 2.5 kHz ± 10 Hz 100 mV and adjust VR802 to obtain 2.87 V on the VTVM. |
| 13 | Multiplier Output Level | Standard Distortion Generator to INPUT Jacks | | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Analog Multiplier P.C.B. VR753, VR751, VR752 | 1. Set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V) 1% distortion. 2. Adjust VR753 to obtain 1% T.H. Distortion on the Bargraph. 3. Set the output of the Distortion Generator to 0 dB (1 V) or -10 dB (316 mV) and check to insure that the Bargraph indicates 0 dB or -10 dB with a tolerance of ± 1 segment. 4. Set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V), 0 dB (1 V), or -10 dB (316 mV) in 3%, 0.3%, or 0.1% distortion. Then check to insure that the tolerance of the Bargraph against the input level is within the following specified range: Tolerance: 0.3%, 1%, 3% ± 1 segment 0.1% ± 2 segments 5. If above does not comply with the specified one, following adjustments are required: a. Set the distortion of the Distortion Generator to 3%. Adjust VR751 so that the indicated distortion on the Bargraph stays the same when the output of the Distortion Generator is changed from +10 dB (3.16 V) to -10 dB (316 mV). b. Set the distortion of the Distortion Generator to 1% and adjust VR751 in the same manner as above step a. c. Set the distortion of the Distortion Generator to 0.3% and adjust VR752 in the same manner as above step a. d. Set the distortion of the Distortion Generator to 0.1% and adjust VR752 in the same manner as above step a. e. Repeat above steps a - d until specified tolerance is obtained. f. After the above steps are completed, set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V) 1% distortion and adjust VR753 to obtain 1% distortion on the Bargraph. |

Note: Turn the Speed Calibration Control fully counterclockwise, then turn it clockwise approximately 7-1/2 times to set the Control to the center position.

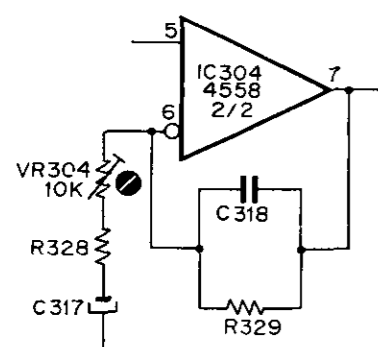


Fig. 5.1.12
10. UNWTD Output Level

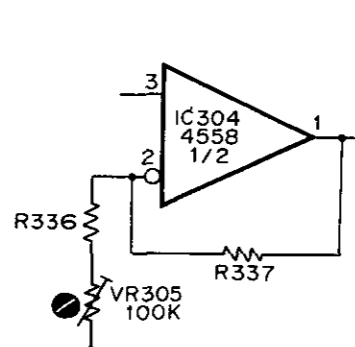


Fig. 5.1.13
11. Wow/Flutter Output Level

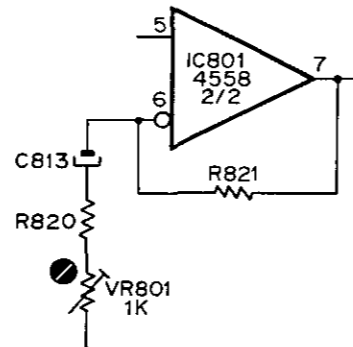


Fig. 5.1.14
12. Frequency Response and Distortion Output Level

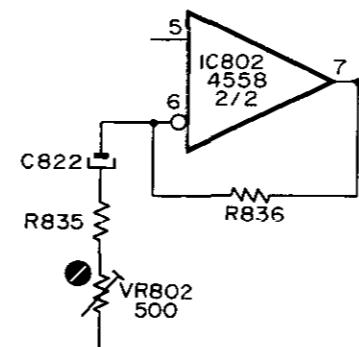


Fig. 5.1.15
13. Multiplier Output Level

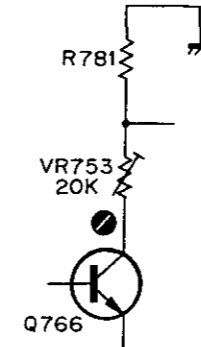


Fig. 5.1.16
13. Multiplier Output Level

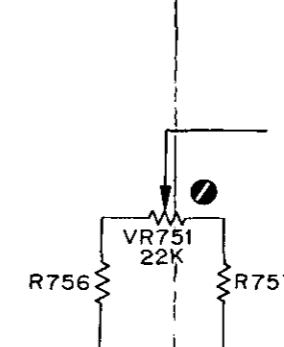


Fig. 5.1.17
13. Multiplier Output Level

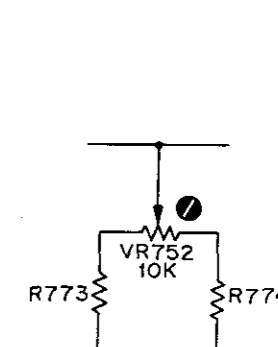


Fig. 5.1.18
13. Multiplier Output Level

5.2 Previous Type

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|-------------------------|---------------------------|--|---|--|--|
| 1 | Oscillator Frequency | | Frequency Counter to Oscillator OUTPUT Jacks | Function - Level Oscillator - 400 Hz Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Switch P.C.B. VC301 | Adjust VC301 to obtain 400 Hz on the Frequency Counter. |
| 2 | Oscillator Distortion | | Distortion Meter to Oscillator OUTPUT Jack | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Osc. P.C.B. VR302 | Adjust VR302 to obtain 0.06% - 0.07% distortion. Note: Connect an Oscilloscope to the Output of the Distortion Meter and check to insure that no humming noise is included in the signal. |
| 3 | Oscillator Output Level | | VTVM to Oscillator OUTPUT Jacks | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Osc. P.C.B. VR301 | Adjust VR301 to obtain 1.2 V on the VTVM. |
| 4 | Absolute Output Level | Oscillator to INPUT Jacks | DC Voltmeter to TP-L, TP-R (Absolute Rectifier P.C.B.) | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Absolute Rectifier P.C.B. VR701, VR801 | Feed in 1 kHz 1 V and adjust VR701 (VR801) to obtain -1.5 V on the DC Voltmeter. Note: Input level should be measured with connecting T-100. |
| 5 | Log. Output Level | Oscillator to INPUT Jacks | DC Voltmeter to CN22-1, CN22-2 | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Linear/Log. Converter P.C.B. VR103, VR203 | Feed in 1 kHz 1 V and adjust VR103 (VR203) to obtain 2.18 V on the DC Voltmeter. |
| 6 | Bargraph Full Scale | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Display P.C.B. VR701 | Feed in 1 kHz 1 V and adjust VR701 so that the Bargraph indicates 0 dB. Note: Adjust VR702 only if circuit is repaired. |

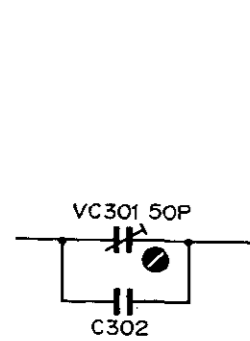


Fig. 5.2.1
1. Oscillator Frequency

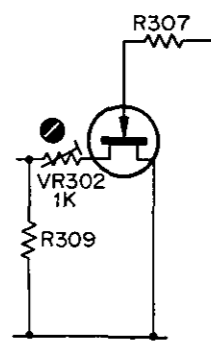


Fig. 5.2.2
2. Oscillator Distortion

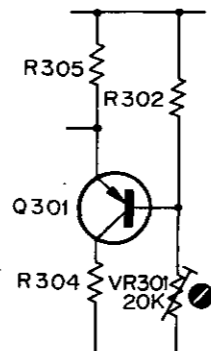


Fig. 5.2.3
3. Oscillator Output Level

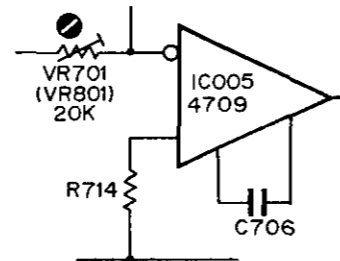


Fig. 5.2.4
4. Absolute Output Level

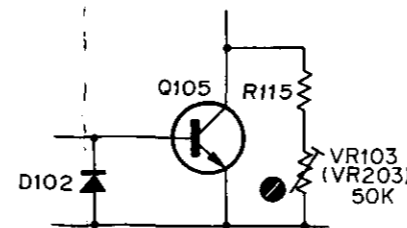


Fig. 5.2.5
5. Log. Output Level

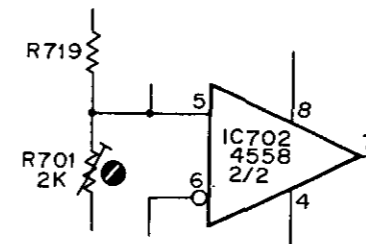


Fig. 5.2.6
6. Bargraph Full Scale

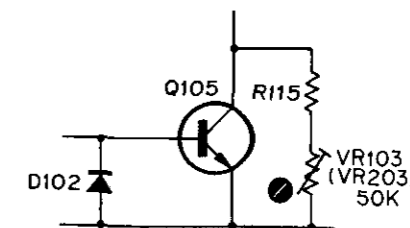


Fig. 5.2.7
7. Log. Adjustment

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|--|---|-------------------|---|---|--|
| 7 | Log. Output Level Log. Dynamic Range Log. Offset | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Linear/Log. Converter P.C.B. VR103, VR203 VR102, VR202 VR101, VR201 | Feed in 1 kHz +10 dB (3.16 V), 0 dB (1 V), -10 dB (316 mV), or -20 dB (100 mV) and check whether the Bargraph indicates +10 dB, 0 dB, -10 dB, or -20 dB. (Allowance of error is within ±1 segment on the Bargraph.) If above is not obtained perform the following steps: 1. Feed in +10 dB (3.16 V), and adjust VR103 for the left channel and VR203 for the right channel to obtain +10 dB on the Bargraph. 2. Feed in -10 dB (316 mV) and adjust VR102 for the left channel and VR202 for the right channel to obtain -10 dB on the Bargraph. 3. Feed in -20 dB (100 mV) and adjust VR101 for the left channel and VR201 for the right channel to obtain -20 dB on the Bargraph. 4. Repeat above steps 1 - 3 until the error between input level and indicated value on the Bargraph becomes within ±1 segment on the Bargraph in each input level. |
| 8 | Peak Level | Oscillator to INPUT Jacks | | Function - Noise-A (-40 dB) Meter Range - 1% Input Level - 1 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | Volume P.C.B. VR102, VR202 | Feed in 1 kHz 0 dB (1 V) and adjust VR102 (VR202) to obtain 0 dB on the Bargraph. |
| 9 | WTD-A Output Level | Oscillator to INPUT Jacks | | Function - Level Meter Range - 1% Input Level - 10 V Speed Cal. VR - Not specified Input Level VR - Max. Osc. Output VR - Max. | WTD (IHF-A) Network P.C.B. VR101, VR201 | Feed in 1 kHz -20 dB (100 mV) and adjust VR101 (VR201) to obtain 0 dB on the Bargraph. |
| 10 | Speed | Oscillator and Frequency Counter to INPUT Jacks | | Function - Wow/Flutter Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR302, VR303 | 1. Feed in 2,910 Hz ±1 Hz 1 V and adjust VR302 to obtain -3% speed on the Bargraph. 2. Feed in 3,090 Hz ±1 Hz 1 V and adjust VR303 to obtain +3% speed on the Bargraph. |
| 11 | UNWTD Output Level | Standard Wow/Flutter Generator to INPUT Jacks | | Function - Unweighted Meter Range - 1% Input Level - 1V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR304 | 1. Set the Standard Wow/Flutter Generator to the following modes: Center Frequency - 3 kHz Wow Frequency - 4 Hz Wow/Flutter - 1% (peak) Output Level - 0.5 to 2 V 2. Adjust VR304 to obtain 1% wow/flutter on the Bargraph. |

Note: Turn the Speed Calibration Control fully counterclockwise, then turn it clockwise approximately 7-1/2 times to set the Control to the center position.

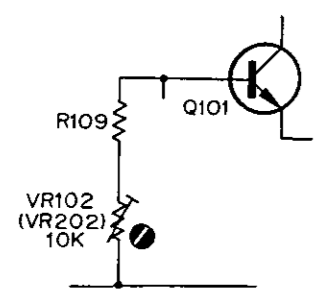


Fig. 5.2.8
7. Log. Adjustment

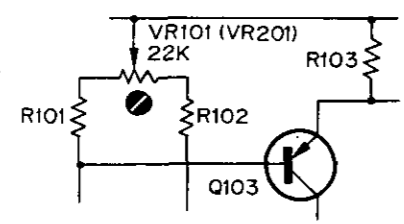


Fig. 5.2.9
7. Log. Adjustment

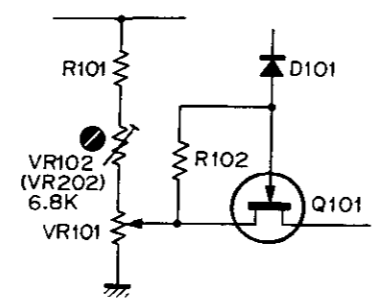


Fig. 5.2.10
8. Peak Level

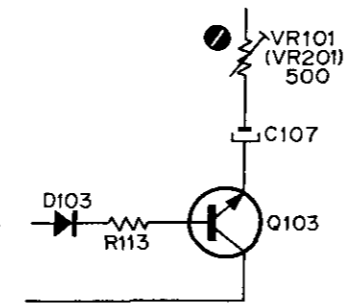


Fig. 5.2.11
9. WTD-A Output Level

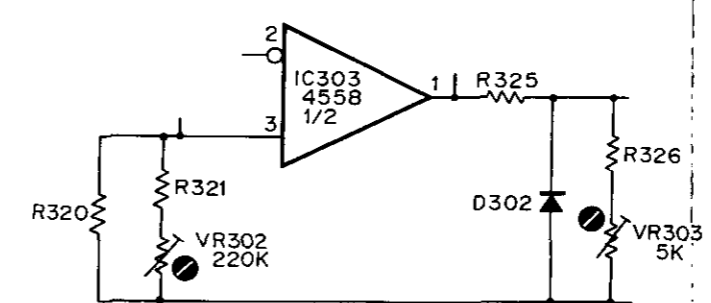


Fig. 5.2.12
10. Speed

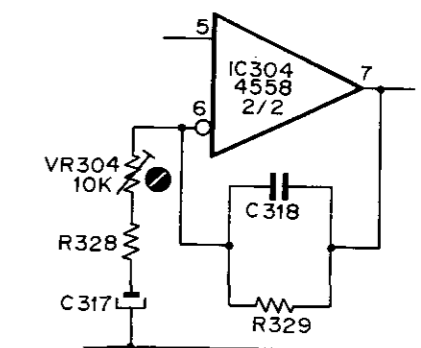


Fig. 5.2.13
11. UNWTD Output Level

| STEP | ITEM | SIGNAL SOURCE | OUTPUT CONNECTION | MODE | ADJUSTMENT | REMARKS |
|------|--|---|---------------------------|--|---|---|
| 12 | Wow/Flutter Output Level | Standard Wow/Flutter Generator to INPUT Jacks | | Function - Wow/Flutter Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Wow/Flutter P.C.B. VR305 | <ol style="list-style-type: none"> Set the Standard Wow/Flutter Generator to the following modes: Center Frequency - 3 kHz Wow Frequency - 4 Hz Wow/Flutter - 1% (peak) Output Level - 0.5 to 2 V Adjust VR305 to obtain 1% wow/flutter on the Bargraph. |
| 13 | Frequency Response Distortion Output Level | Oscillator and Frequency Counter to INPUT Jacks | VTVM to SCOPE OUTPUT Jack | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Distortion P.C.B. VR801, VR802 | <ol style="list-style-type: none"> Feed in 2.5 kHz \pm10 Hz 100 mV and read the level on the VTVM. Feed in 760 Hz \pm10 Hz 100 mV and adjust VR801 to obtain the same level as above step 1. Repeat above steps 1 and 2 until the difference of the levels between steps 1 and 2 becomes 0. Feed in 2.5 kHz \pm10 Hz 100 mV and adjust VR802 to obtain 2.87 V on the VTVM. |
| 14 | Multiplier Output Level | Standard Distortion Generator to INPUT Jacks | | Function - T.H. Dist. Meter Range - 1% Input Level - 1 V Speed Cal. VR - Center (See note) Input Level VR - Max. Osc. Output VR - Max. | Analog Multiplier P.C.B. VR753, VR751, VR752 | <ol style="list-style-type: none"> Set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V) 1% distortion. Adjust VR753 to obtain 1% T.H. Distortion on the Bargraph. Set the output of the Distortion Generator to 0 dB (1 V) or -10 dB (316 mV) and check to insure that the Bargraph indicates 0 dB or -10 dB with a tolerance of \pm1 segment. Set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V), 0 dB (1 V), or -10 dB (316 mV) in 3%, 0.3%, or 0.1% distortion. Then check to insure that the tolerance of the Bargraph against the input level is within the following specified range: Tolerance: 0.3%, 1%, 3% \pm1 segment 0.1% \pm2 segments If above does not comply with the specified one, following adjustments are required: <ol style="list-style-type: none"> Set the distortion of the Distortion Generator to 3%. Adjust VR751 so that the indicated distortion on the Bargraph stays the same when the output of the Distortion Generator is changed from +10 dB (3.16 V) to -10 dB (316 mV). Set the distortion of the Distortion Generator to 1% and adjust VR751 in the same manner as above step a. Set the distortion of the Distortion Generator to 0.3% and adjust VR752 in the same manner as above step a. Set the distortion of the Distortion Generator to 0.1% and adjust VR752 in the same manner as above step a. Repeat above steps a - d until specified tolerance is obtained. After the above steps are completed, set the output of the Distortion Generator to 400 Hz +10 dB (3.16 V) 1% distortion and adjust VR753 to obtain 1% distortion on the Bargraph. |

Note: Turn the Speed Calibration Control fully counterclockwise, then turn it clockwise approximately 7-1/2 times to set the Control to the center position.

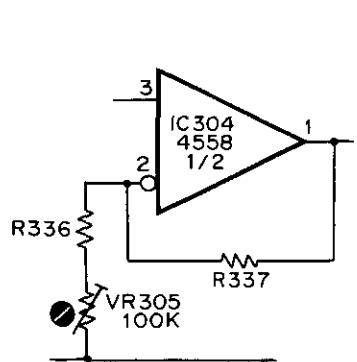


Fig. 5.2.14
12. Wow/Flutter Output Level

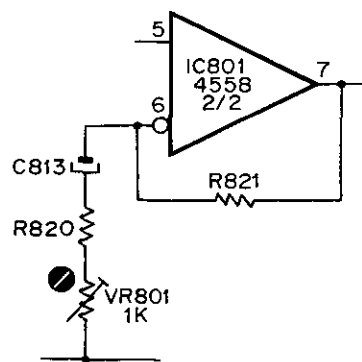


Fig. 5.2.15
13. Frequency Response and Distortion Output Level

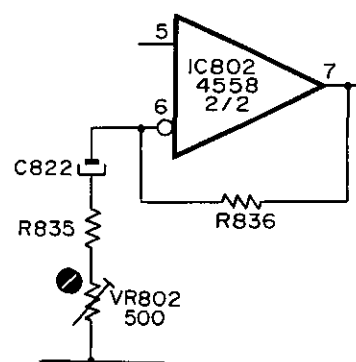


Fig. 5.2.16

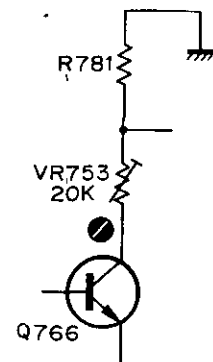


Fig. 5.2.17
14. Multiplier Output Level

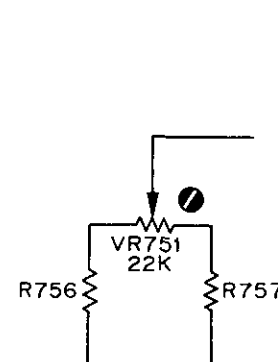


Fig. 5.2.18
14. Multiplier Output Level

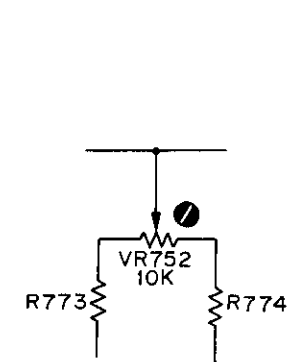


Fig. 5.2.19
14. Multiplier Output Level

6. MOUNTING DIAGRAMS, CIRCUIT DIAGRAMS AND PARTS LIST

Note: Mounting diagram shows a dip side view of the printed circuit board.

6.1. IC Block Diagrams

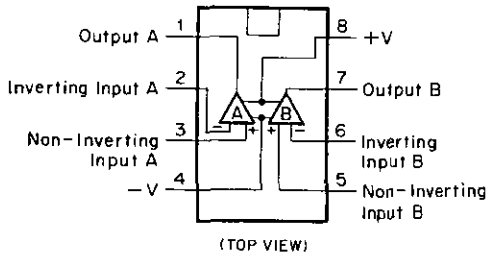


Fig. 6.1.1 OP Amp. IC 4558

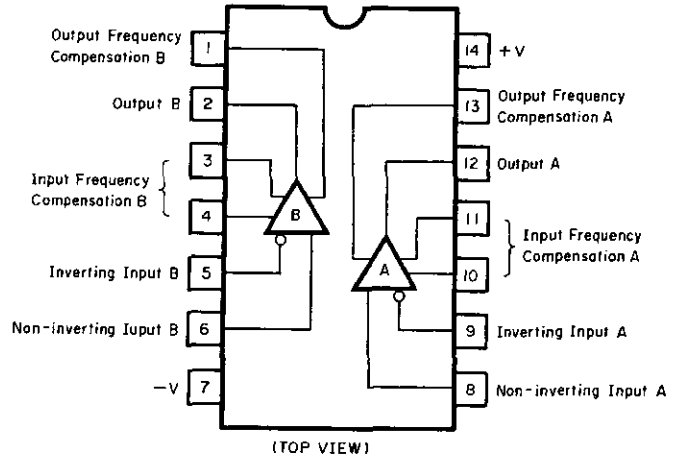


Fig. 6.1.2 OP Amp. IC 4709

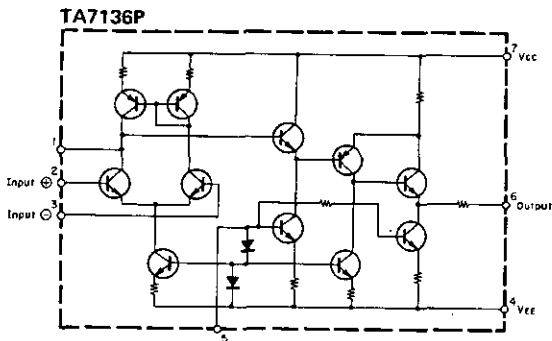


Fig. 6.1.3 OP Amp. IC TA7136P

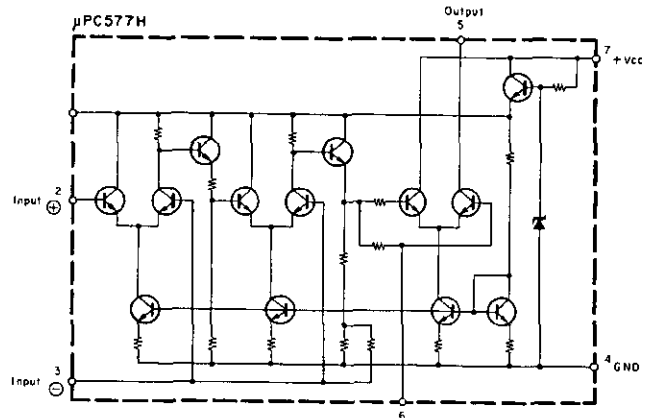


Fig. 6.1.4 FM IF Amp. IC μPC577H

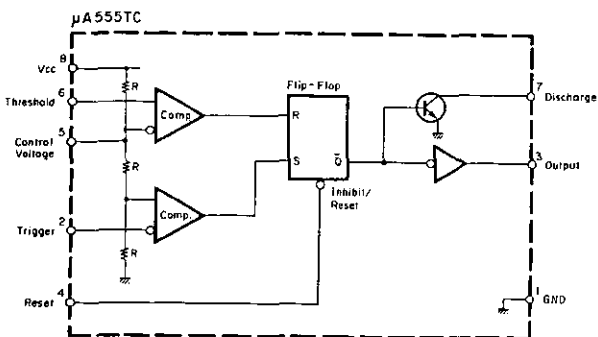


Fig. 6.1.5 Timer IC μA555TC

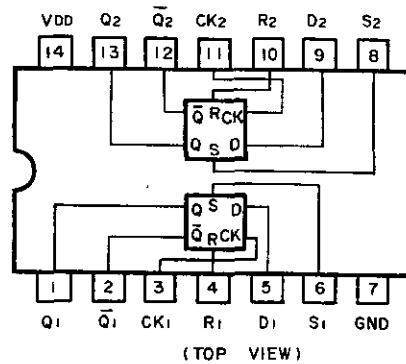


Fig. 6.1.6 D-Type Flip-Flop C-MOS IC TC4013BP

6.2 Connector P.C.B. Ass'y

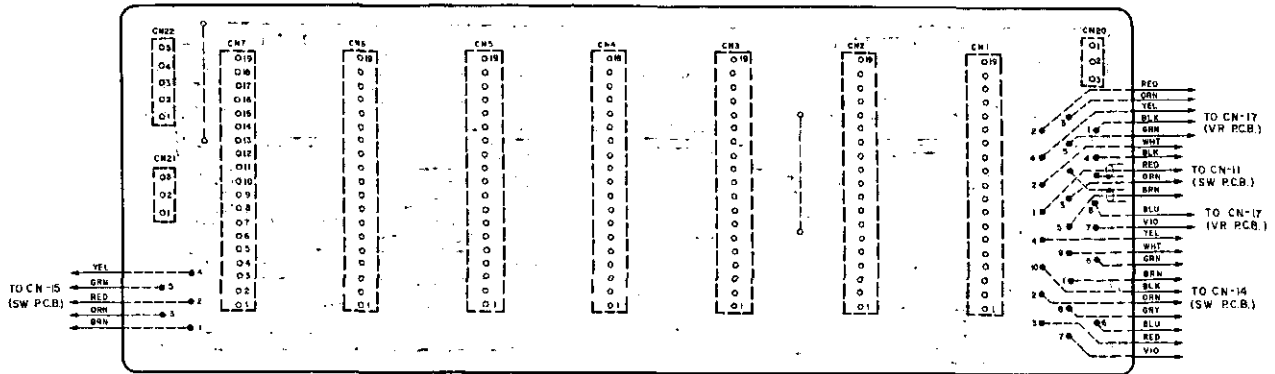


Fig. 6.2.1

| Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|-------------------------------|
| | BA03893A | Connector P.C.B. Ass'y |
| | 0B07751B | Connector P.C.B. |
| | BA03808A | 19P Connector Ass'y (7 pcs.) |
| | 0B08435A | CN Connector A (1 pce.) |
| | 0B08436A | CN Connector B (1 pce.) |
| | 0B08437B | CN Connector C (1 pce.) |
| | 0B08438A | CN Connector D (1 pce.) |
| | 0B08185A | 3P-T Post (2 pcs.) |
| | 0B08183A | 5P-T Post (1 pce.) |

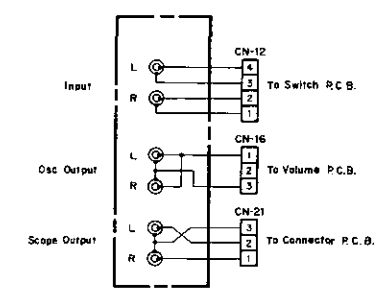
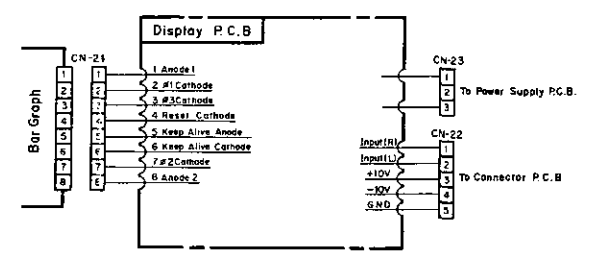
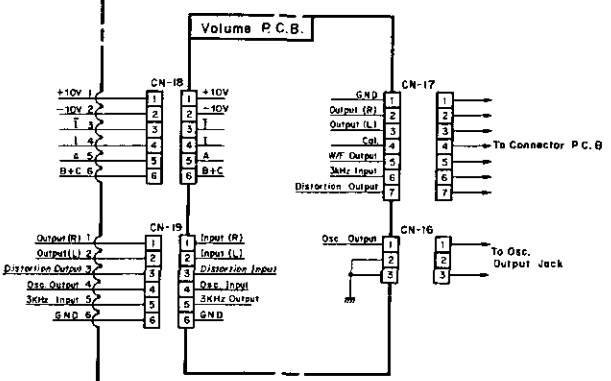
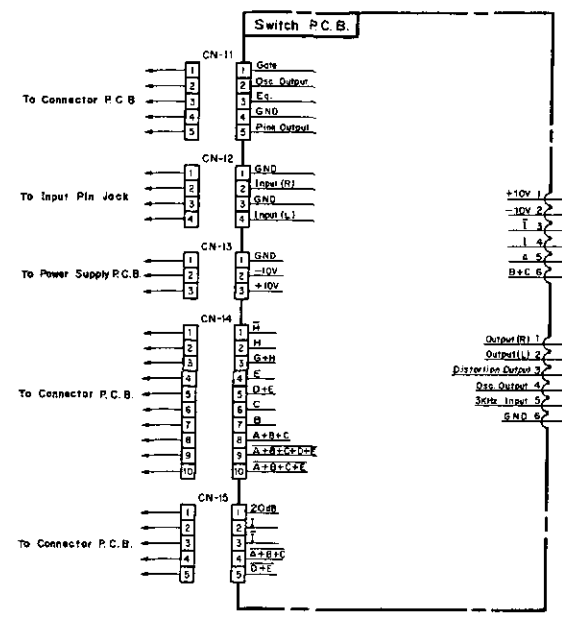
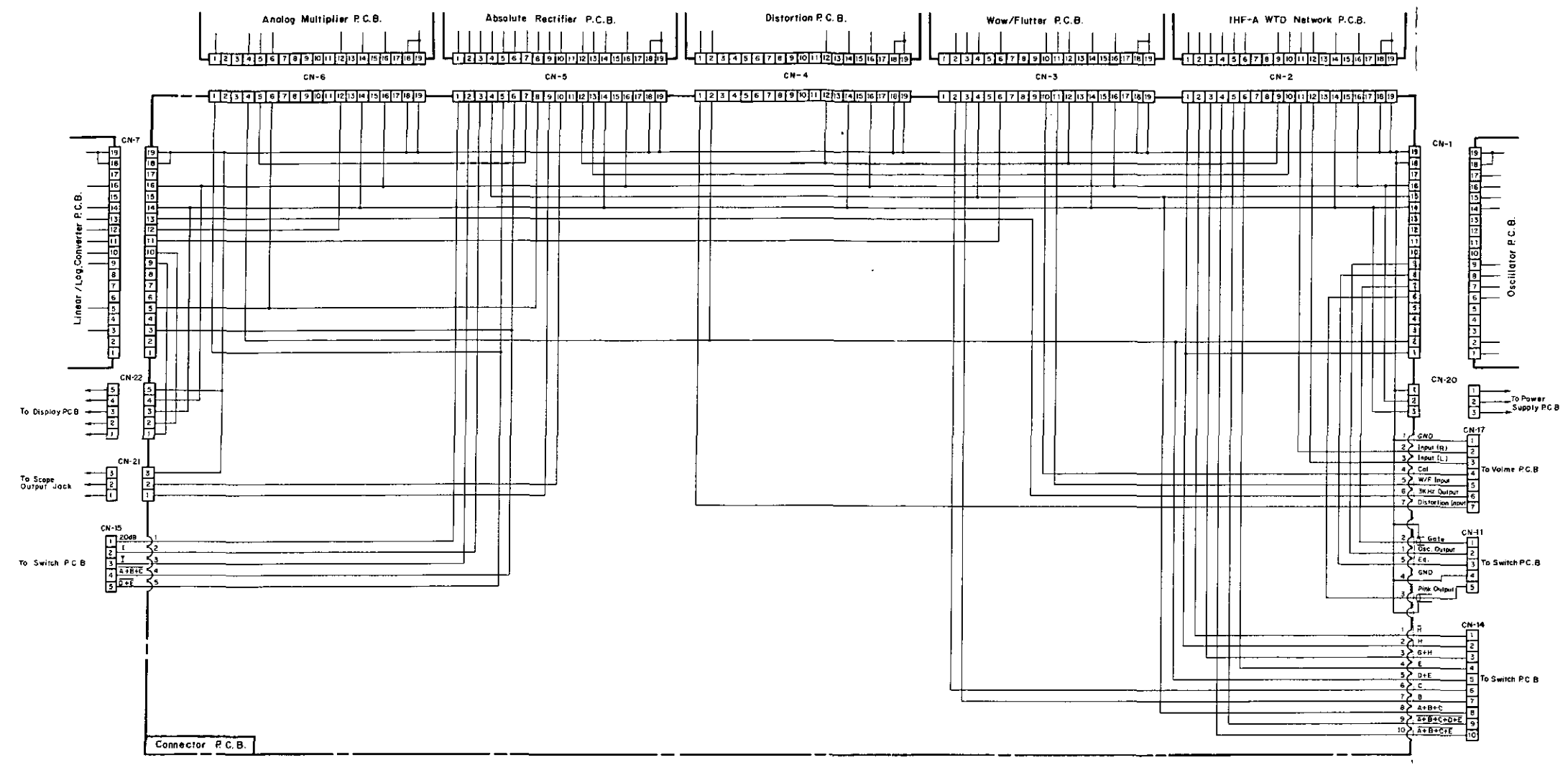


Fig. 6.2.2 Connecting Diagram

6.3. Power Supply P.C.B. Ass'y

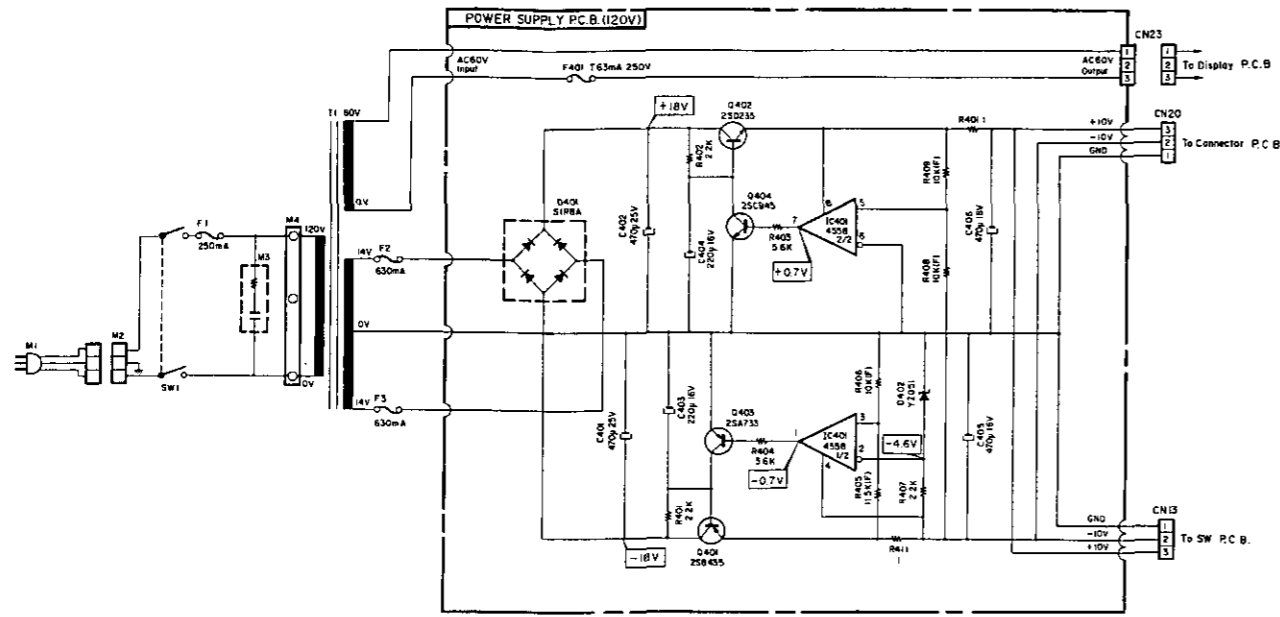


Fig. 6.3.1 120 V

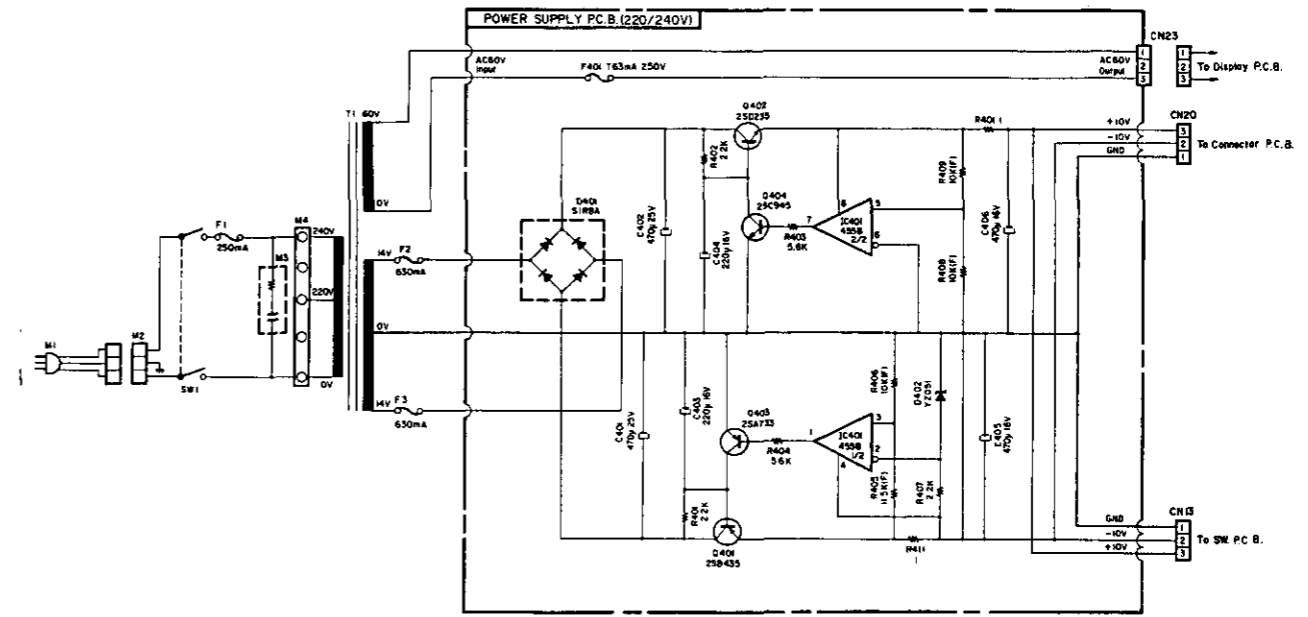


Fig. 6.3.3 220 V/240 V

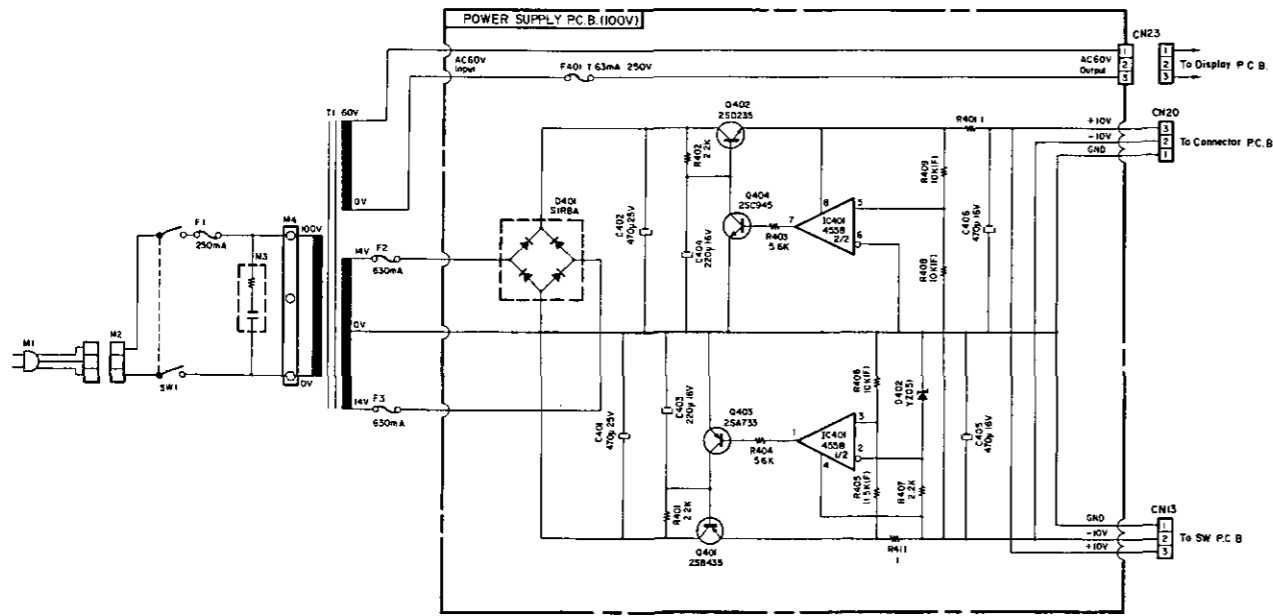


Fig. 6.3.2 100 V

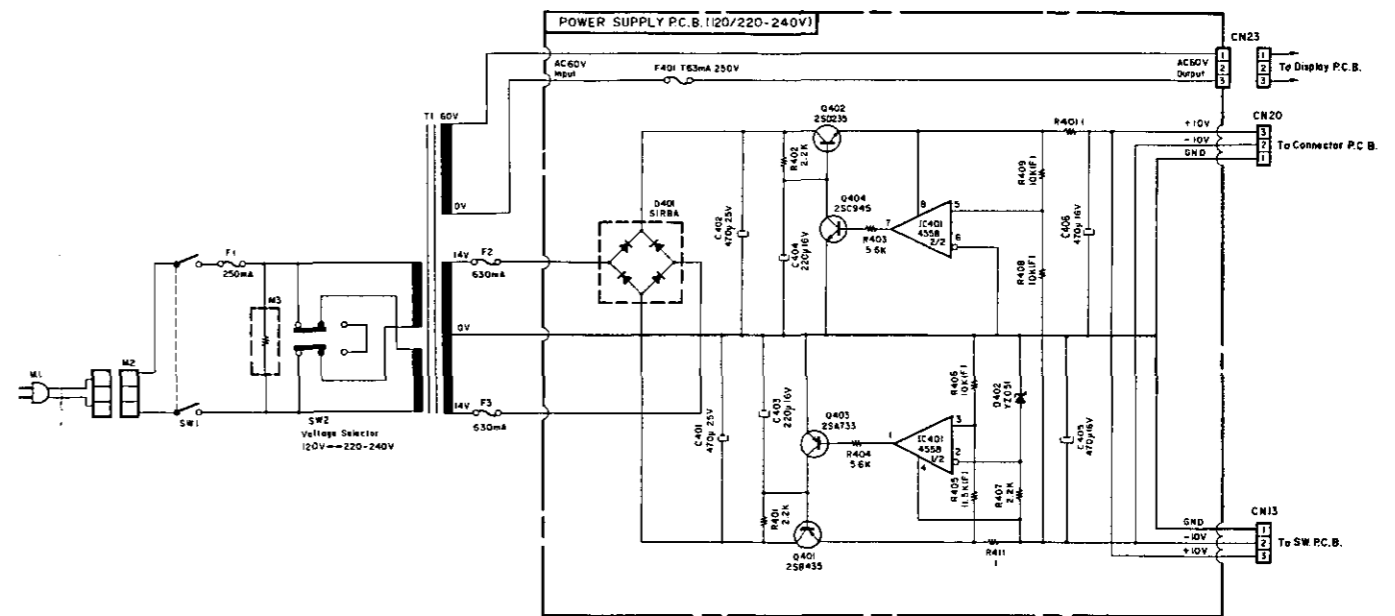


Fig. 6.3.4 120 V/120-240 V

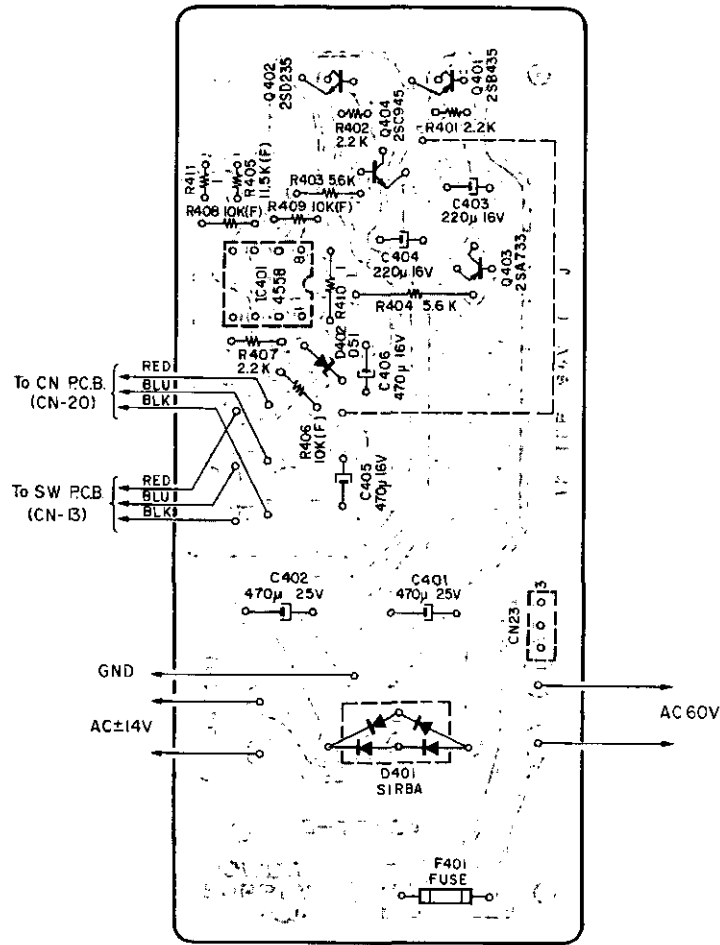


Fig. 6.3.5

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|----------|--------------------------------------|--------------------|----------|--|
| | BA03892A | Power Supply P.C.B. Ass'y | CN23 | 0B08185A | 3P-T Post |
| | 0B07742B | Power Supply P.C.B. | | 0B08345A | Fuse T 63mA 250V (1 pce.) |
| IC401 | 0B06124B | IC RC4558D | | 0B08349A | Fuse Clip (2 pcs.) |
| Q401 | 0B06011A | Transistor 2SB435 | | 0B08430A | P-S Connector A 3PH (1 pce.) |
| Q402 | 0B01823A | Transistor 2SD235 | | 0B08431A | P-S Connector B 3PH (1 pce.) |
| Q403 | 0B06013A | Transistor 2SA733 | | 0B08077B | Motor Governor P.C.B. Holder (1 pce.) |
| Q404 | 0B06100A | Transistor 2SC945 (A) | | 0J03740B | Heat Sink E1 (1 pce.) |
| D401 | 0B06088A | Diode Bridge 1SRBA 1A 100V | | 0E00606A | Screw M3x6 Philips Pan Head (3A) (3 pcs.) |
| D402 | 0B06058A | Zener Diode YZ051 | | 0E00608A | Screw M3x10 Philips Pan Head (3A) (3 pcs.) |
| R401,402 | 0B05566A | Carbon Resistor 2.2K ERD-25V J | | 0E00507A | Nut Hex. M3 (2 pcs.) |
| R403,404 | 0B01887A | Carbon Resistor 5.6K ERD-25T J | | 0B05206A | Glass Tube 12mm (4 pcs.) |
| R405 | 0B09071A | Metal Film Resistor 11.5K ERO-25CK F | | 0M03773A | Fuse Label T 63mA (1 pce.) |
| R406,408 | 0B09014A | Metal Film Resistor 10K ERO-25CK F | | | |
| R410,411 | 0B05941A | Fail Safe Type Resistor 1 ERD-14F J | | | |
| C401,402 | 0B01401A | Electrolytic Capacitor 470µ 25V | | | |
| C403,404 | 0B01398A | Electrolytic Capacitor 220µ 16V | | | |
| C405,406 | 0B01392A | Electrolytic Capacitor 470µ 16V | | | |

6.4. Wow & Flutter P.C.B. Ass'y

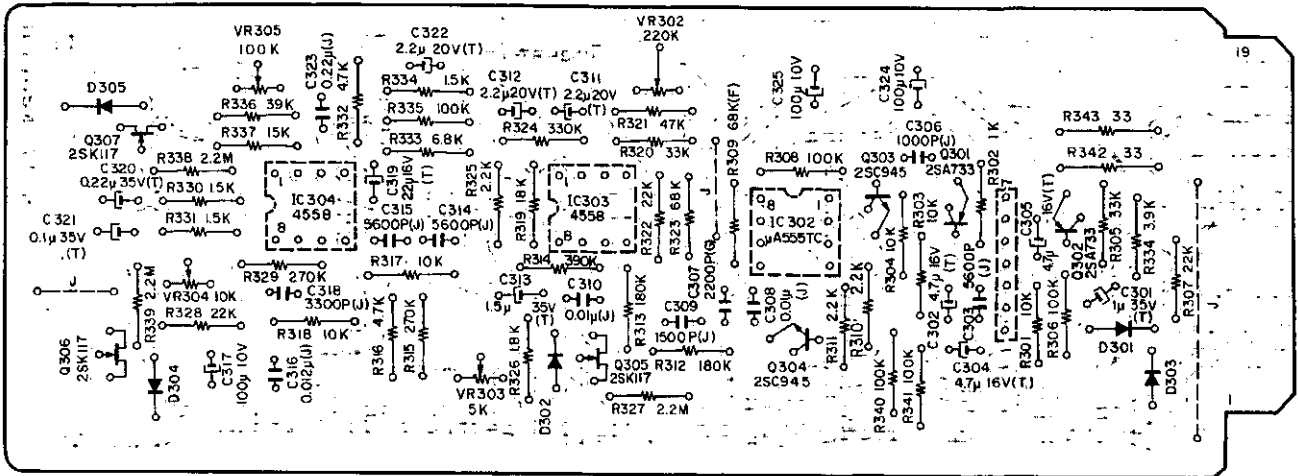
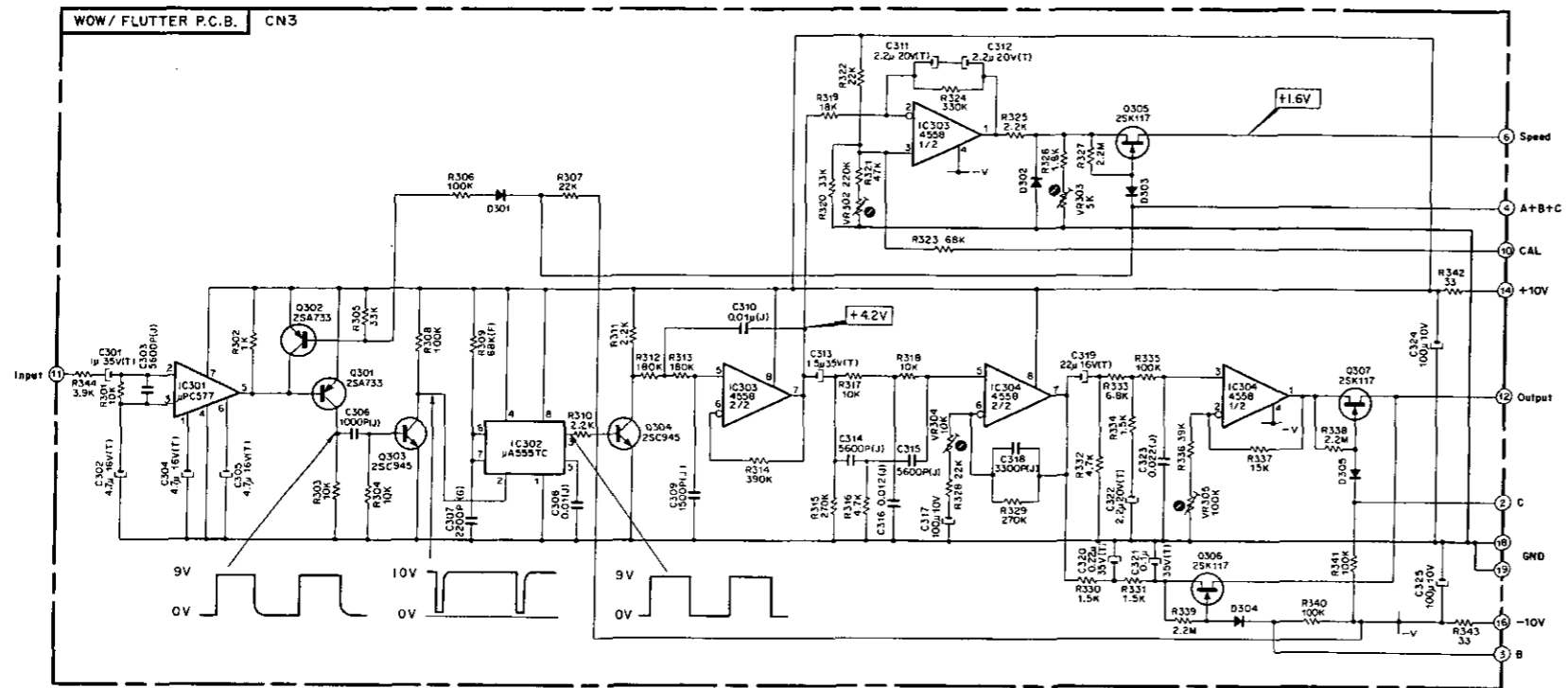


Fig. 6.4.1

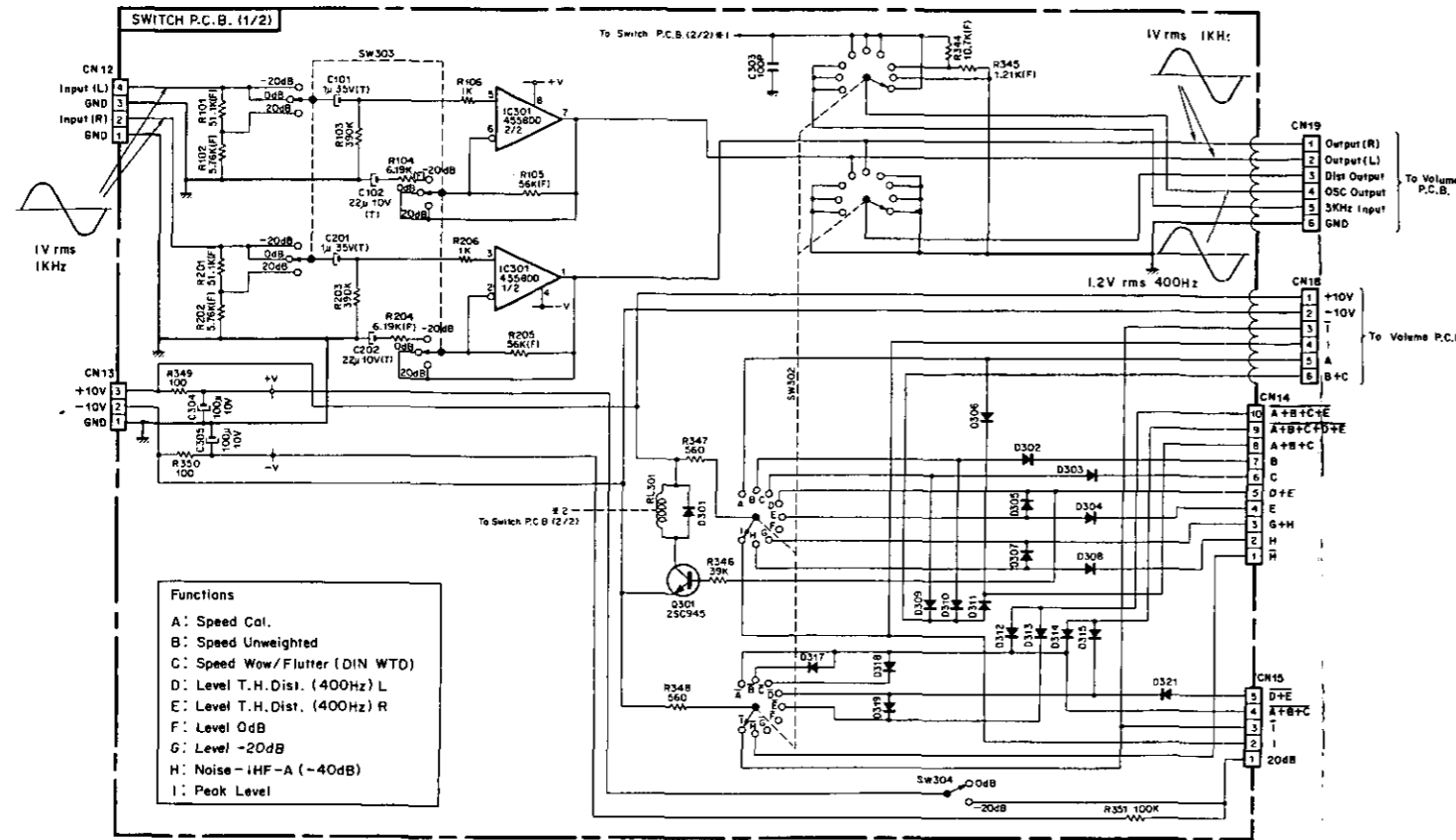
| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|---------------------------------------|--------------------|--------------------------|--------------------------------------|
| | BA03884A | Wow & Flutter P.C.B. Ass'y | R326 | 0B05614A | Carbon Resistor 1.8K ERD-25T J |
| | 0B07749B | Wow & Flutter P.C.B. | R327,338 | 0B05641A | Carbon Resistor 2.2M ERD-25T J |
| IC301 | 0B06114A | IC μ PC577H | 339 | | |
| IC302 | 0B06137A | IC μ A555TC | R330,331 | 0B05698A | Carbon Resistor 1.5K ERD-25T J |
| IC303,304 | 0B06124B | IC RC4558D | 334 | | |
| Q301,302 | 0B06013A | Transistor 2SA733 | R333 | 0B01682A | Carbon Resistor 6.8K ERD-25T J |
| Q303,304 | 0B06100A | Transistor 2SC945 (A) | R336 | 0B01854A | Carbon Resistor 39K ERD-25T J |
| Q305,306 | 0B06129A | FET 2SK117 | R337 | 0B01683A | Carbon Resistor 15K ERD-25T J |
| D301-305 | 0B01909A | Silicon Diode 1S1555 (5 pcs.) | R342,343 | 0B01713A | Carbon Resistor 33 ERD-25T J |
| VR302 | 0B07188A | Semi-fixed Volume 220K (B) | R344 | 0B05675A | Carbon Resistor 3.9K ERD-25T J |
| VR303 | 0B09059A | Semi-fixed Volume 5K (B) | C301 | 0B05638A | Tantalum Capacitor 1 μ 35V |
| VR304 | 0B07162A | Semi-fixed Volume 10K (B) | C302,304 | 0B05657A | Tantalum Capacitor 4.7 μ 16V |
| VR305 | 0B09060A | Semi-fixed Volume 100K (B) | 305 | | |
| R301,303 | 0B01888A | Carbon Resistor 10K ERD-25T J | C303,314 | 0B05659A | Mylar Capacitor 5600P 50V J |
| 304,317 | | | 315 | | |
| 318 | | | C306 | 0B05550A | Mylar Capacitor 1000P 50V J |
| R302 | 0B01857A | Carbon Resistor 1K ERD-25T J | C307 | 0B09035A | SP Capacitor 2200P 50V G |
| R305,320 | 0B05509A | Carbon Resistor 33K ERD-25T J | C308,310 | 0B05681A | Mylar Capacitor 0.01 μ 50V J |
| R306,308 | 0B01889A | Carbon Resistor 100K ERD-25T J | C309 | 0B05653A | Mylar Capacitor 1500P 50V J |
| 335,340 | | | C311,312 | 0B05598A | Tantalum Capacitor 2.2 μ 20V |
| 341 | | | 322 | | |
| R307,322 | 0B05615A | Carbon Resistor 22K ERD-25T J | C313 | 0B05639A | Tantalum Capacitor 1.5 μ 35V |
| 328 | | | C316 | 0B05843A | Mylar Capacitor 0.012 μ 50V J |
| R309 | 0B09013A | Metal Film Resistor 68K ERO-25CK F | C317,324 | 0B05885A | Electrolytic Capacitor 100 μ 10V |
| R310,311 | 0B05622A | Carbon Resistor 2.2K ERD-25T J | 325 | | |
| 325 | | | C318 | 0B01914A | Mylar Capacitor 3300P 50V J |
| R312,313 | 0B05640A | Carbon Resistor 180K ERD-25T J | C319 | 0B05636A | Tantalum Capacitor 22 μ 16V |
| R314 | 0B05676A | Carbon Resistor 390K ERD-25T J | C320 | 0B05772A | Tantalum Capacitor 0.22 μ 35V |
| R315,329 | 0B05620A | Carbon Resistor 270K ERD-25T J | C321 | 0B05781A | Tantalum Capacitor 0.1 μ 35V |
| R316,332 | 0B01846A | Carbon Resistor 4.7K ERD-25T J | C323 | 0B05582A | Mylar Capacitor 0.022 μ 50V J |
| R319 | 0B05560A | Carbon Resistor 18K ERD-25T J | 0B05202A | Glass Tube 25mm (2 pcs.) | |
| R321 | 0B05641A | Carbon Resistor 47K ERD-25T J | | | |
| R323 | 0B05692A | Carbon Resistor 68K ERD-25T J | | | |
| R324 | 0B05627A | Carbon Resistor 330K ERD-25T J | | | |



Conditions:
 Input Signal – 3000 Hz ($\pm 0.1\%$), 30 mV or more
 Input Range SW – 0 dB
 Function Control – Speed Unweighted

Fig. 6.4.2 Note: Diode is 1SS53, 1S953 or 1S1555 unless otherwise specified.

6.5. Switch P.C.B. Ass'y



Functions
 A: Speed Cal.
 B: Speed Unweighted
 C: Speed Wow/Flutter (DIN WTD)
 D: Level T.H. Dist. (400Hz) L
 E: Level T.H. Dist. (400Hz) R
 F: Level 0dB
 G: Level -20dB
 H: Noise -1HF-A (-40dB)
 I: Peak Level

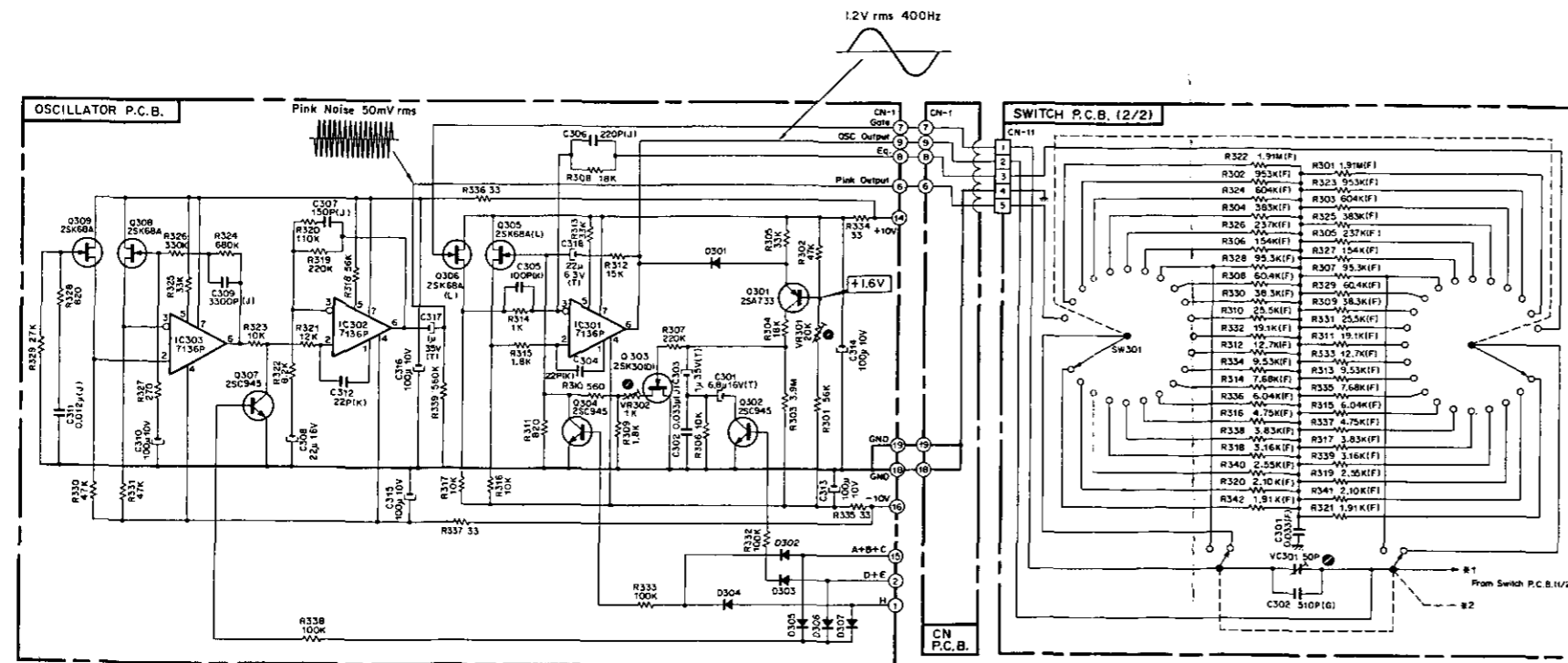
Switch P.C.B. Ass'y

Conditions:
 Input Signal - 1 V rms 1 kHz
 Input Range SW - 0 dB
 Function Control - Level
 Oscillator Control - 400 Hz

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

Fig. 6.5.1

6.6. Oscillator P.C.B. Ass'y



Oscillator P.C.B. Ass'y

Conditions:
 Function Control - Level
 Oscillator Control - 400 Hz
 Osc. Output Control - Max.

Fig. 6.6.1

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

| Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|--------------------------------------|
| | BA03890A | Switch P.C.B. Ass'y |
| IC301 | 0B07740B | Switch P.C.B. IC RC4558DD |
| Q301 | 0B06146A | Transistor 2SC945 (A) |
| D301-315 | 0B01909A | Silicon Diode 1S1555 (19 pcs.) |
| 317-319 | | |
| 321 | | |
| R101,201 | 0B05985A | Metal Film Resistor 51.1K ERO-25CK F |
| R102,202 | 0B05978A | Metal Film Resistor 5.76K ERO-25CK F |
| R103,203 | 0B05676A | Carbon Resistor 390K ERD-25T J |
| R104,204 | 0B09011A | Metal Film Resistor 6.19K ERO-25CK F |
| R105,205 | 0B09012A | Metal Film Resistor 56K ERO-25CK F |
| R106,206 | 0B01857A | Carbon Resistor 1K ERD-25T J |
| R301 | 0B05993A | Metal Film Resistor 1.91M ERO-25CK F |
| R302 | 0B05992A | Metal Film Resistor 953K ERO-25CK F |
| R303 | 0B05991A | Metal Film Resistor 604K ERO-25CK F |
| R304 | 0B05990A | Metal Film Resistor 383K ERO-25CK F |
| R305 | 0B09066A | Metal Film Resistor 237K ERO-25CK F |
| R306 | 0B05988A | Metal Film Resistor 154K ERO-25CK F |
| R307 | 0B05987A | Metal Film Resistor 95.3K ERO-25CK F |
| R308 | 0B05986A | Metal Film Resistor 60.4K ERO-25CK F |
| R309 | 0B09008A | Metal Film Resistor 38.3K ERO-25CK F |
| R310 | 0B05984A | Metal Film Resistor 25.5K ERO-25CK F |
| R311 | 0B05983A | Metal Film Resistor 19.1K ERO-25CK F |
| R312 | 0B05999A | Metal Film Resistor 12.7K ERO-25CK F |
| R313 | 0B05981A | Metal Film Resistor 9.53K ERO-25CK F |
| R314 | 0B05980A | Metal Film Resistor 7.68K ERO-25CK F |
| R315 | 0B05979A | Metal Film Resistor 6.04K ERO-25CK F |
| R316 | 0B05977A | Metal Film Resistor 4.75K ERO-25CK F |
| R317 | 0B05976A | Metal Film Resistor 3.83K ERO-25CK F |
| R318 | 0B05975A | Metal Film Resistor 3.16K ERO-25CK F |
| R319 | 0B09065A | Metal Film Resistor 2.55K ERO-25CK F |
| R320 | 0B09064A | Metal Film Resistor 2.10K ERO-25CK F |
| R321 | 0B09063A | Metal Film Resistor 1.91K ERO-25CK F |
| R322 | 0B09030A | Metal Film Resistor 1.91M ERO-25VK F |
| R323 | 0B09029A | Metal Film Resistor 953K ERO-25VK F |
| R324 | 0B09028A | Metal Film Resistor 604K ERO-25VK F |
| R325 | 0B09027A | Metal Film Resistor 383K ERO-25VK F |
| R326 | 0B09070A | Metal Film Resistor 237K ERO-25VK F |
| R327 | 0B09025A | Metal Film Resistor 154K ERO-25VK F |
| R328 | 0B09024A | Metal Film Resistor 95.3K ERO-25VK F |
| R329 | 0B09023A | Metal Film Resistor 60.4K ERO-25VK F |
| R330 | 0B09022A | Metal Film Resistor 38.3K ERO-25VK F |
| R331 | 0B09021A | Metal Film Resistor 25.5K ERO-25VK F |
| R332 | 0B09020A | Metal Film Resistor 19.1K ERO-25VK F |
| R333 | 0B09019A | Metal Film Resistor 12.7K ERO-25VK F |
| R334 | 0B09018A | Metal Film Resistor 9.53K ERO-25VK F |
| R335 | 0B09017A | Metal Film Resistor 7.68K ERO-25VK F |
| R336 | 0B09016A | Metal Film Resistor 6.04K ERO-25VK F |
| R337 | 0B09015A | Metal Film Resistor 4.75K ERO-25VK F |
| R338 | 0B05998A | Metal Film Resistor 3.83K ERO-25VK F |
| R339 | 0B05997A | Metal Film Resistor 3.16K ERO-25VK F |
| R340 | 0B09069A | Metal Film Resistor 2.55K ERO-25VK F |
| R341 | 0B09068A | Metal Film Resistor 2.10K ERO-25VK F |
| R342 | 0B09067A | Metal Film Resistor 1.91K ERO-25VK F |
| R344 | 0B05982A | Metal Film Resistor 10.7K ERO-25CK F |
| R345 | 0B05971A | Metal Film Resistor 1.21K ERO-25CK F |
| R346 | 0B01854A | Carbon Resistor 39K ERD-25T J |
| R347,348 | 0B05575A | Carbon Resistor 560 ERD-25T J |
| R349,350 | 0B01679A | Carbon Resistor 100 ERD-25T J |
| R351 | 0B01889A | Carbon Resistor 100K ERD-25T J |
| VC301 | 0B01250A | Trimmer Capacitor 50P |
| C101,201 | 0B05638A | Tantalum Capacitor 1μ 35V |

| Schematic Ref. No. | Part No. | Description |
|--------------------|----------------------|------------------------------------|
| C102,202 | OB09044A | Tantalum Capacitor 22μ 10V |
| C301 | OB09233A | PP Capacitor 0.033μ 100V F |
| C302 | OB09057A | SP Capacitor 510P 50V G |
| C303 | OB05892A | Ceramic Capacitor 100P 50V K |
| C304,305 | OB05885A | Electrolytic Capacitor 100μ 10V |
| RL301 | OB07171A | Relay 24V |
| SW301 | OB07196A | Rotary Switch |
| SW302 | OB07197A | Rotary Switch |
| SW303 | OB08400A | Lever Switch |
| SW304 | OB08399A | Lever Switch |
| CN11,15 | OB08303A | 5P-S Post |
| CN12 | OB08375A | 4P-S Post |
| CN13 | OB08184A | 3P-S Post |
| CN14 | OB08286A | 10P-S Post |
| | OB08439A | Switch Connector A 6PH (1 pce.) |
| | OB08440A | Switch Connector B 6PH (1 pce.) |
| | BA03882A | Oscillator P.C.B. Assy |
| IC301,302,303 | OB07743B OB06068A | Oscillator P.C.B. IC 7136P |
| Q301 | OB06013A | Transistor 2SA733 |
| Q302,304,307 | OB06100A | Transistor 2SC945 (A) |
| Q303 | OB06001A | FET 2SK30 (D) |
| Q305,306 | OB06159A | FET 2SK68A (L) |
| Q308,309 | OB06067A | FET 2SK68A |
| D301-307 | OB01909A | Silicon Diode 1S1555 (7 pcs.) |
| VR301 | OB09061A | Semi-fixed Volume 20K (B) |
| VR302 | OB09083A | Semi-fixed Volume 1K (B) |
| R301,318 | OB05508A | Carbon Resistor 56K ERD-25T J |
| R302,330,331 | OB05641A | Carbon Resistor 47K ERD-25T J |
| R303 | OB05964A | Carbon Resistor 3.9M ERD-25T J |
| R304,308 | OB05560A | Carbon Resistor 18K ERD-25T J |
| R305,313,325 | OB05509A | Carbon Resistor 33K ERD-25T J |
| R306,316,317,323 | OB01888A | Carbon Resistor 10K ERD-25T J |
| R307,319 | OB05625A | Carbon Resistor 220K ERD-25T J |
| R309,315 | OB05614A | Carbon Resistor 1.8K ERD-25T J |
| R310 | OB05575A | Carbon Resistor 560 ERD-25T J |
| R311,328 | OB01680A | Carbon Resistor 820 ERD-25T J |
| R312 | OB01683A | Carbon Resistor 15K ERD-25T J |
| R314 | OB01857A | Carbon Resistor 1K ERD-25T J |
| R320 | OB09072A | Carbon Resistor 110K ERD-25T J |
| R321 | OB05771A | Carbon Resistor 12K ERD-25T J |
| R322 | OB01856A | Carbon Resistor 8.2K ERD-25T J |
| R324 | OB05868A | Carbon Resistor 680K ERD-25T J |
| R326 | OB05627A | Carbon Resistor 330K ERD-25T J |
| R327 | OB05645A | Carbon Resistor 270 ERD-25T J |
| R329 | OB05743A | Carbon Resistor 27K ERD-25T J |
| R332,333,338 | OB01889A | Carbon Resistor 100K ERD-25T J |
| R334,335,336,337 | OB01713A | Carbon Resistor 33 ERD-25T J |
| R339 | OB05784A | Carbon Resistor 560K ERD-25T J |
| C301 | OB05769A | Tantalum Capacitor 6.8μ 16V |
| C302 | OB05583A | Mylar Capacitor 0.033μ 50V J |
| C303,317 | OB05638A | Tantalum Capacitor 1μ 35V |
| C304,312 | OB05806A | Ceramic Capacitor 22P 50V K |
| C305 | OB05892A | Ceramic Capacitor 100P 50V K |
| C306 | OB05532A | SP Capacitor 220P 50V J |
| C307 | OB09073A | SP Capacitor 150P 50V J |
| C308 | OB01862A | Electrolytic Capacitor 22μ 16V |
| C309 | OB01914A | Mylar Capacitor 3300P 50V J |
| C310,313,316 | OB05885A | Electrolytic Capacitor 100μ 10V |
| C311 | OB05843A | Mylar Capacitor 0.012μ 50V |
| C318 | OB09119A | Tantalum Capacitor 22μ 6.3V |
| | OB08507A | Oscillator Shield Plate (1 pce.) |
| | OB08405A | Oscillator Shield Case E1 (1 pce.) |
| | OB05202A | Glass Tube 25mm (4 pcs.) |

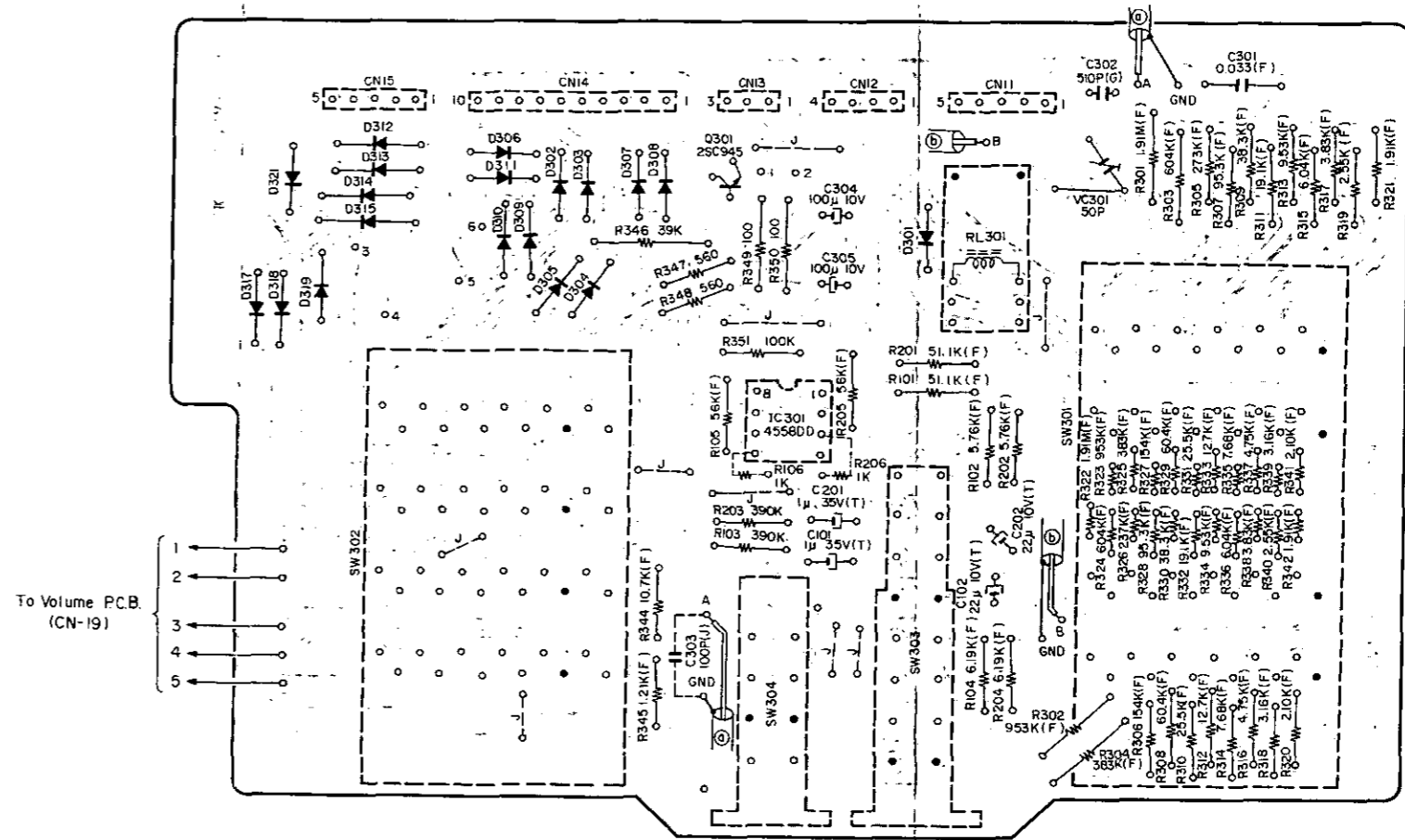


Fig. 6.5.2

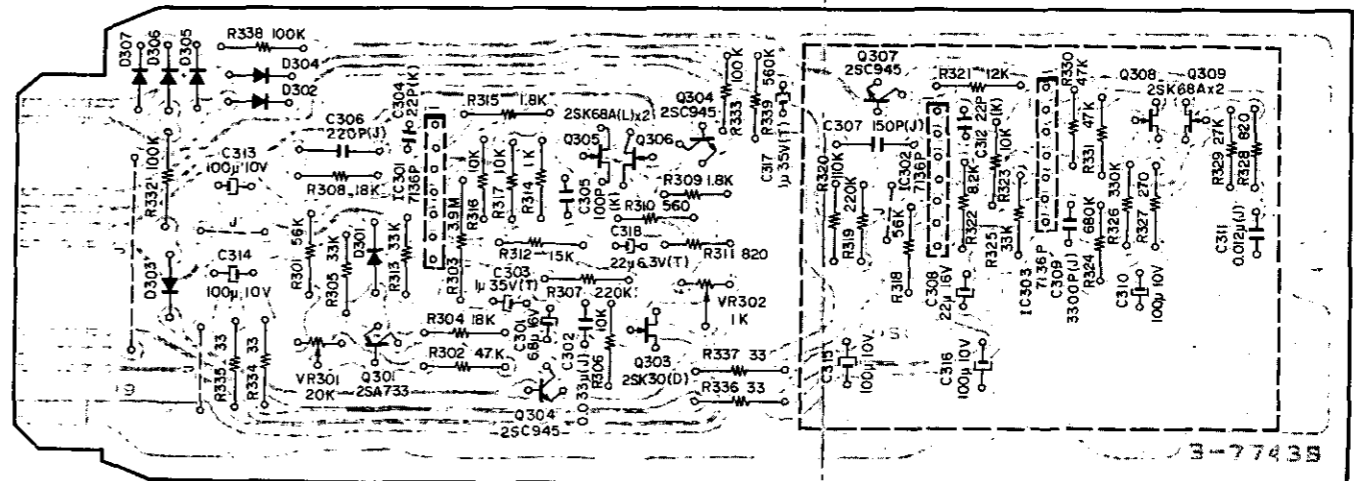


Fig. 6.6.2

6.7. Absolute Rectifier P.C.B. Ass'y

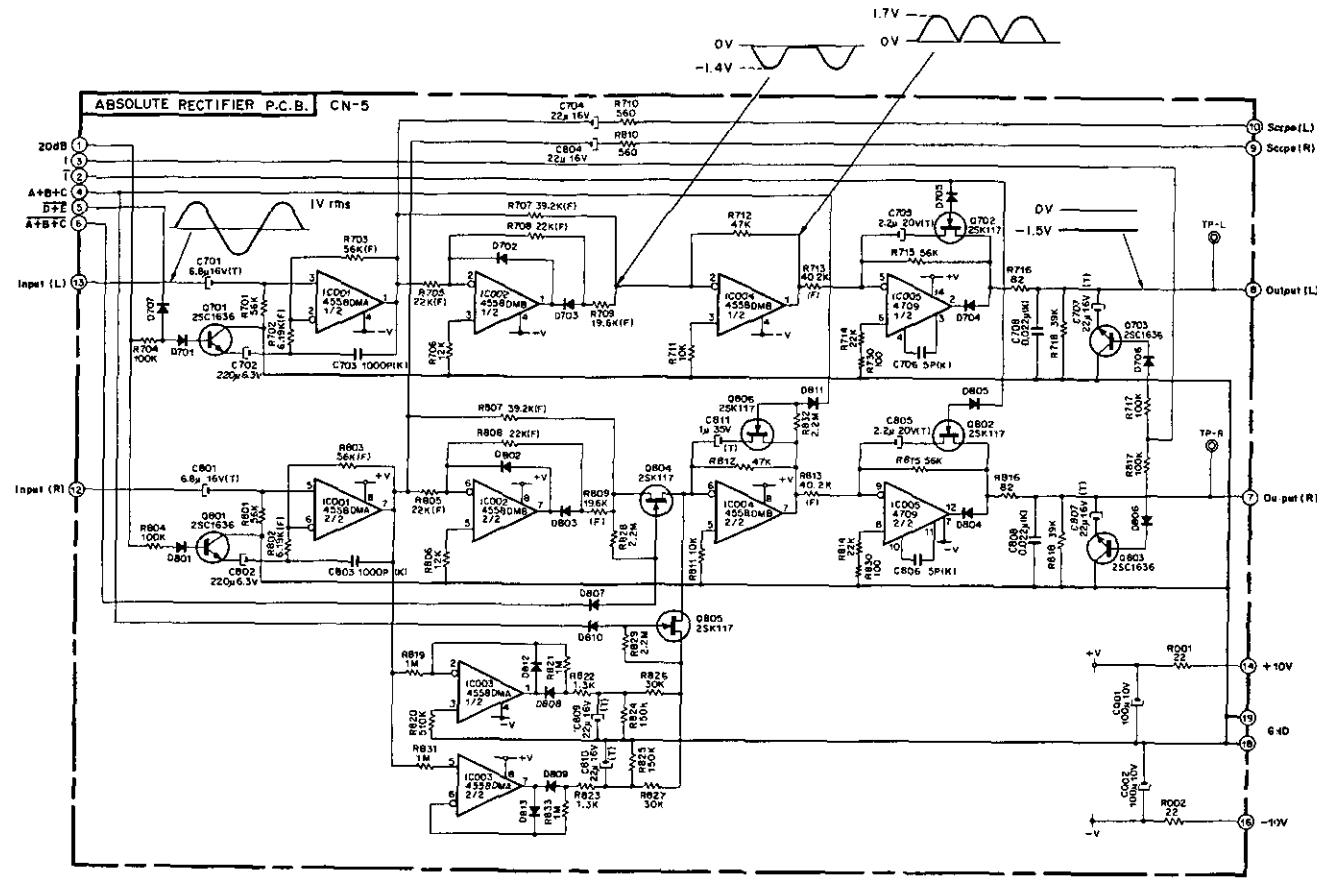


Fig. 6.7.1 Current Type

Conditions:
 Input Signal - 1 V rms 1 kHz
 Input Range SW - 0 dB
 Meter Range SW - 0 dB
 Function Control - Level

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

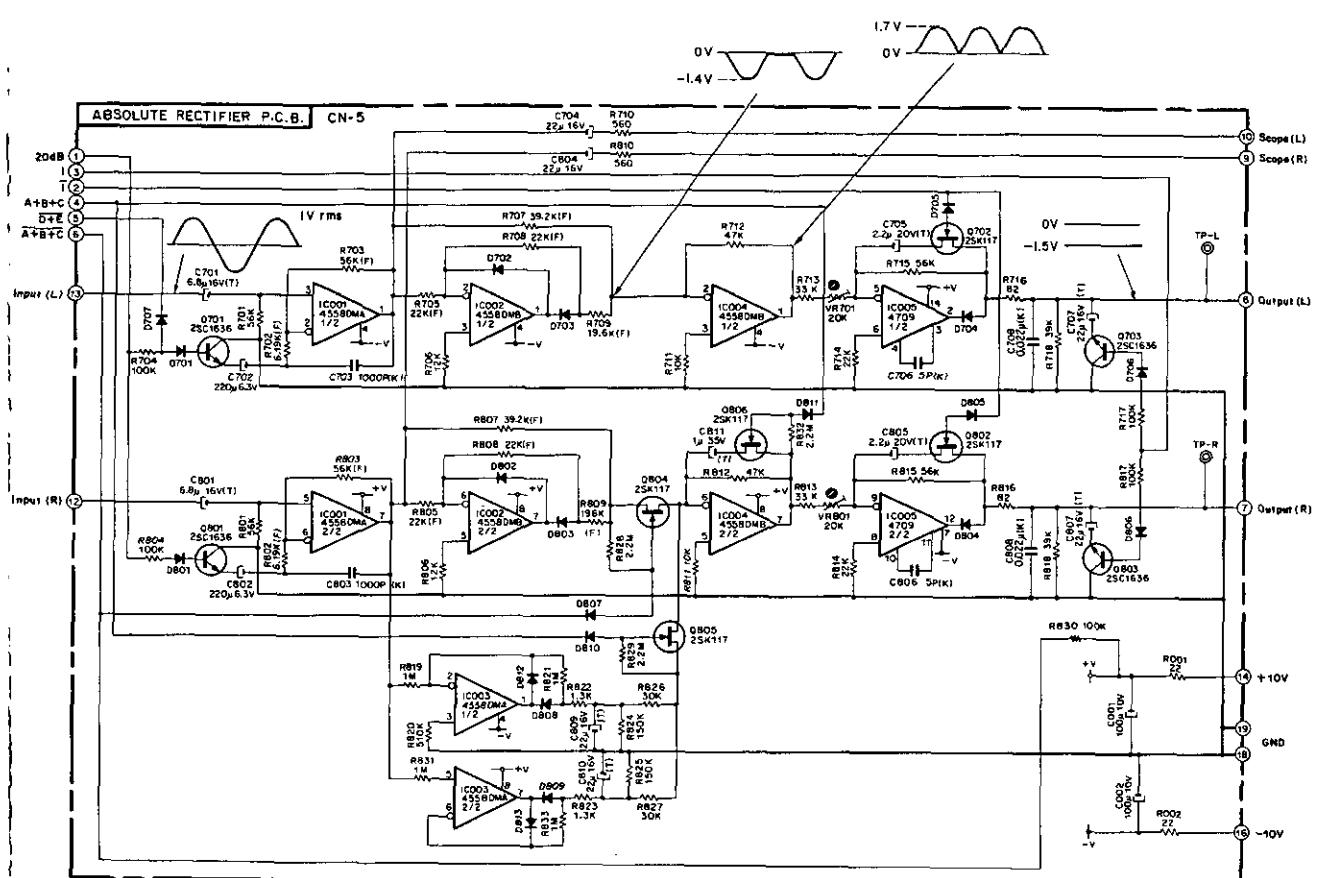


Fig. 6.7.3 Previous Type

Conditions:
 Input Signal - 1 V rms 1 kHz
 Input Range SW - 0 dB
 Meter Range SW - 0 dB
 Function Control - Level

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

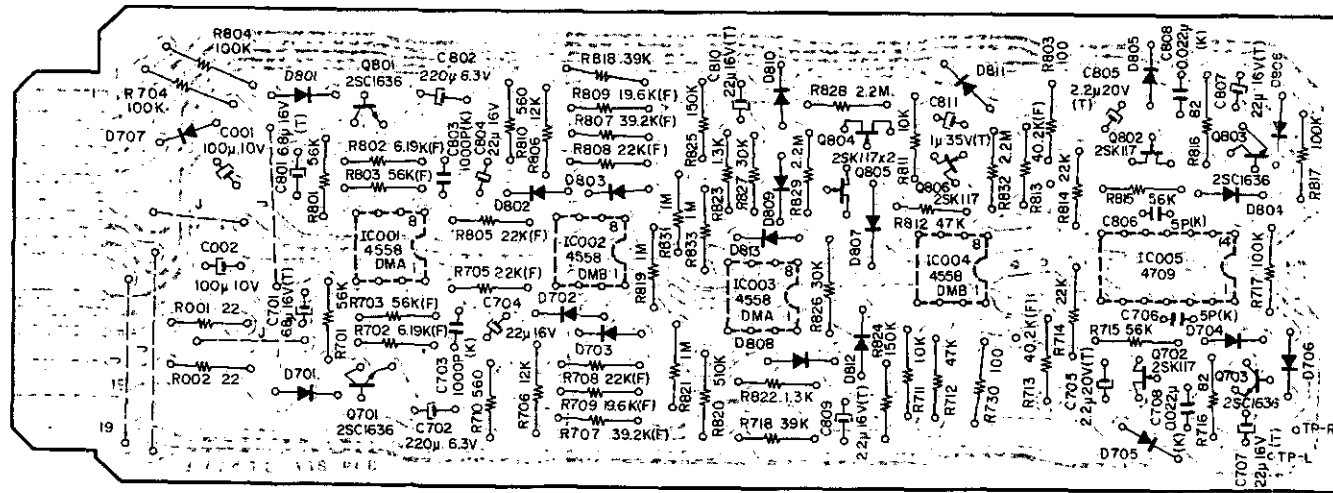


Fig. 6.7.2 Current Type

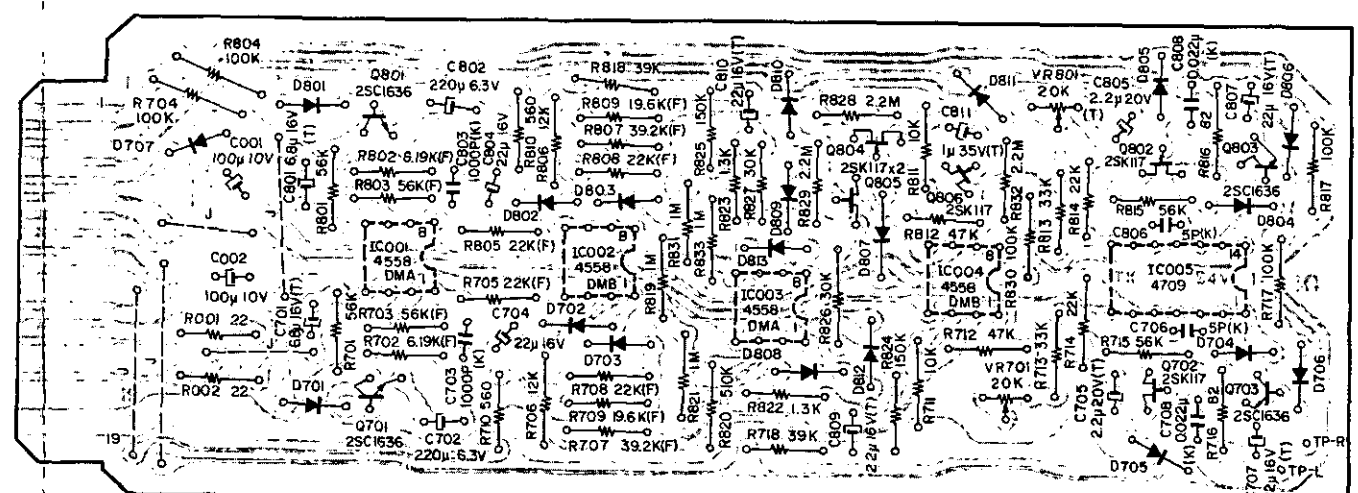
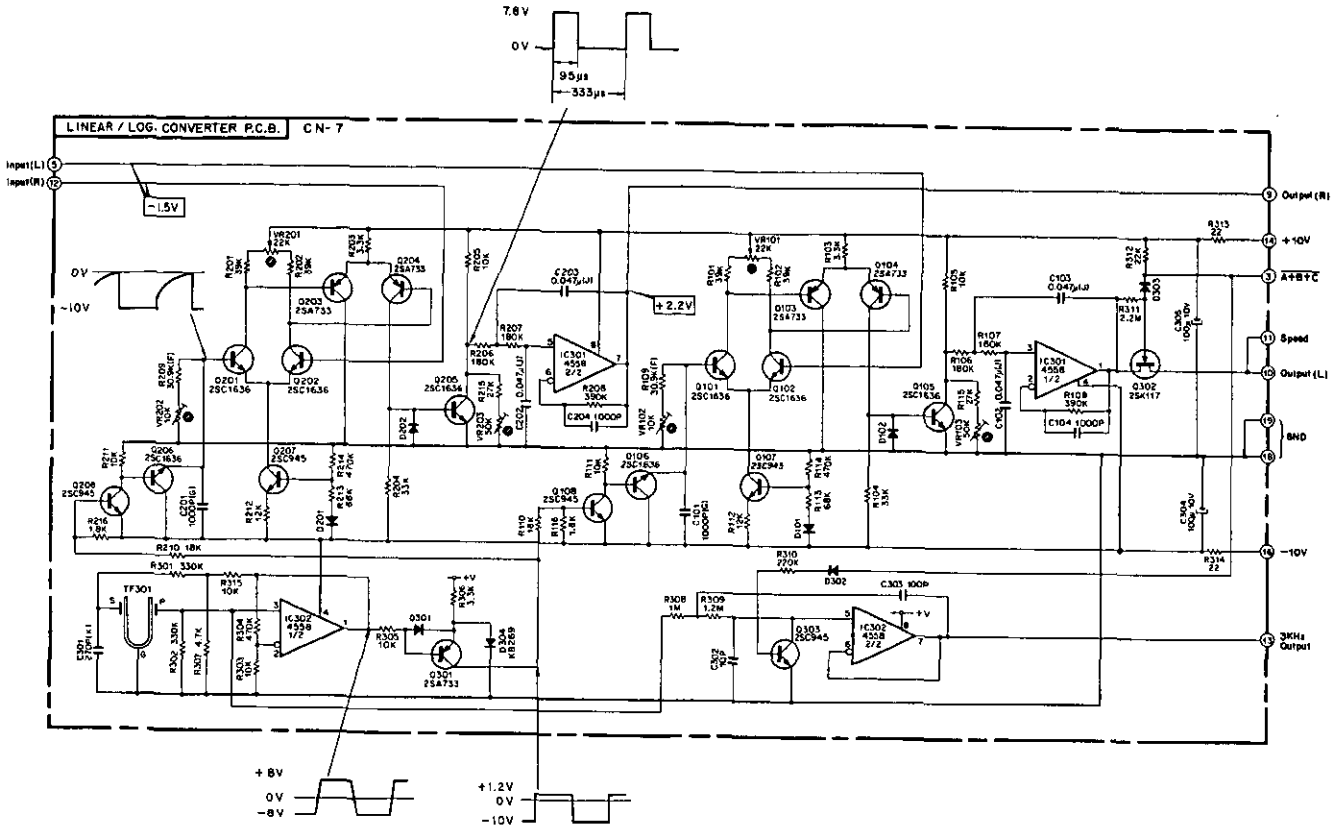


Fig. 6.7.4 Previous Type

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|----------------------------|-----------------|---|----------------------------|-----------------|--|
| | BA03886B | Absolute Rectifier P.C.B. Ass'y Current Type | | BA03886B | Absolute Rectifier P.C.B. Ass'y Previous Type |
| | OB07745C | Absolute Rectifier P.C.B. | | OB07745C | Absolute Rectifier P.C.B. |
| IC001,003 | OB06160A | IC RC4558DMA | IC001,003 | OB06160A | IC RC4558DMA |
| IC002,004 | OB06151A | IC RC4558DMB | IC002,004 | OB06151A | IC RC4558DMB |
| IC005 | OB06027A | IC 4709 | IC005 | OB06027A | IC 4709 |
| D701-707 801-813 | OB01909A | Silicon Diode 1S1555 (20 pcs.) | D701-707 801-813 | OB01909A | Silicon Diode 1S1555 (20 pcs.) |
| Q701,703 801,803 | OB06070A | Transistor 2SC1636 | Q701,703 801,803 | OB06070A | Transistor 2SC1636 |
| Q702,802 804,805 806 | OB06129A | FET 2SK117 | Q702,802 804,805 806 | OB06129A | FET 2SK117 |
| R001,002 | OB05579A | Carbon Resistor 22 ERD-25T J | VR701,801 | OB09061A | Semi-fixed Volume 20K |
| R701,801 | OB05508A | Carbon Resistor 56K ERD-25T J | R001,002 | OB05579A | Carbon Resistor 22 ERD-25T J |
| R702,802 | OB09011A | Metal Film Resistor 6.19K ERO-25CK F | R701,715 | OB05508A | Carbon Resistor 56K ERD-25T J |
| R703,715 803,815 | OB09012A | Metal Film Resistor 56K ERO-25CK F | 801,815 | | |
| R704,717 804,817 | OB01889A | Carbon Resistor 100K ERD-25T J | R702,802 | OB09011A | Metal Film Resistor 6.19K ERO-25CK F |
| R705,708 805,808 | OB05968A | Metal Film Resistor 22K ERO-25CK F | R703,803 | OB09012A | Metal Film Resistor 56K ERO-25CK F |
| R706,806 | OB05771A | Carbon Resistor 12K ERD-25T J | R704,717 804,817 830 | OB01889A | Carbon Resistor 100K ERD-25T J |
| R707,807 | OB09080A | Metal Film Resistor 39.2K ERO-25CK F | R705,708 805,808 | OB05968A | Metal Film Resistor 22K ERO-25CK F |
| R709,809 | OB09051A | Metal Film Resistor 19.6K ERO-25CK F | R706,806 | OB05771A | Carbon Resistor 12K ERD-25T J |
| R710,810 | OB05575A | Carbon Resistor 560 ERD-25T J | R707,807 | OB09080A | Metal Film Resistor 39.2K ERO-25CK F |
| R711,811 | OB01888A | Carbon Resistor 10K ERD-25T J | R709,809 | OB09051A | Metal Film Resistor 19.6K ERO-25CK F |
| R712,812 | OB09135A | Metal Film Resistor 47K ERO-25CK F | R710,810 | OB05575A | Carbon Resistor 560 ERD-25T J |
| R713,813 | OB09136A | Metal Film Resistor 40.2K ERO-25CK F | R711,811 | OB01888A | Carbon Resistor 10K ERD-25T J |
| R714,814 | OB05615A | Carbon Resistor 22K ERD-25T J | R712,812 | OB05641A | Carbon Resistor 47K ERD-25T J |
| R716,816 | OB05631A | Carbon Resistor 82 ERD-25T J | R713,813 | OB05509A | Carbon Resistor 33K ERD-25T J |
| R718, 818 | OB01854A | Carbon Resistor 39K ERD-25T J | R714,814 | OB05615A | Carbon Resistor 22K ERD-25T J |
| R730,830 | OB01679A | Carbon Resistor 100 ERD-25T J | R716,816 | OB05631A | Carbon Resistor 82 ERD-25T J |
| R819,821 831,833 | OB05776A | Carbon Resistor 1M ERD-25T J | R718,818 | OB01854A | Carbon Resistor 39K ERD-25T J |
| R820 | OB09054A | Carbon Resistor 510K ERD-25T J | R819,821 831,833 | OB05776A | Carbon Resistor 1M ERD-25T J |
| R822,823 | OB09074A | Carbon Resistor 1.3K ERD-25T J | R820 | OB09054A | Carbon Resistor 510K ERD-25T J |
| R824,825 | OB05626A | Carbon Resistor 150K ERD-25T J | R822,823 | OB09074A | Carbon Resistor 1.3K ERD-25T J |
| R826,827 | OB09075A | Carbon Resistor 30K ERD-25T J | R824,825 | OB05626A | Carbon Resistor 150K ERD-25T J |
| R828,829 832 | OB05671A | Carbon Resistor 2.2M ERD-25T J | R826,827 | OB09075A | Carbon Resistor 30K ERD-25T J |
| C001,002 | OB05885A | Electrolytic Capacitor 100μ 10V | R828,829 832 | OB05671A | Carbon Resistor 2.2M ERD-25T J |
| C701,801 | OB05769A | Tantalum Capacitor 6.8μ 16V | C001,002 | OB05885A | Electrolytic Capacitor 100μ 10V |
| C702,802 | OB01394A | Electrolytic Capacitor 220μ 6.3V | C701,801 | OB05769A | Tantalum Capacitor 6.8μ 16V |
| C703,803 | OB04025A | Ceramic Capacitor 1000P 50V K | C702,802 | OB01394A | Electrolytic Capacitor 220μ 6.3V |
| C704,804 | OB01862A | Electrolytic Capacitor 22μ 16V | C703,803 | OB04025A | Ceramic Capacitor 1000P 50V K |
| C705,805 | OB05598A | Tantalum Capacitor 2.2μ 20V | C704,804 | OB01862A | Electrolytic Capacitor 22μ 16V |
| C706,806 | OB05905A | Ceramic Capacitor 5P 50V K | C705,805 | OB05598A | Tantalum Capacitor 2.2μ 20V |
| C707,807 809,810 | OB05636A | Tantalum Capacitor 22μ 16V | C706,806 | OB05905A | Ceramic Capacitor 5P 50V K |
| C708,808 | OB04062A | Mylar Capacitor 0.022μ 50V K | C707,807 809,810 | OB05636A | Tantalum Capacitor 22μ 16V |
| C811 | OB05638A | Tantalum Capacitor 1μ 35V | C708,808 | OB04062A | Mylar Capacitor 0.022μ 50V K |
| TP-L, R | OB03924A | Gate Pin | C811 | OB05638A | Tantalum Capacitor 1μ 35V |
| | OB05202A | Glass Tube 25mm (2 pcs.) | TP-L, R | OB03924A | Gate Pin |
| | | | | OB05202A | Glass Tube 25mm (2 pcs.) |

6.8. Linear/Log. Converter P.C.B. Ass'y



Conditions:
 Input Signal – 1 V rms 1 kHz
 Input Range SW – 0 dB
 Meter Range SW – 0 dB
 Function Control – Level

Fig. 6.8.1

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

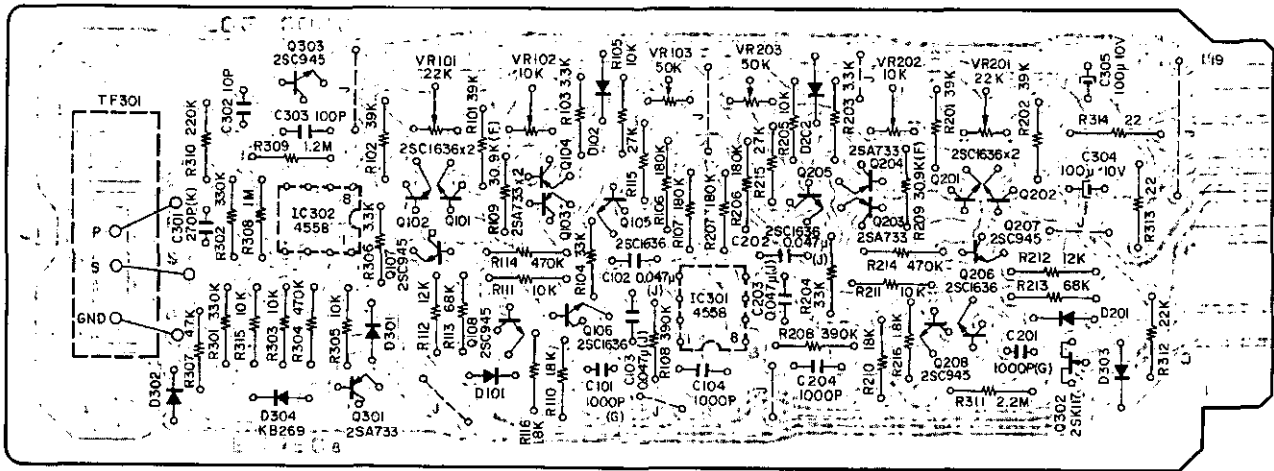
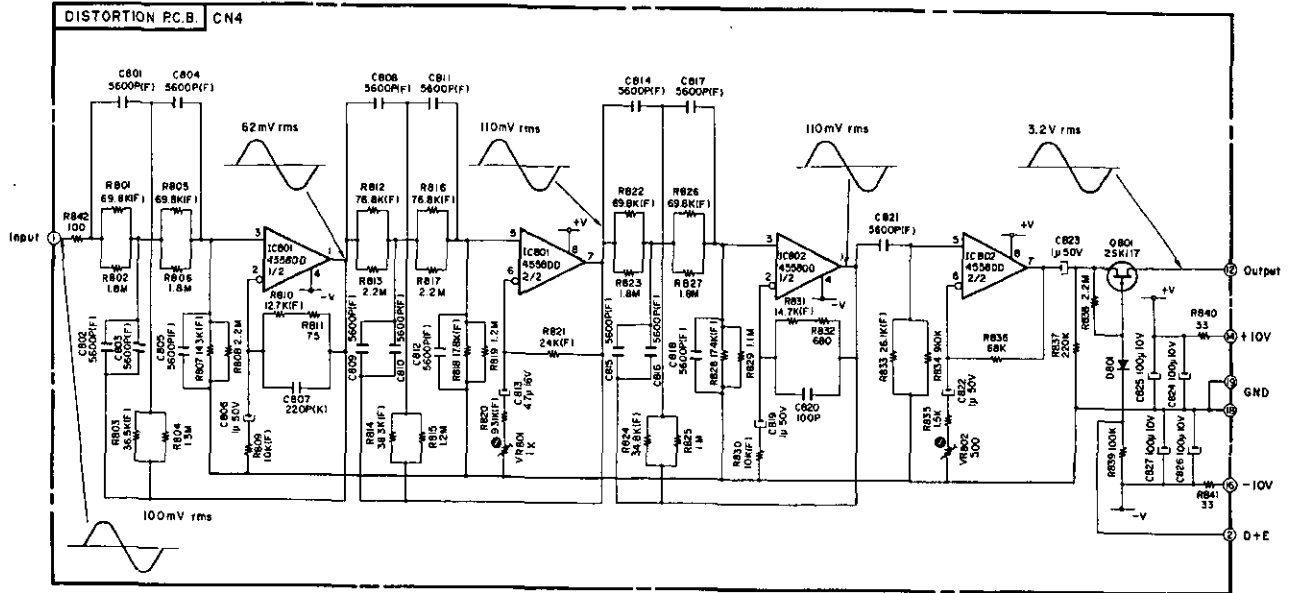


Fig. 6.8.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|---|--------------------|--------------------------|---------------------------------|
| | BA03888A | Linear/Log. Converter P.C.B. Ass'y | R112,212 | OB05771A | Carbon Resistor 12K ERD-25T J |
| IC301,302 | OB07750B | Linear/Log. Converter P.C.B. | R113,213 | OB05692A | Carbon Resistor 68K ERD-25T J |
| Q101,102 | OB06124B | IC RC4558D | R114,214 | OB01684A | Carbon Resistor 470K ERD-25T J |
| 105,106 | OB06070A | Transistor 2SC1636 | 304 | | |
| 201,202 | | | R115,215 | OB05743A | Carbon Resistor 27K ERD-25T J |
| 205,206 | | | R116,216 | OB05614A | Carbon Resistor 1.8K ERD-25T J |
| Q103,104 | OB06013A | Transistor 2SA733 | R301,302 | OB05627A | Carbon Resistor 330K ERD-25T J |
| 203,204 | | | R307 | OB01846A | Carbon Resistor 4.7K ERD-25T J |
| 301 | | | R308 | OB05776A | Carbon Resistor 1M ERD-25T J |
| Q107,108 | OB06100A | Transistor 2SC945 (A) | R309 | OB05962A | Carbon Resistor 1.2M ERD-25T J |
| 207,208 | | | R310 | OB05625A | Carbon Resistor 220K ERD-25T J |
| 303 | | | R311 | OB05671A | Carbon Resistor 2.2M ERD-25T J |
| Q302 | OB06129A | FET 2SK117 | R312 | OB05615A | Carbon Resistor 22K ERD-25T J |
| D101,102 | OB01909A | Silicon Diode 1S1555 | R313,314 | OB05579A | Carbon Resistor 22 ERD-25T J |
| 201,202 | | | C101,201 | OB09043A | SP Capacitor 1000P 50V G |
| 301,302 | | | C102,103 | OB05796A | Mylar Capacitor 0.047μ 50V J |
| 303 | | | 202,203 | | |
| D304 | OB01702A | Varistor KB269 | C104,204 | OB04025A | Ceramic Capacitor 1000P 50V |
| VR101,201 | OB07185A | Semi-fixed Volume 22K (B) | C301 | OB09076A | Ceramic Capacitor 270P 50V K |
| VR102,202 | OB07191A | Semi-fixed Volume 10K (B) | C302 | OB09077A | Ceramic Capacitor 10P 50V |
| VR103,203 | OB07166A | Semi-fixed Volume 50K (B) | C303 | OB01288A | Ceramic Capacitor 100P 50V |
| R101,102 | OB01854A | Carbon Resistor 39K ERD-25T J | C304,305 | OB05885A | Electrolytic Capacitor 100μ 10V |
| 201,202 | | | TF301 | OB08404A | Micro Fork |
| R103,203 | OB01681A | Carbon Resistor 3.3K ERD-25T J | OB05204A | Tube F 13mm (2 pcs.) | |
| 306 | | | OB08461B | T.F. Holder (1 pce.) | |
| R104,204 | OB05509A | Carbon Resistor 33K ERD-25T J | OB08462A | T.F. Pin (1 pce.) | |
| R105,111 | OB01888A | Carbon Resistor 10K ERD-25T J | OB05202A | Glass Tube 25mm (2 pcs.) | |
| 205,211 | | | | | |
| 303,305 | | | | | |
| 315 | | | | | |
| R106,107 | OB05640A | Carbon Resistor 180K ERD-25T J | | | |
| 206,207 | | | | | |
| R108,208 | OB05676A | Carbon Resistor 390K ERD-25T J | | | |
| R109,209 | OB09055A | Metal Film Resistor 30.9K ERO-25CK F | | | |
| R110,210 | OB05560A | Carbon Resistor 18K ERD-25T J | | | |

6.9. Distortion P.C.B. Ass'y



Conditions:
 Input Signal – 100 mV rms 1 kHz
 Input Range SW – 0 dB
 Function Control – Level T.H. Dist. L or R

Fig. 6.9.1

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

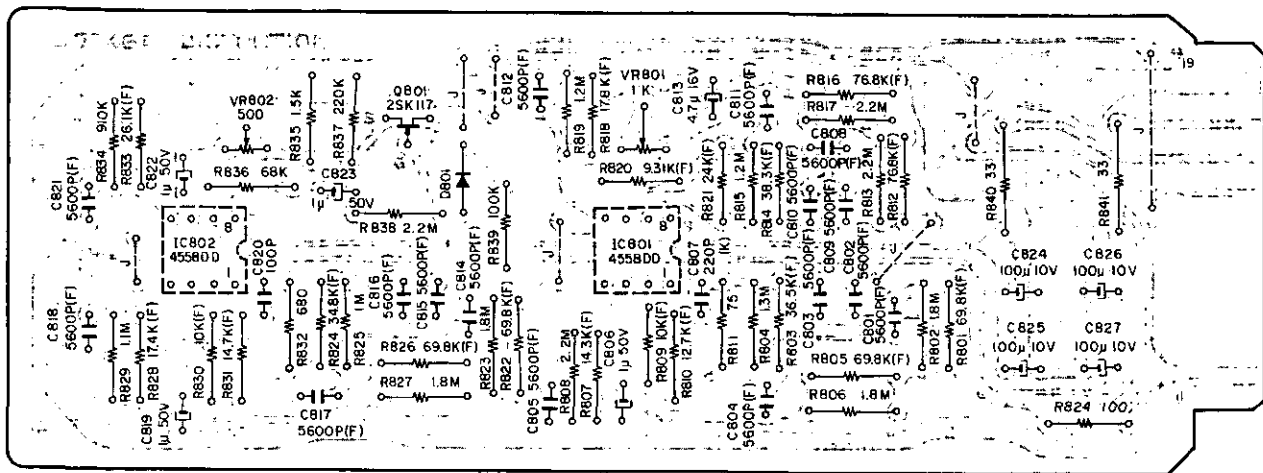
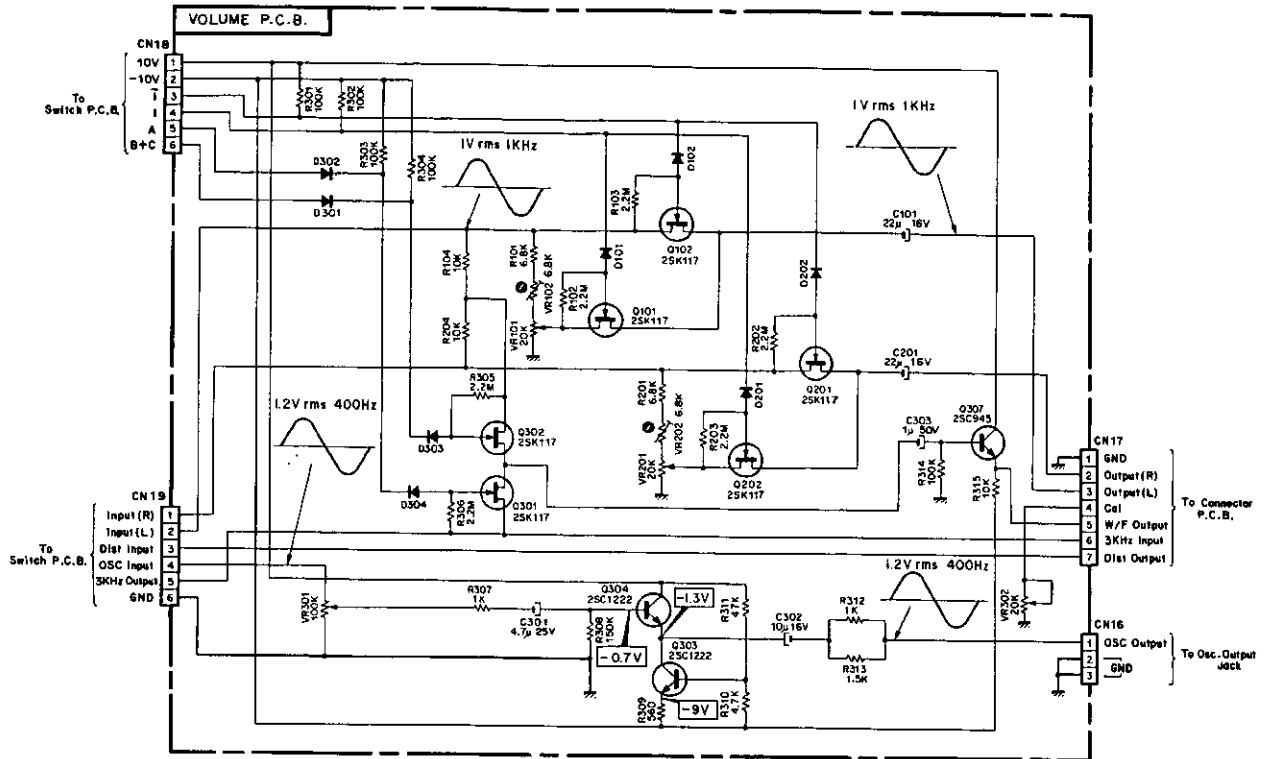


Fig. 6.9.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|--------------------------------------|--------------------|----------|-------------------------------------|
| | BA03885A | Distortion P.C.B. Ass'y | R836 | 0B05692A | Carbon Resistor 68K ERD-25T J |
| | 0B07746B | Distortion P.C.B. | R837 | 0B05625A | Carbon Resistor 220K ERD-25T J |
| IC801,802 | 0B06146A | IC RC4558DD | R839 | 0B01889A | Carbon Resistor 100K ERD-25T J |
| Q801 | 0B06129A | FET 2SK117 | R840,841 | 0B01713A | Carbon Resistor 33 ERD-25T J |
| D801 | 0B01909A | Silicon Diode 1S1555 | R842 | 0B01679A | Carbon Resistor 100 ERD-25T J |
| VR801 | 0B07192A | Semi-fixed Volume 1K (B) | C801-805 | 0B09232A | PP Capacitor 5600P 100V F (16 pcs.) |
| VR802 | 0B01883A | Semi-fixed Volume 500 (B) | 808-812 | | |
| R801,805 | 0B09009A | Metal Film Resistor 69.8K ERO-25CK F | 814-818 | | |
| 822,826 | | | 821 | | |
| R802,806 | 0B05680A | Carbon Resistor 1.8M ERD-25T J | C806,819 | 0B01405A | Electrolytic Capacitor 1μ 50V |
| 823,827 | | | 822,823 | | |
| R803 | 0B09007A | Metal Film Resistor 36.5K ERO-25CK F | C807 | 0B05879A | Ceramic Capacitor 220P 50V K |
| R804 | 0B05963A | Carbon Resistor 1.3M ERD-25T J | C813 | 0B01389A | Electrolytic Capacitor 4.7μ 16V |
| R807 | 0B06000A | Metal Film Resistor 14.3K ERO-25CK F | C820 | 0B01288A | Ceramic Capacitor 100P 50V |
| R808,813 | 0B05671A | Carbon Resistor 2.2M ERD-25T J | C824,825 | 0B05885A | Electrolytic Capacitor 100μ 10V |
| 817,838 | | | 826,827 | | |
| R809,830 | 0B09014A | Metal Film Resistor 10K ERO-25CK F | | 0B05202A | Glass Tube 25mm (2 pcs.) |
| R810 | 0B05999A | Metal Film Resistor 12.7K ERO-25CK F | | | |
| R811 | 0B05959A | Carbon Resistor 75 ERD-25T J | | | |
| R812,816 | 0B09010A | Metal Film Resistor 76.8K ERO-25CK F | | | |
| R814 | 0B09008A | Metal Film Resistor 38.3K ERO-25CK F | | | |
| R815,819 | 0B05962A | Carbon Resistor 1.2M ERD-25T J | | | |
| R818 | 0B09003A | Metal Film Resistor 17.8K ERO-25CK F | | | |
| R820 | 0B05970A | Metal Film Resistor 9.31K ERO-25CK F | | | |
| R821 | 0B09005A | Metal Film Resistor 24.0K ERO-25CK F | | | |
| R824 | 0B09006A | Metal Film Resistor 34.8K ERO-25CK F | | | |
| R825 | 0B05776A | Carbon Resistor 1M ERD-25T J | | | |
| R828 | 0B09002A | Metal Film Resistor 17.4K ERO-25CK F | | | |
| R829 | 0B05961A | Carbon Resistor 1.1M ERD-25T J | | | |
| R831 | 0B09001A | Metal Film Resistor 14.7K ERO-25CK F | | | |
| R832 | 0B05794A | Carbon Resistor 680 ERD-25T J | | | |
| R833 | 0B09053A | Metal Film Resistor 26.1K ERO-25CK F | | | |
| R834 | 0B05960A | Carbon Resistor 910K ERD-25T J | | | |
| R835 | 0B05698A | Carbon Resistor 1.5K ERD-25T J | | | |

6.10. Volume P.C.B. Ass'y



Conditions:
 Input Signal – 1 V rms 1 kHz
 Input Range SW – 0 dB
 Function Control – Level
 Oscillator Control – 400 Hz
 Osc. Output Control – Max.

Fig. 6.10.1

Note: Diode is 1SS53, 1S953 or 1S1555 unless otherwise specified.

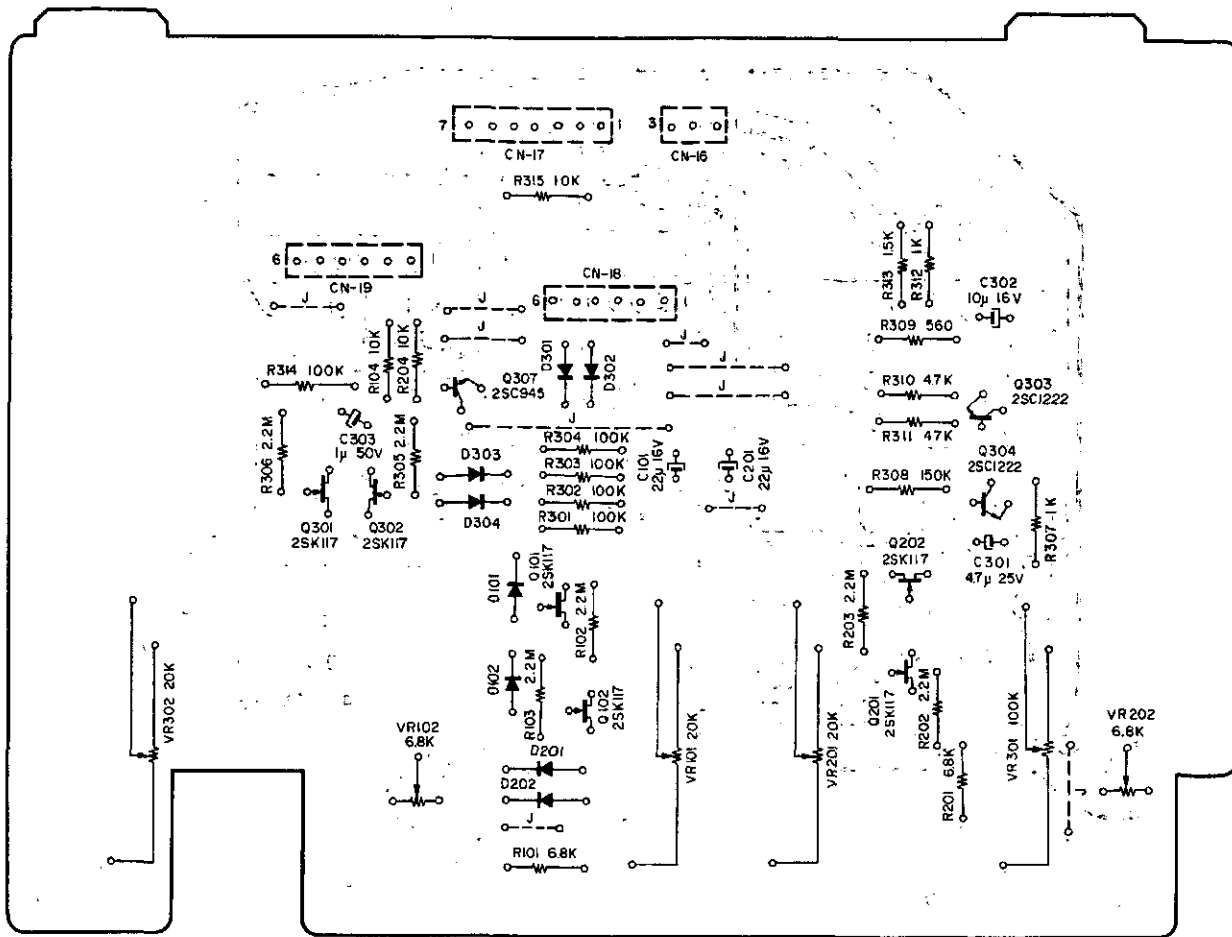
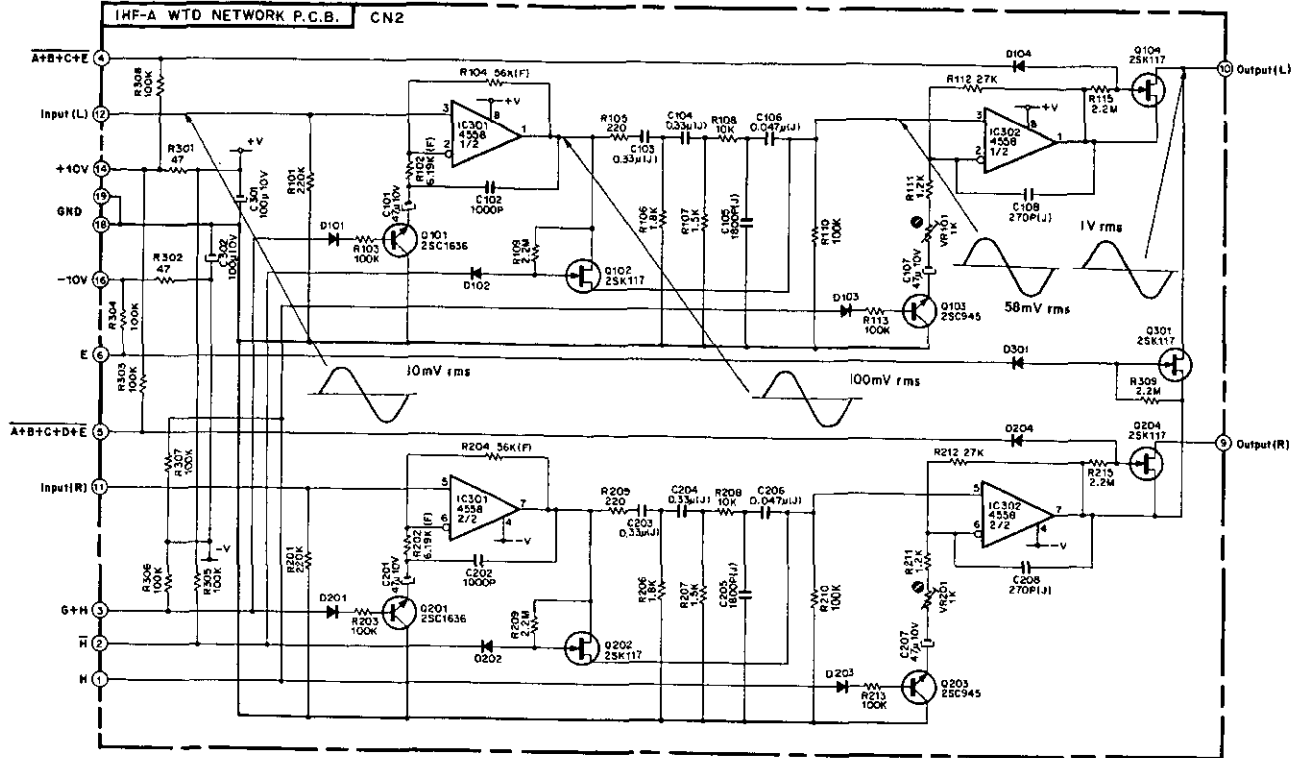


Fig. 6.10.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|----------|--------------------------------|--------------------|----------|---------------------------------|
| | BA03891A | Volume P.C.B. Ass'y | R301,302 | OB01889A | Carbon Resistor 100K ERD-25T J |
| | OB07741B | Volume P.C.B. | 303,304 | | |
| D101,102 | OB01909A | Silicon Diode 1S1555 | 314 | | |
| 201,202 | | | R307,312 | OB01857A | Carbon Resistor 1K ERD-25T J |
| 301,302 | | | R308 | OB05626A | Carbon Resistor 150K ERD-25T J |
| 303,304 | | | R309 | OB05575A | Carbon Resistor 560 ERD-25T J |
| Q101,102 | OB06129A | FET 2SK117 | R310 | OB01846A | Carbon Resistor 4.7K ERD-25T J |
| 201,202 | | | R311 | OB05641A | Carbon Resistor 47K ERD-25T J |
| 301,302 | | | R313 | OB05698A | Carbon Resistor 1.5K ERD-25T J |
| Q303,304 | OB06062A | Transistor 2SC1222 | C101,201 | OB01862A | Electrolytic Capacitor 22μ 16V |
| Q307 | OB06100A | Transistor 2SC945 (A) | C301 | OB01402A | Electrolytic Capacitor 4.7μ 25V |
| VR101,201 | OB07194A | Volume 20K | C302 | OB01412A | Electrolytic Capacitor 10μ 16V |
| 302 | | | C303 | OB01405A | Electrolytic Capacitor 1μ 50V |
| VR102,202 | OB09124A | Semi-fixed Volume 6.8K (B) | CN16 | OB08184A | 3P-T Post |
| VR301 | OB07195A | Volume 100K | CN17 | OB08451A | 7P-T Post |
| R101,201 | OB01682A | Carbon Resistor 6.8K ERD-25T J | CN18, 19 | OB08442A | 6P-B Post |
| R102,103 | OB05671A | Carbon Resistor 2.2M ERD-25T J | | | |
| 202,203 | | | | | |
| 305,306 | | | | | |
| R104,204 | OB01888A | Carbon Resistor 10K ERD-25T J | | | |
| 315 | | | | | |

6.11. IHF-A WTD Network P.C.B. Ass'y



Conditions:
 Input Signal – 10 mV rms 1 kHz
 Input Range SW – 0 dB
 Function Control – Noise-A

Fig. 6.11.1

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

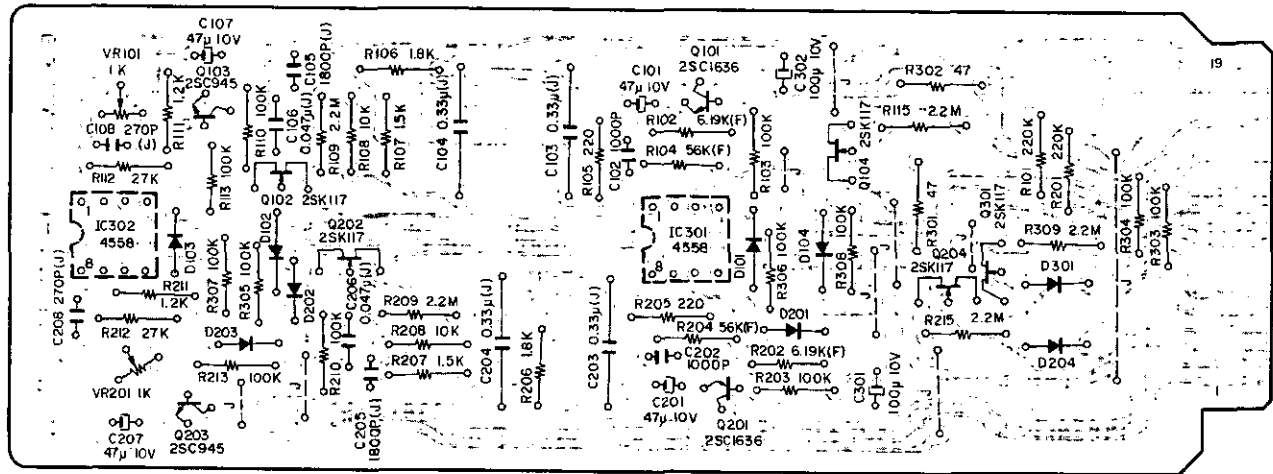
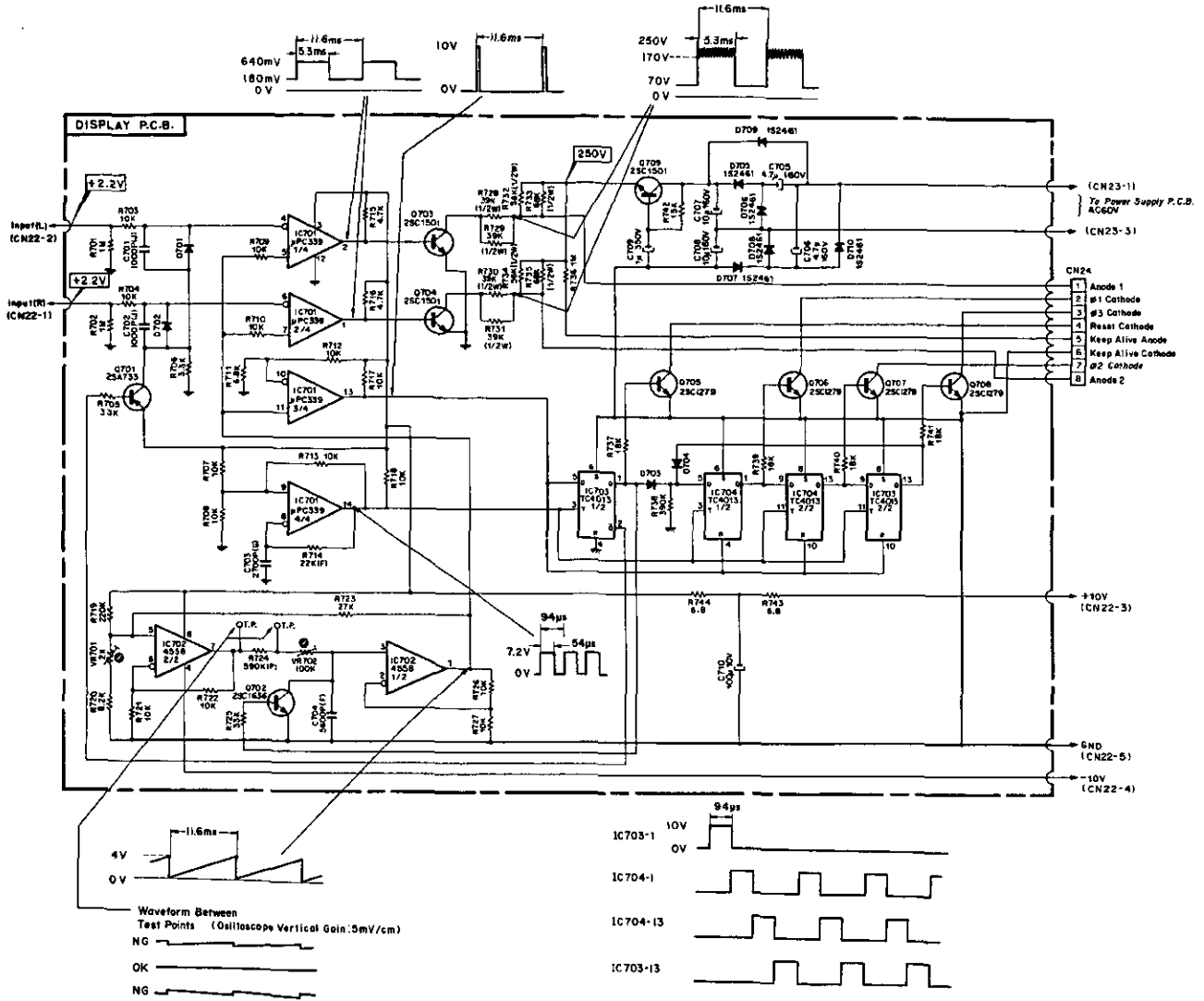


Fig. 6.11.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|----------|--------------------------------------|--------------------|----------|---------------------------------|
| | BA03883A | IHF-A WTD Network P.C.B. Ass'y | C106,206 | OB05796A | Mylar Capacitor 0.047μ 50V J |
| | | | C108,208 | OB09058A | Ceramic Capacitor 270P 50V J |
| | | | C301,302 | OB05885A | Electrolytic Capacitor 100μ 10V |
| IC301,302 | OB07747B | IHF-A WTD Network P.C.B. | | OB05202A | Glass Tube 25mm (2 pcs.) |
| Q101,201 | OB06124B | IC RC4558D | | | |
| Q102,104 | OB06070A | Transistor 2SC1636 | | | |
| 202,204 | OB06129A | FET 2SK117 | | | |
| 301 | | | | | |
| Q103,203 | OB06100A | Transistor 2SC945 (A) | | | |
| D101-104 | OB01909A | Silicon Diode 1S1555 (9 pcs.) | | | |
| 201-204 | | | | | |
| 301 | | | | | |
| VR101,201 | OB07180A | Semi-fixed Volume 1K | | | |
| R101,201 | OB05625A | Carbon Resistor 220K ERD-25T J | | | |
| R102,202 | OB09011A | Metal Film Resistor 6.19K ERO-25CK F | | | |
| R103,110 | OB01889A | Carbon Resistor 100K ERD-25T J | | | |
| 113,203 | | (12 pcs.) | | | |
| 210,213 | | | | | |
| 303-308 | | | | | |
| R104,204 | OB09012A | Metal Film Resistor 56K ERO-25CK F | | | |
| R105,205 | OB01933A | Carbon Resistor 220 ERD-25T J | | | |
| R106,206 | OB05614A | Carbon Resistor 1.8K ERD-25T J | | | |
| R107,207 | OB05698A | Carbon Resistor 1.5K ERD-25T J | | | |
| R108,208 | OB01888A | Carbon Resistor 10K ERD-25T J | | | |
| R109,115 | OB05671A | Carbon Resistor 2.2M ERD-25T J | | | |
| 209,215 | | | | | |
| 309 | | | | | |
| R111,211 | OB05623A | Carbon Resistor 1.2K ERD-25T J | | | |
| R112,212 | OB05743A | Carbon Resistor 27K ERD-25T J | | | |
| R301,302 | OB01706A | Carbon Resistor 47 ERD-25T J | | | |
| C101,107 | OB01836A | Electrolytic Capacitor 47μ 10V | | | |
| 201,207 | | | | | |
| C102,202 | OB04025A | Ceramic Capacitor 1000P 50V | | | |
| C103,104 | OB05844A | Mylar Capacitor 0.33μ 50V J | | | |
| 203,204 | | | | | |
| C105,205 | OB01913A | Mylar Capacitor 1800P 50V J | | | |

6.12. Display P.C.B. Ass'y



Conditions:
 Input Signal - 1 V rms 1 kHz
 Input Range SW - 0 dB
 Meter Range SW - 0 dB
 Function Control - Level

Fig. 6.12.1

Note: Diode is 1S553, 1S953 or 1S1555 unless otherwise specified.

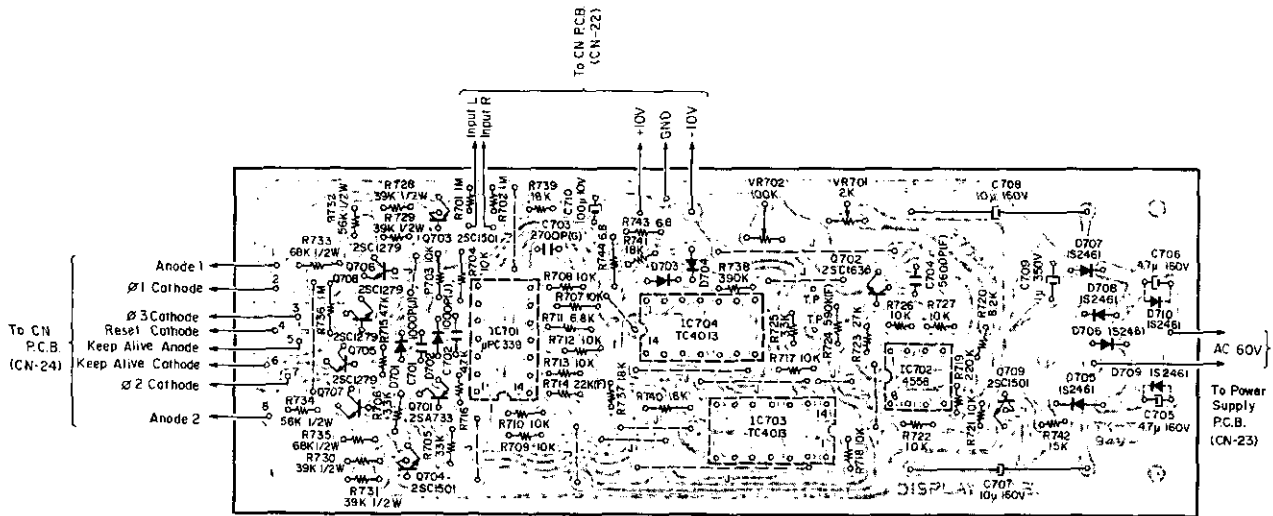
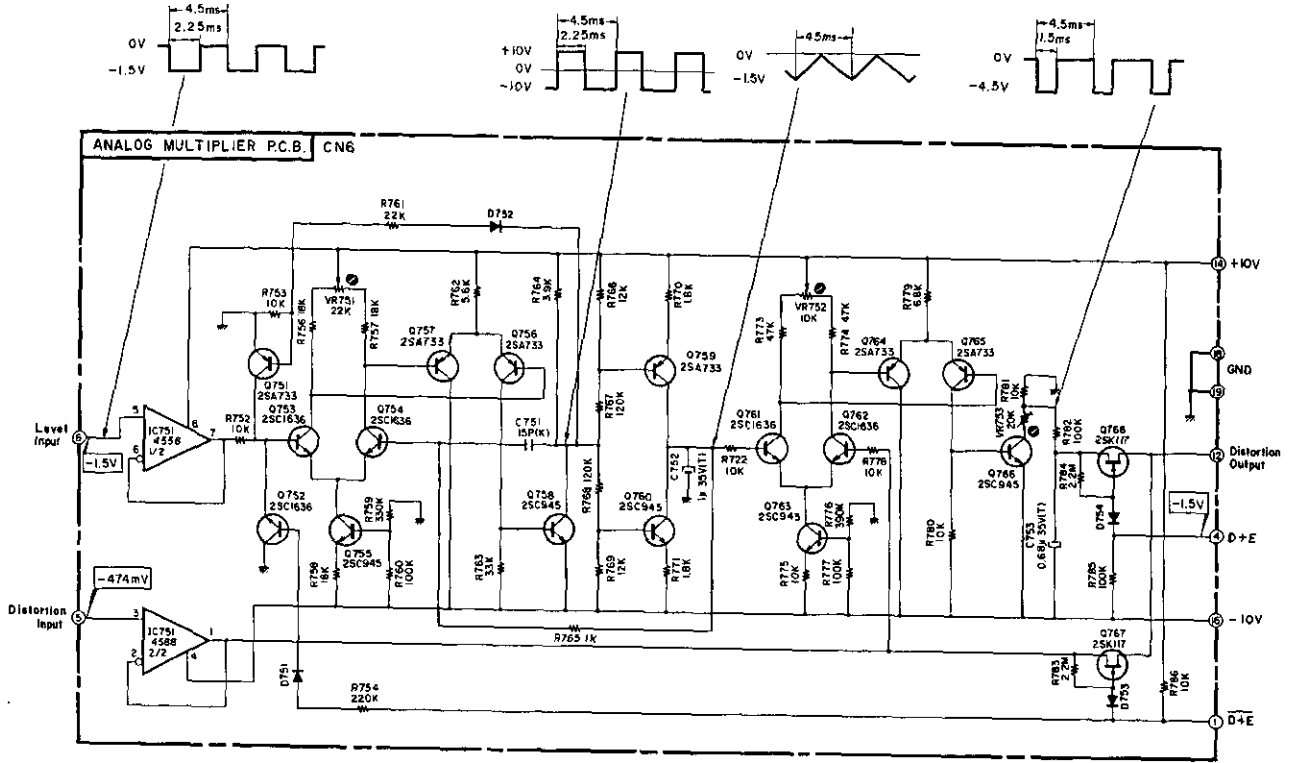


Fig. 6.12.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|----------|------------------------------------|--------------------|--------------------------|---------------------------------------|
| | BA03889A | Display P.C.B. Ass'y | R724 | 0B09390A | Metal Film Resistor 590K CN15K2E F |
| | | | R728,729 | 0B09123A | Carbon Resistor 39K ERD-50T J |
| | | | 730,731 | | |
| IC701 | 0B06132A | Display P.C.B. IC μ PC339 | R732,734 | 0B09129A | Carbon Resistor 56K ERD-50T J |
| IC702 | 0B06124B | IC RC4558D | R733,735 | 0B09130A | Carbon Resistor 68K ERD-50T J |
| IC703,704 | 0B06133A | IC TC4013B P | R737,739 | 0B05561A | Carbon Resistor 18K ERD-25V J |
| Q701 | 0B06013A | Transistor 2SA733 | 740,741 | | |
| Q702 | 0B06070A | Transistor 2SC1636 | R738 | 0B05595A | Carbon Resistor 390K ERD-25V J |
| Q703,704 | 0B06136A | Transistor 2SC1501 | R742 | 0B05591A | Carbon Resistor 15K ERD-25V J |
| 709 | | | R743,744 | 0B05857A | Carbon Resistor 6.8 ERD-25T J |
| Q705,706 | 0B06134A | Transistor 2SC1279 | C701,702 | 0B05550A | Mylar Capacitor 1000P 50V J |
| 707,708 | | | C703 | 0B09041A | SP Capacitor 2700P 50V G |
| D701,702 | 0B01909A | Silicon Diode 1S1555 | C704 | 0B09232A | PP Capacitor 5600P 100V F |
| 703,704 | | | C705,706 | 0B09382A | Electrolytic Capacitor 4.7 μ 160V |
| D705,706 | 0B06136A | Silicon Diode 1S2461 | C707,708 | 0B09040A | Electrolytic Capacitor 10 μ 160V |
| 707,708 | | | C709 | 0B09038A | Electrolytic Capacitor 1 μ 350V |
| 709,710 | | | C710 | 0B05885A | Electrolytic Capacitor 100 μ 10V |
| VR701 | 0B09062A | Semi-fixed Volume 2K (B) | 0B03924A | Gate Pin (2 pcs.) | |
| VR702 | 0B07220A | Semi-fixed Volume 100K (B) | 0B08428A | D-P Connector A (1 pce.) | |
| R701,702 | 0B05564A | Carbon Resistor 1M ERD-25V J | 0B08429A | D-P Connector B (1 pce.) | |
| 736 | | | 0B05203A | Glass Tube 30mm (8 pcs.) | |
| R703,704 | 0B01833A | Carbon Resistor 10K ERD-25V J | | | |
| 707,708 | | | | | |
| 709,710 | | | | | |
| 712,713 | | | | | |
| 717,718 | | | | | |
| 721,722 | | | | | |
| 726,727 | | | | | |
| R705,725 | 0B01879A | Carbon Resistor 33K ERD-25V J | | | |
| R706 | 0B01793A | Carbon Resistor 3.3K ERD-25V J | | | |
| R711 | 0B01877A | Carbon Resistor 6.8K ERD-25V J | | | |
| R714 | 0B05968A | Metal Film Resistor 22K ERO-25CK F | | | |
| R715,716 | 0B01795A | Carbon Resistor 4.7K ERD-25V J | | | |
| R719 | 0B05596A | Carbon Resistor 220K ERD-25V J | | | |
| R720 | 0B01878A | Carbon Resistor 8.2K ERD-25V J | | | |
| R723 | 0B05538A | Carbon Resistor 27K ERD-25V J | | | |

6.13. Analog Multiplier P.C.B. Ass'y



Conditions:
 Input Signal – 1 V rms 400 Hz
 Distortion 1%
 Input Range SW – 0 dB
 Meter Range SW – 1%
 Function Control – Level T.H, Dist, L or R

Fig. 6.13.1

Note: Diode is 1SS53, 1S953 or 1S1555 unless otherwise specified.

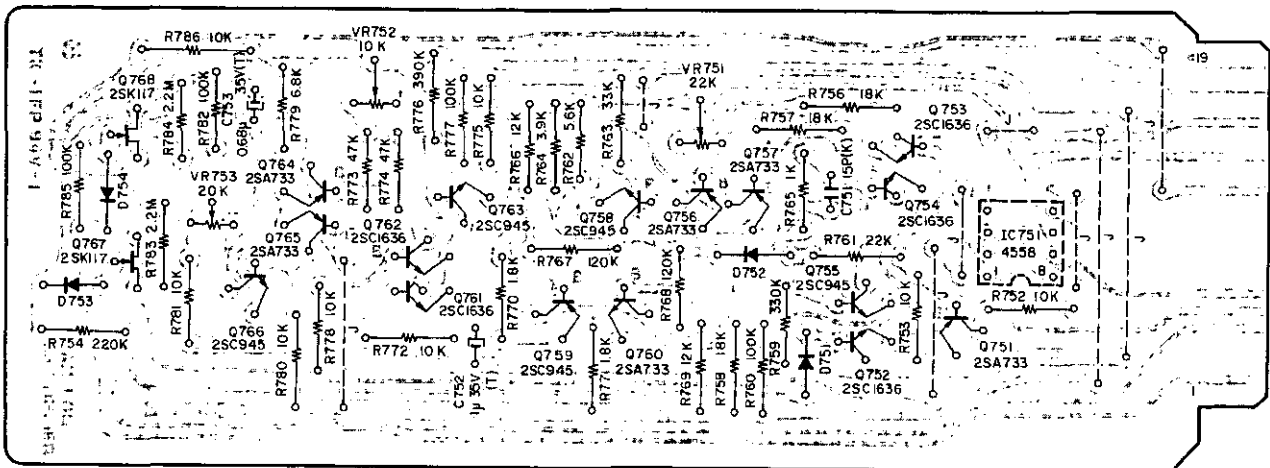


Fig. 6.13.2

| Schematic Ref. No. | Part No. | Description | Schematic Ref. No. | Part No. | Description |
|--------------------|-----------------|---------------------------------------|--------------------|----------------------|--------------------------------|
| | BA03887A | Analog Multiplier P.C.B. Ass'y | R773,774 | 0B05641A | Carbon Resistor 47K ERD-25T J |
| | 0B07748B | Analog Multiplier P.C.B. | R776 | 0B05676A | Carbon Resistor 390K ERD-25T J |
| IC751 | 0B06124B | IC RC4558D | R779 | 0B01682A | Carbon Resistor 6.8K ERD-25T J |
| D751,752 | 0B01909A | Silicon Diode 1S1555 | R783,784 | 0B05671A | Carbon Resistor 2.2M ERD-25T J |
| 753,754 | | | C751 | 0B05887A | Ceramic Capacitor 15P 50V K |
| Q751,756 | 0B06013A | Transistor 2SA733 | C752 | 0B05638A | Tantalum Capacitor 1μ 35V |
| 757,759 | | | C753 | 0B05773A | Tantalum Capacitor 0.68μ 35V |
| 764,765 | | | 0B05204A | Tube F 13mm (2 pcs.) | |
| Q752,753 | 0B06070A | Transistor 2SC1636 | | | |
| 754,761 | | | | | |
| 762 | | | | | |
| Q755,758 | 0B06100A | Transistor 2SC945 (A) | | | |
| 760,763 | | | | | |
| 766 | | | | | |
| Q767,768 | 0B06129A | FET 2SK117 | | | |
| VR751 | 0B07185A | Semi-fixed Volume 22K (B) | | | |
| VR752 | 0B07184A | Semi-fixed Volume 10K (B) | | | |
| VR753 | 0B09061A | Semi-fixed Volume 20K (B) | | | |
| R752,753 | 0B01888A | Carbon Resistor 10K ERD-25T J | | | |
| 772,775 | | | | | |
| 778,780 | | | | | |
| 781,786 | | | | | |
| R754 | 0B05625A | Carbon Resistor 220K ERD-25T J | | | |
| R756,757 | 0B05560A | Carbon Resistor 18K ERD-25T J | | | |
| 758 | | | | | |
| R759 | 0B05627A | Carbon Resistor 330K ERD-25T J | | | |
| R760,777 | 0B01889A | Carbon Resistor 100K ERD-25T J | | | |
| 782,785 | | | | | |
| R761 | 0B05615A | Carbon Resistor 22K ERD-25T J | | | |
| R762 | 0B01887A | Carbon Resistor 5.6K ERD-25T J | | | |
| R763 | 0B05509A | Carbon Resistor 33K ERD-25T J | | | |
| R764 | 0B05675A | Carbon Resistor 3.9K ERD-25T J | | | |
| R765 | 0B01857A | Carbon Resistor 1K ERD-25T J | | | |
| R766,769 | 0B05771A | Carbon Resistor 12K ERD-25T J | | | |
| R767,768 | 0B05621A | Carbon Resistor 120K ERD-25T J | | | |
| R770,771 | 0B05614A | Carbon Resistor 1.8K ERD-25T J | | | |

7. MECHANISM ASS'Y AND PARTS LIST

7.1. Synthesis

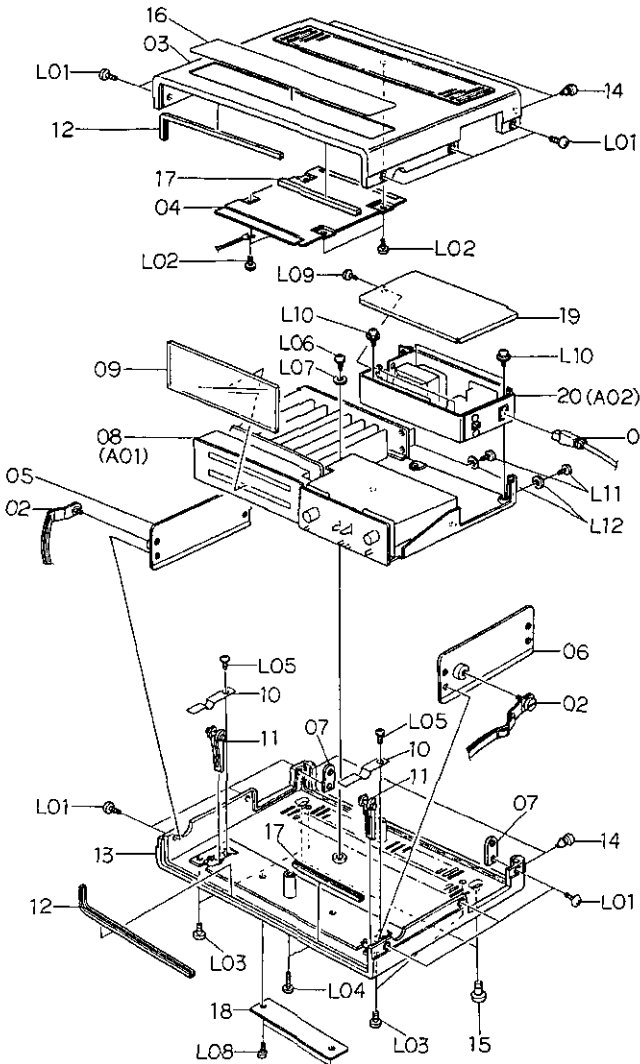


Fig. 7.1

| Schematic Ref. No. | Part No. | Description | Q'ty |
|--------------------|----------|--|------|
| | | Synthesis | |
| 01 | 0B08422A | Power Cord (U.S.A., Canada & Others) | 1 |
| | 0B08424A | Power Cord (UK & Australia) | 1 |
| | 0B08423A | Power Cord (Sweden) | 1 |
| | 0B08425A | Power Cord (Japan) | 1 |
| 02 | HA03735A | Shoulder Belt Ass'y | 1 |
| 03 | HA03734A | Top Cover Sub Ass'y | 1 |
| 04 | 0J03758A | P.C.B. Guide Plate | 1 |
| 05 | JA03206B | Side Holder L Ass'y | 1 |
| 06 | JA03205B | Side Holder R Ass'y | 1 |
| 07 | 0J03761A | Cover Holder | 2 |
| 08 | JA03326A | Synthesis Mechanism Ass'y | 1 |
| 09 | 0H03568F | Acrylic Cover | 1 |
| 10 | 0J03762A | Leg Spring | 2 |
| 11 | 0A03282D | Leg | 2 |
| 12 | 0J03768B | Acrylic Cover Holder | 2 |
| 13 | HA03733A | Bottom Cover Sub Ass'y | 1 |
| 14 | 0A03283A | Rubber Foot | 4 |
| 15 | 0H03437A | Rubber Foot | 2 |
| 16 | 0H03569D | BD Name Plate | 1 |
| 17 | 0J03891A | Cover Spacer | 2 |
| 18 | 0M03875A | Caution Name Plate | 1 |
| 19 | 0J03745C | Power Supply Box Cover | 1 |
| 20 | JA03213A | Power Supply Ass'y (U.S.A.) | 1 |
| | JA03215A | Power Supply Ass'y (UK & Australia) | 1 |
| | JA03216A | Power Supply Ass'y (Sweden) | 1 |
| | JA03441A | Power Supply Ass'y (Canada) | 1 |
| | JA03217A | Power Supply Ass'y (Japan) | 1 |
| | JA03340A | Power Supply Ass'y (Others 1) | 1 |
| | JA03334A | Power Supply Ass'y (Others 2) | 1 |
| - | 0M03705A | Power Cord Label (UK & Australia) | 1 |
| L01 | 0E00713A | Screw M3x6 Philips Truss Head (Bronze) | 12 |
| L02 | 0E00502A | Screw M3x5 Philips Pan Head | 4 |
| L03 | 0E00738A | Screw M4x6 Philips Binding Head (Bronze) | 4 |
| L04 | 0E00818A | Screw M3x8 Philips Binding Head (Black Chromate) | 2 |
| L05 | 0E00776A | Screw M2.6x3 Philips Pan Head (Bronze) | 2 |
| L06 | 0E00667A | Screw M4x6 Philips Pan Head (2A) | 1 |
| L07 | 0E00141A | Washer 4mm | 1 |
| L08 | 0E00774A | BT Screw M2.6x5 philips Pan Head (Bronze) | 2 |
| L09 | 0E00778A | Screw M2.6x5 Philips Binding Head (Bronze) | 1 |
| L10 | 0E00606A | Screw M3x6 Philips Pan Head (3A) | 4 |
| L11 | 0E00540A | Screw M3x5 Philips Binding Head (Bronze) | 3 |
| L12 | 0E00157A | Washer 3mm (Black Plastics) | 3 |

7.2. Synthesis Mechanism Ass'y (A01)

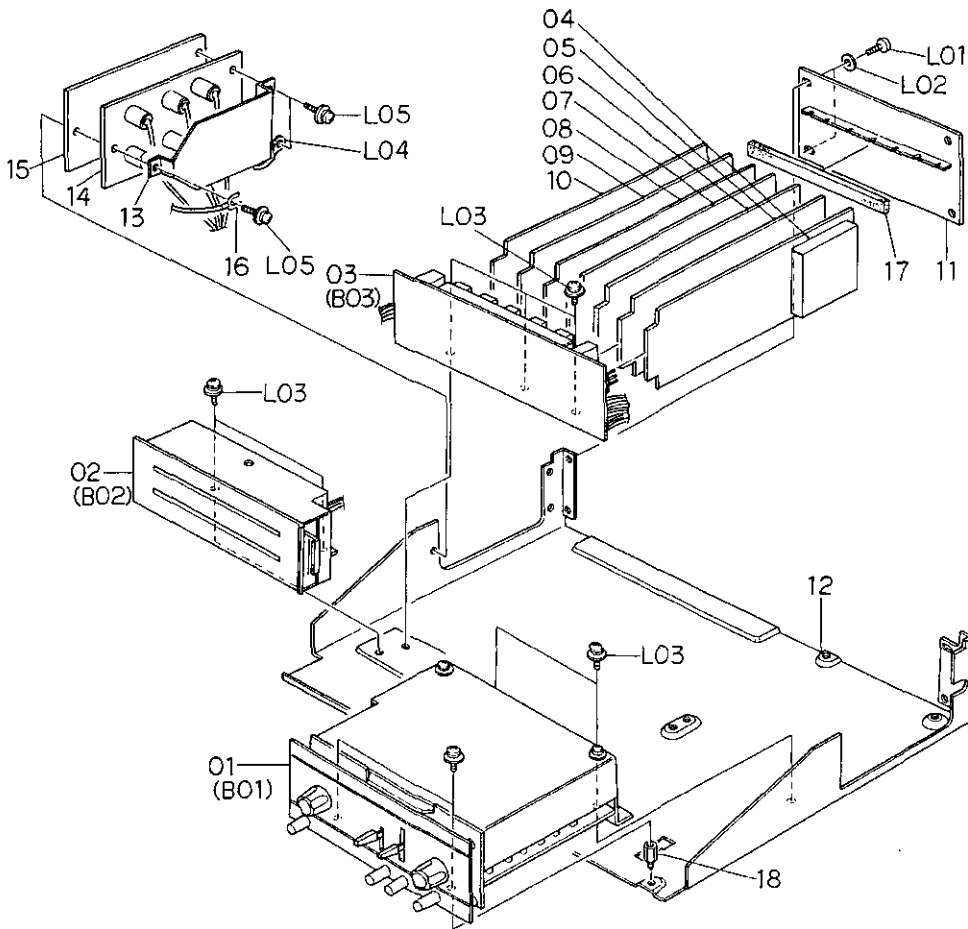


Fig. 7.2

| Schematic Ref. No. | Part No. | Description | Q'ty | Schematic Ref. No. | Part No. | Description | Q'ty |
|--------------------|----------|------------------------------------|------|--------------------|----------|--|------|
| A01 | JA03326A | Synthesis Mechanism Ass'y | 1 | 17 | 0J03774A | P.C.B. Pad | 1 |
| | | | | 18 | 0J03756A | Switch Stud | 2 |
| 01 | JA03218A | Switch Control Ass'y | 1 | - | 0M04053A | Input Indication Label | 1 |
| 02 | JA03219A | Bar-graph Holder Ass'y | 1 | L01 | 0E00540A | Screw M3x5 Philips Binding Head (Bronze) | 2 |
| 03 | JA03221A | Connector Ass'y | 1 | L02 | 0E00157A | Washer 3mm (Black Plastics) | 2 |
| 04 | BA03882A | Oscillator P.C.B. Ass'y | 1 | L03 | 0E00606A | Screw M3x6 Philips Pan Head (3A) | 9 |
| 05 | BA03883A | IHF-A WTD Network P.C.B. Ass'y | 1 | L04 | 0E00037A | Earth Lug B-5 | 1 |
| 06 | BA03884A | Wow & Flutter P.C.B. Ass'y | 1 | L05 | 0E00607A | Screw M3x8 Philips Pan Head (3A) | 3 |
| 07 | BA03885A | Distortion P.C.B. Ass'y | 1 | | | | |
| 08 | BA03886B | Absolute Rectifier P.C.B. Ass'y | 1 | | | | |
| 09 | BA03887A | Analogue Multiplier P.C.B. Ass'y | 1 | | | | |
| 10 | BA03888A | Linear/Log. Converter P.C.B. Ass'y | 1 | | | | |
| 11 | JA03202D | Rear Panel B Ass'y | 1 | | | | |
| 12 | JA03220A | Main Chassis Sub Ass'y | 1 | | | | |
| 13 | 0J03778B | Shield Plate | 1 | | | | |
| 14 | BA03897A | 6P Pin Jack Ass'y | 1 | | | | |
| 15 | 0H03566D | Pin Jack Name Plate | 1 | | | | |
| 16 | 0B08446A | Cord with Terminal A | 1 | | | | |

7.3. Power Supply Ass'y (A02)

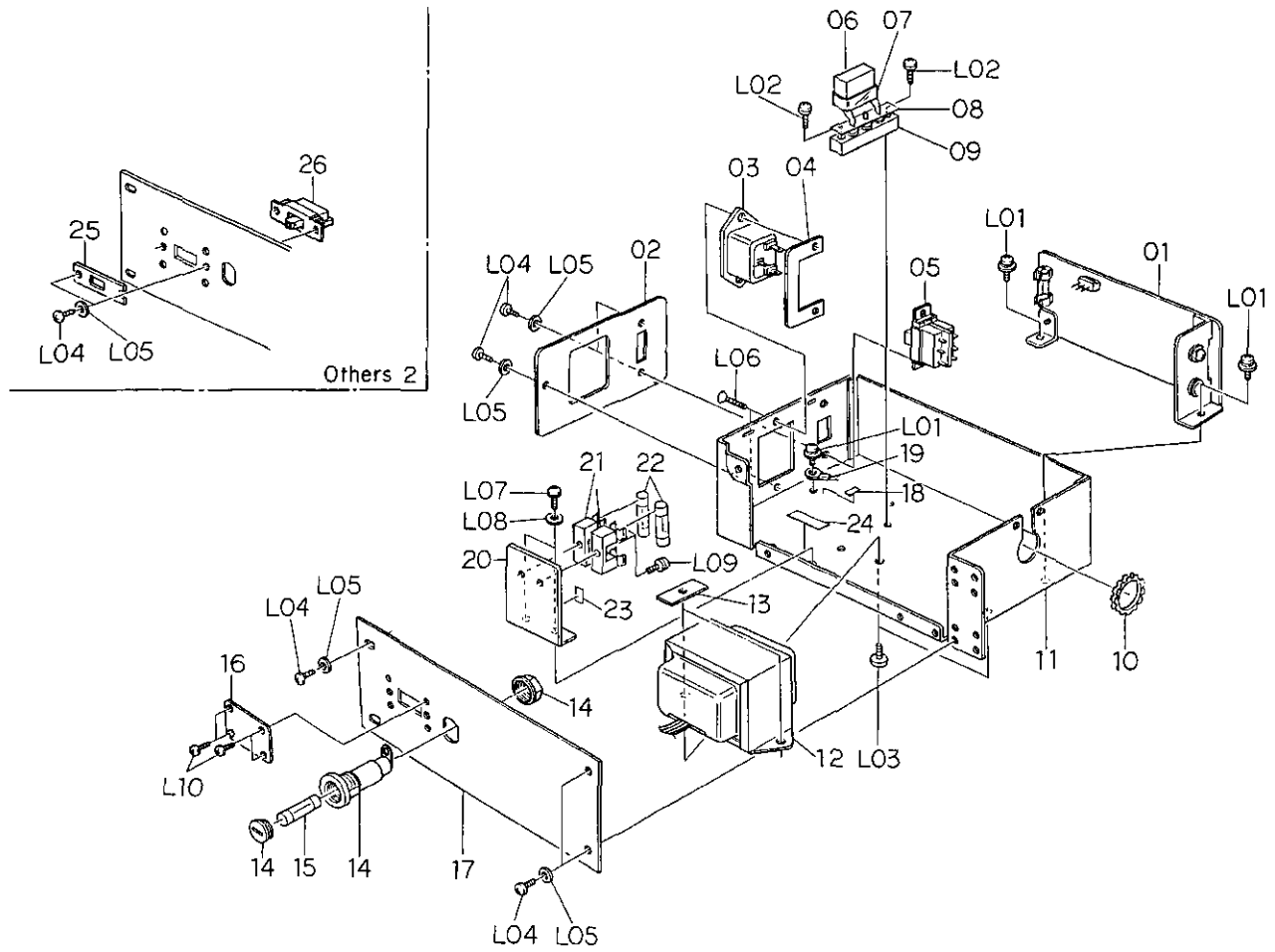


Fig. 7.3

| Schematic Ref. No. | Part No. | Description | Q'ty | Schematic Ref. No. | Part No. | Description | Q'ty | |
|--------------------|----------|---|--|--------------------|-----------------------------|--|------|--|
| A02 | JA03213A | Power Supply Ass'y (U.S.A.) | 1 | *21 | 0B08048A | Fuse Holder (Except for U.S.A. & Others 2) | 2 | |
| | JA03215A | Power Supply Ass'y (UK & Australia) | 1 | 22 | 0B08161U | Fuse 630mA, T 250V (Sweden, UK, Australia & Others 1) | 2 | |
| | JA03216A | Power Supply Ass'y (Sweden) | 1 | | 0B08161A | Fuse 630mA, T 250V (Japan) | 2 | |
| | JA03441A | Power Supply Ass'y (Canada) | 1 | 0B08608A | Fuse 250mA 250V (Canada) | 1 | | |
| | JA03217A | Power Supply Ass'y (Japan) | 1 | 23 | 0M03745A | Fuse Label 630mA Tx2 (Sweden, UK, Japan, Australia & Others 1) | 1 | |
| | JA03340A | Power Supply Ass'y (Others 1) | 1 | | 0M03970A | Fuse Label 250mA (Canada) | 1 | |
| | JA03334A | Power Supply Ass'y (Others 2) | 1 | 0M03971A | Fuse Caution Label (Canada) | 1 | | |
| 01 | BA03895A | Power Supply P.C.B. Ass'y (U.S.A. & Canada) | 1 | 24 | 0B03947A | Voltage Selector Lock Plate (Others 2) | 1 | |
| | BA03892A | Power Supply P.C.B. Ass'y (UK, Australia, Sweden, Japan & Others 1 & 2) | 1 | 25 | 0B07092U | Voltage Selector Switch (Others 2) | 1 | |
| 02 | 0H03567D | Power Supply Name Plate | 1 | 26 | 0B08447A | Cord with Terminal B | 1 | |
| 03 | 0B08414A | A.C. Inlet | 1 | 19 | 0M03794A | Voltage Seal 100V (Japan) | 1 | |
| 04 | 0J03742A | Inlet Holder | 1 | — | 0M03795A | Voltage Seal 120V (U.S.A. & Canada) | 1 | |
| 05 | 0B07172A | Power Switch (U.S.A. & Canada) | 1 | — | 0M03797A | Voltage Seal 240V (UK & Australia) | 1 | |
| | 0B07092A | Power Switch (UK, Sweden, Australia, Others 1 & 2) | 1 | | 0M03796A | Voltage Seal 220V (Sweden & Others 1) | 1 | |
| 06 | 0B07305A | Power Switch (Japan) | 1 | — | 0M03955A | Voltage Seal B (Others 2) | 1 | |
| | 0B08342A | Spark Killer (U.S.A. & Canada) | 1 | — | 0M03899A | Serial Number Plate | 1 | |
| | 0B08240A | Spark Killer (UK, Australia & Others 1) | 1 | — | 0J03644A | Chobert Rivet | 2 | |
| | 0B08445A | Spark Killer (Sweden) | 1 | — | 0M03458B | Pass Label | 1 | |
| | 0B08363A | Spark Killer (Japan) | 1 | — | 0M03959A | File Number Label B (Canada) | 1 | |
| | 0B08240U | Spark Killer (Others 2) | 1 | — | 0E00606A | Screw M3x6 Philips Pan Head (3A) | 3 | |
| *07 | 0B08359A | Spark Killer Cover | 2 | L01 | 0E00510A | Screw M3x8 Philips Pan Head (2A) | 2 | |
| 08 | 0B08410A | 3P Terminal Insulator (U.S.A. & Canada) | 1 | L02 | 0E00738A | Screw M4x6 Philips Binding Head | 2 | |
| | 0B08268U | 5P Terminal Insulator 05 (UK, Sweden, Australia & Others 1) | 1 | L03 | 0E00540A | Screw M3x5 Philips Binding Head (Bronze) | 8 | |
| | 0B08030U | 3P Terminal Insulator (Japan) | 1 | *L04 | 0E00157A | Washer 3mm (Black Plastics) | 8 | |
| | 0B08270U | 3P Terminal Insulator 05 (Others 2) | 1 | L06 | 0E00518A | Screw M3x8 Philips Countersunk | 2 | |
| 09 | 0B08024U | 3P Terminal Strip (U.S.A., Canada, Japan & Others 2) | 1 | *L07 | 0E00622A | Screw M3x5 Philips Pan Head (2A) | 2 | |
| | 0B08025U | 5P Terminal Strip (UK, Sweden, Australia & Others 1) | 1 | *L08 | 0E00183A | Washer 3.5mm | 2 | |
| 10 | 0B08503A | Free Bushing 143mm | 1 | *L09 | 0E00612A | Screw M3x6 Philips Pan Head (2A) | 2 | |
| 11 | 0J03737E | Power Supply Box | 1 | *L10 | 0E00773A | BT Screw M2x4 Philips Pan Head (Bronze) | 4 | |
| 12 | 0B06573A | Power Transformer (U.S.A. & Canada) | 1 | L11 | | | | |
| | 0B06574A | Power Transformer (UK, Sweden, Australia & Others 1) | 1 | | | | | |
| | 0B06572A | Power Transformer (Japan) | 1 | | | | | |
| | 0B06590A | Power Transformer (Others 2) | 1 | | | | | |
| | 13 | 0C01162B | Bolt Receptacle Plate | | 2 | | | |
| | 14 | 0B08418A | Fuse Holder (U.S.A. & Japan) | | 1 | | | |
| | | 0B08421A | Fuse Holder (UK, Sweden, Australia & Others 1 & 2) | | 1 | | | |
| 15 | 0B08419A | Fuse 250mA 250V (U.S.A. & Japan) | 1 | | | | | |
| | 0B08360A | Fuse 125mA 250V (UK, Sweden, Australia & Others 1 & 2) | 1 | | | | | |
| 16 | 0M03874B | Fuse Caution Name Plate (U.S.A., UK, Sweden, Australia, Others 1 & Japan) | 1 | | | | | |
| | 0M03972A | Caution Name plate (Canada) | 1 | | | | | |
| 17 | 0J03747J | Rear Panel A | 1 | | | | | |
| 18 | 0M03700A | Ground Label | 1 | | | | | |
| 20 | 0J03744B | Fuse Holder Plate (Except for U.S.A. & Others 2) | 1 | | | | | |

*: Depends on the versions.

7.4. Switch Control Ass'y (B01)

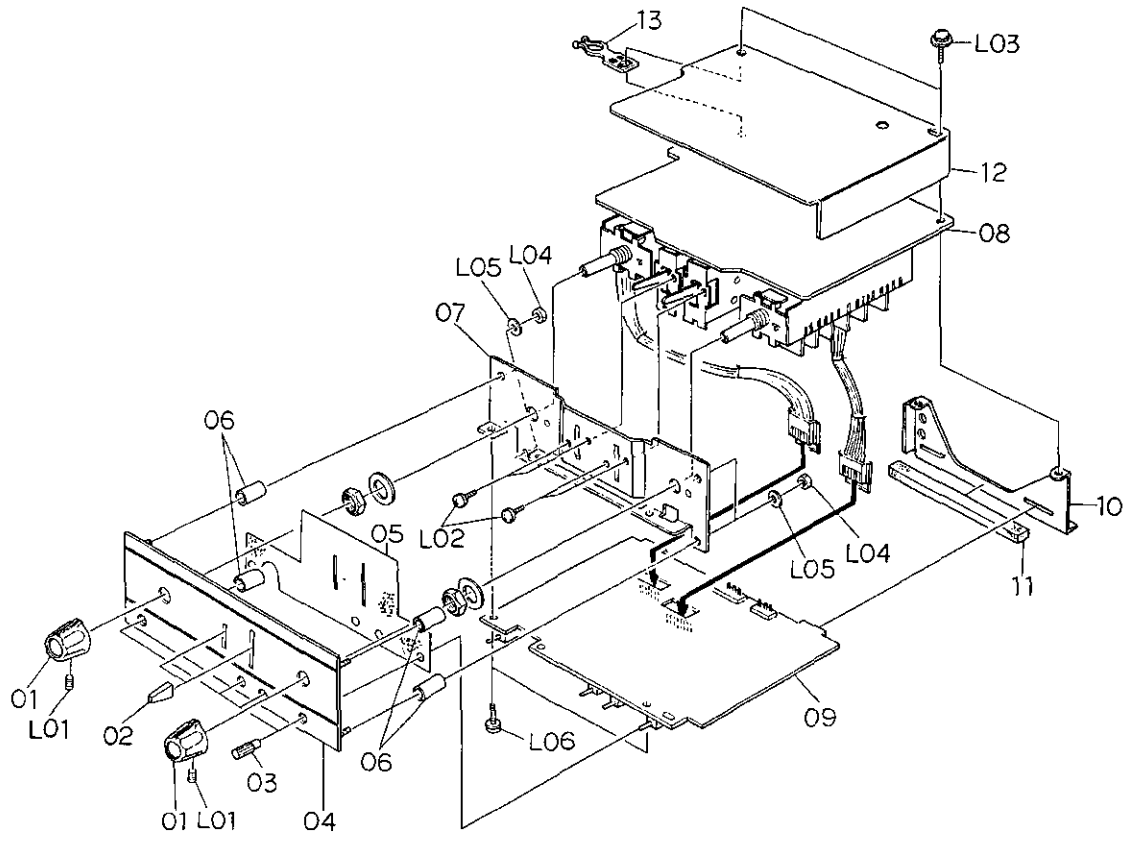


Fig. 7.4

| Schematic Ref. No. | Part No. | Description | Q'ty |
|--------------------|----------|---|------|
| B01 | JA03218A | Switch Control Ass'y | 1 |
| 01 | HA03729C | Rotary Switch Knob Ass'y | 2 |
| 02 | 0H03565A | Slide Switch Knob | 2 |
| 03 | 0H03564B | Calibration Knob | 4 |
| 04 | HA03730B | Front Panel Ass'y | 1 |
| 05 | 0J03769A | Front Panel Himelton | 1 |
| 06 | 0J03886A | Front Panel Stud | 4 |
| 07 | 0J03746B | Switch Holder | 1 |
| 08 | BA03890A | Switch P.C.B. Ass'y | 1 |
| 09 | BA03891A | Volume P.C.B. Ass'y | 1 |
| 10 | 0J03741D | Switch P.C.B. Holder | 1 |
| 11 | 0J03773A | Volume P.C.B. Cushion | 1 |
| 12 | 0J03901B | Switch P.C.B. Insulator | 1 |
| 13 | 0B08516A | Wire Holder 583 | 1 |
| L01 | 0E00774A | Screw M4x4 Cup Point (Hex. Socket Head) | 2 |
| L02 | 0E00622A | Screw M3x5 Philips Pan Head (2A) | 4 |
| L03 | 0E00607A | Screw M3x8 Philips Pan Head (3A) | 2 |
| L04 | 0E00718A | Nut Hex. M3 | 4 |
| L05 | 0E00030A | Washer 3mm | 4 |
| L06 | 0E00510A | Screw M3x8 Philips Pan Head (2A) | 2 |

7.5. Bar-graph Holder Ass'y (B02)

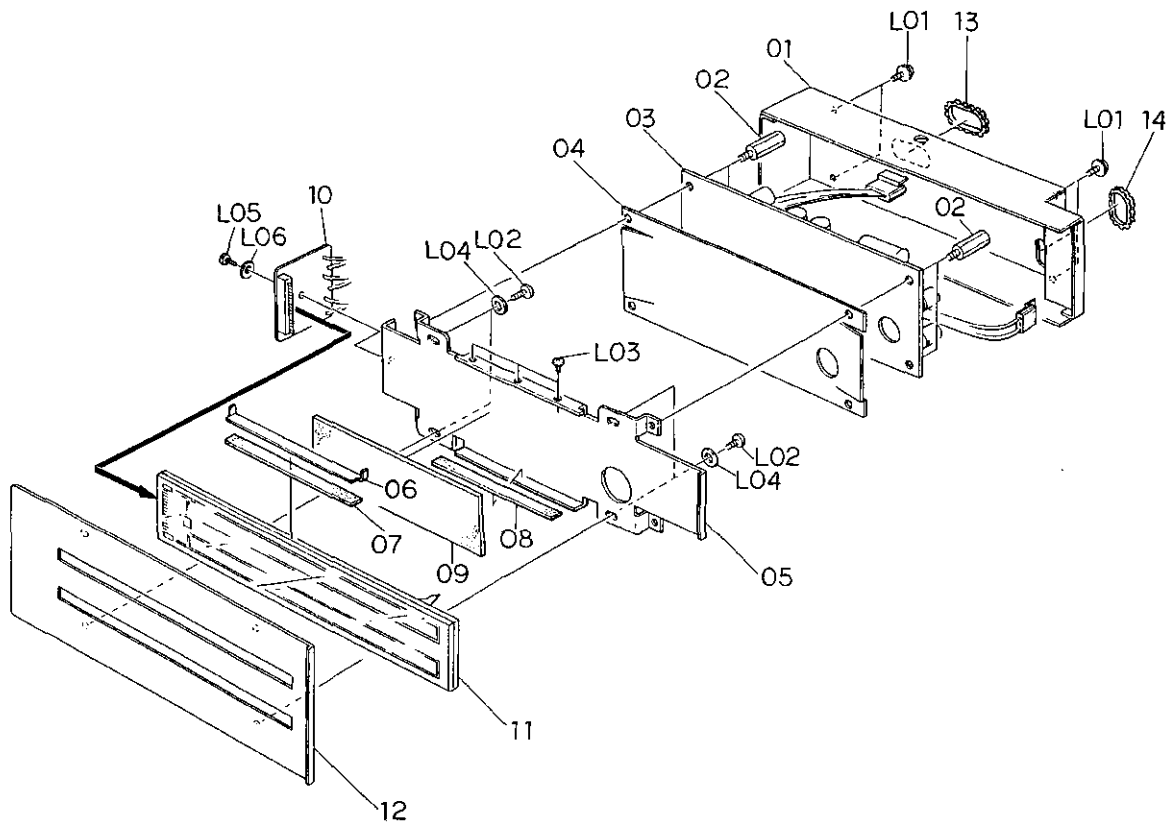


Fig. 7.5

| Schematic Ref. No. | Part No. | Description | Q'ty |
|--------------------|----------|-----------------------------------|------|
| B02 | JA03219A | Bar-graph Holder Ass'y | 1 |
| 01 | JA03204B | Shield Cover Ass'y | 1 |
| 02 | 0J03755A | Bar-graph Stud | 4 |
| 03 | BA03889A | Display P.C.B. Ass'y | 1 |
| 04 | 0J03772A | Display P.C.B. Insulator | 1 |
| 05 | 0J03753B | Bar-graph Holder | 1 |
| 06 | 0J03754A | Pressure Plate | 1 |
| 07 | 0J03775B | Bar-graph Cushion A | 1 |
| 08 | 0J03776B | Bar-graph Cushion B | 1 |
| 09 | 0J03777B | Bar-graph Cushion C | 1 |
| 10 | BA03894A | 8P Plug P.C.B. Ass'y | 1 |
| 11 | 0B08416A | Bar-graph | 1 |
| 12 | JA03203C | Scale Panel Ass'y | 1 |
| 13 | 0B08417A | Free Bushing 52mm | 1 |
| 14 | 0B08426A | Free Bushing 41mm | 1 |
| L01 | 0E00606A | Screw M3x6 Philips Pan Head (3A) | 4 |
| L02 | 0E00778A | Screw M2.6x5 Philips Binding Head | 4 |
| L03 | 0E00826A | Screw M2x2.2 Philips Pan Head | 3 |
| L04 | 0E00183A | Washer 3mm | 4 |
| L05 | 0E00166A | Screw M2x4 Cylinder Head | 1 |
| L06 | 0E00779A | Washer 2mm (Bakelite) | 1 |

7.6. Connector Ass'y (B03)

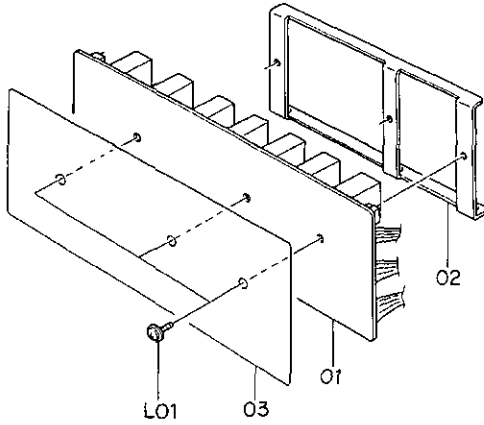


Fig. 7.6

| Schematic Ref. No. | Part No. | Description | Q'ty |
|--------------------|----------|----------------------------------|------|
| B03 | JA03221A | Connector Ass'y | 1 |
| 01 | BA03893A | Connector P.C.B. Ass'y | 1 |
| 02 | QJ03750A | Connector P.C.B. Holder | 1 |
| 03 | QJ04024A | P.C.B. Insulator | 1 |
| L01 | 0E00607A | Screw M3x8 Philips Pan Head (3A) | 3 |

8. BLOCK DIAGRAM

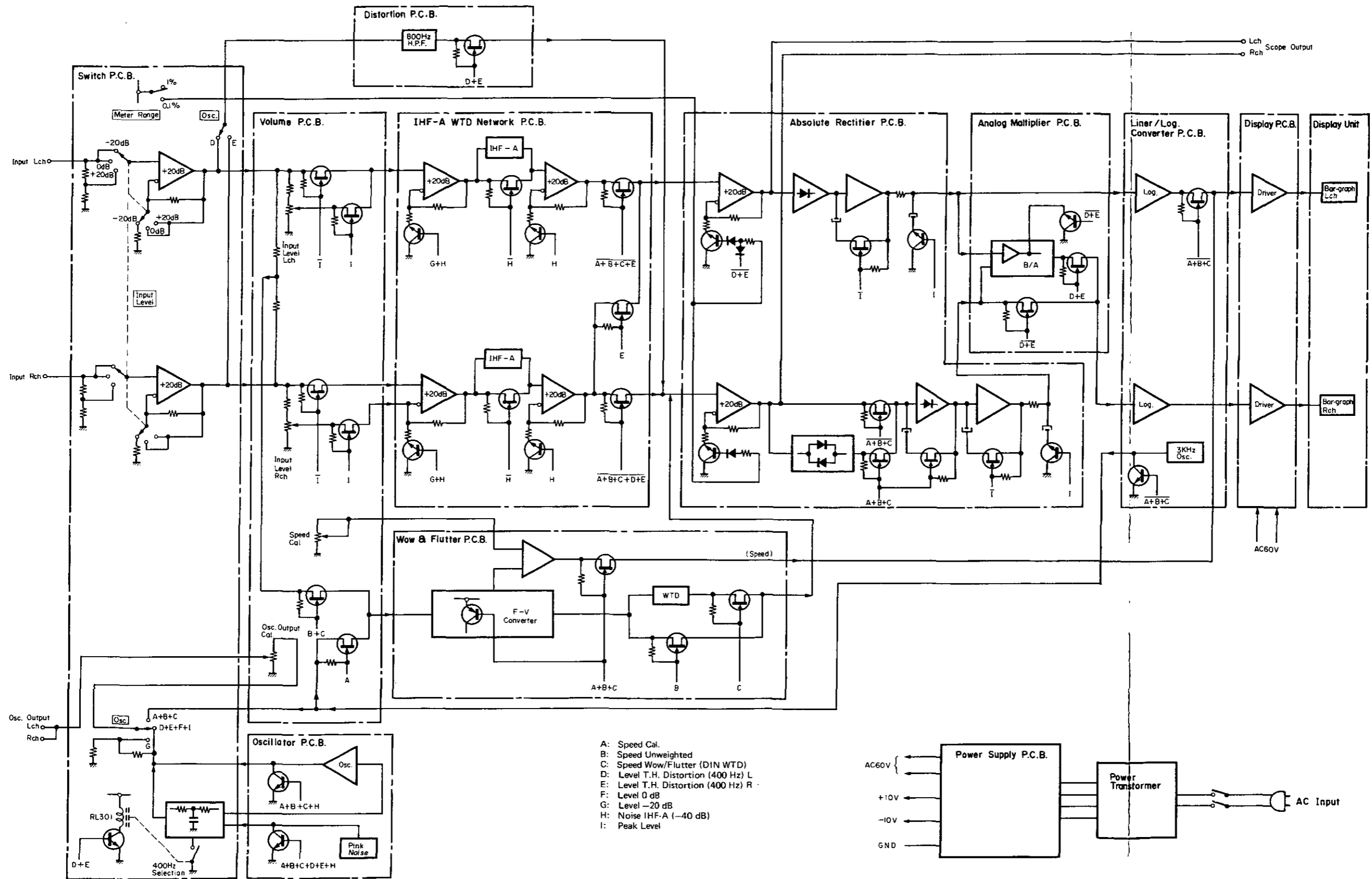


Fig. 8

9. WIRING DIAGRAM

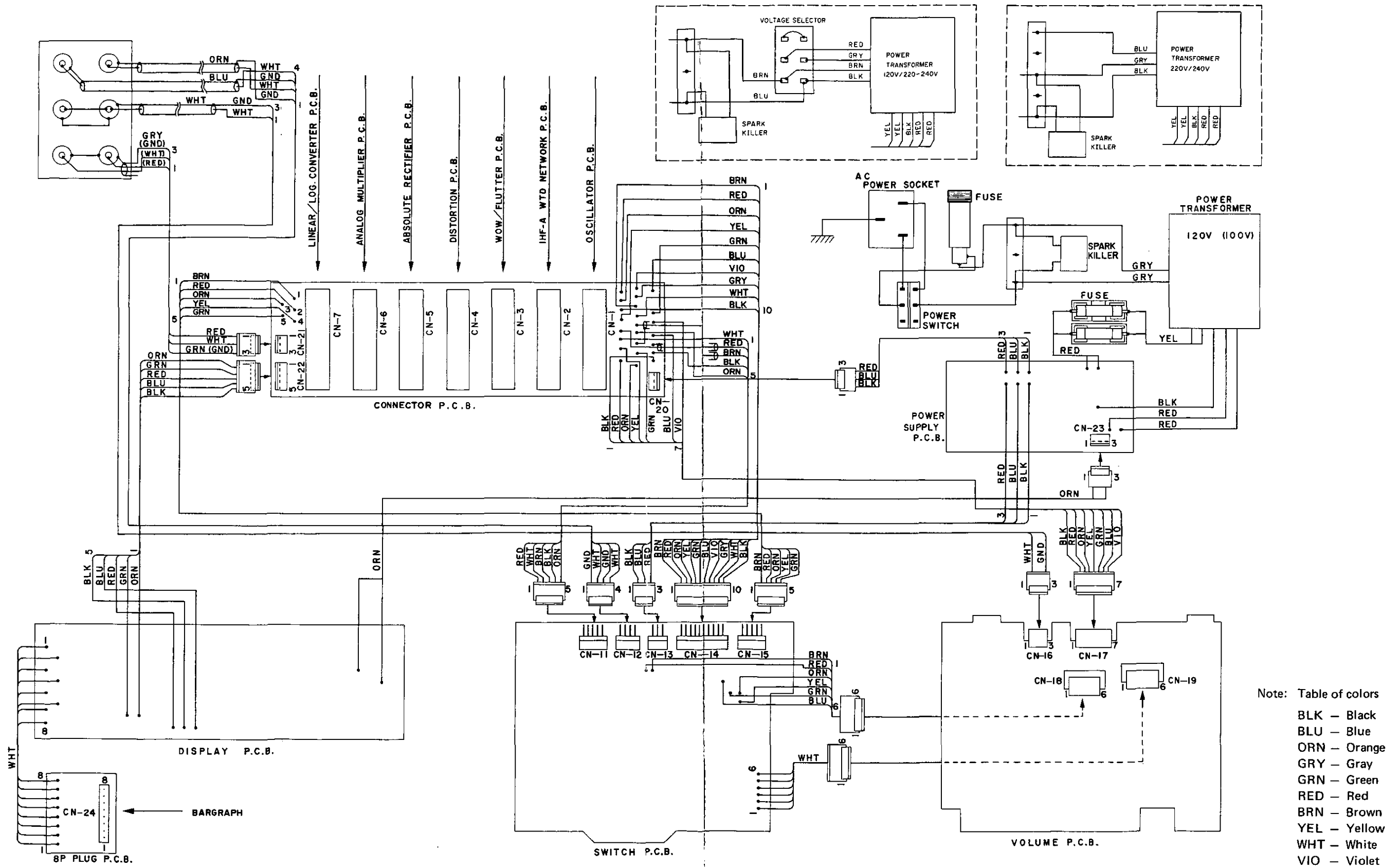


Fig. 9

10. TROUBLESHOOTING

10.1. Notes

- (1) Referring to the Owner's Manual, operate the Audio Analyzer T-100, and establish which circuit is in trouble.
- (2) Remove the covers, the printed-circuit boards, etc., and visually check the parts, wiring or conductive pattern of the printed-circuit board for abnormalities. Various abnormalities may be found through visual check such as burnt elements, broken wires, cold soldering and loose connections of connectors.
- (3) Check to insure whether the outputs +10 V and -10 V of the Power Supply Circuit are correct.
- (4) Check to insure whether the output AC 60 V of the Power Supply Circuit is correct.
- (5) Check the operation of circuits having trouble with a VOM or an oscilloscope according to the circuit diagram.

10.2. Troubleshooting

10.2.1. Indicators do not indicate proper value when Function Control is set to "Level"

Conditions: Input Signal - 1 kHz 1 V rms for L and R channels

Input Level SW - 0 dB
Meter Range SW - 0 dB
Function Control - Level

- (1) 1 V rms is not obtained at IC301-3 and -5 on Switch P.C.B.
 - (a) Poor contact or disconnection of connector CN-12
 - (b) Defective Input Level Switch
- (2) 1 V rms is not obtained at Outputs (L) and (R) on Switch P.C.B.
 - (a) Defective IC301
- (3) 1 V rms is not obtained at Inputs (L) and (R) on Volume P.C.B.
 - (a) Poor contact or disconnection of wire of CN-19
- (4) 1 V rms is not obtained at Outputs (L) and (R) on Volume P.C.B.
 - (a) Abnormality of logic signals or defective bilateral switch Q102 or 202
- (5) 1 V rms is not obtained at Inputs (L) and (R) on IHF-A WTD Network P.C.B.
 - (a) Poor contact or disconnection of wire of CN-17
- (6) 1 V rms is not obtained at Outputs (L) and (R) on IHF-A WTD Network P.C.B. (or Inputs (L) and (R) on Absolute Rectifier P.C.B.)
 - (a) Defective IC301 or 302
 - (b) Abnormality of logic signals or defective bilateral switch Q102, 202, 104, 204 or 301
 - (c) Bilateral switch Q306 or 307 on Wow & Flutter P.C.B. or Q801 on Distortion P.C.B. is ON
- (7) -1.5 V DC is not obtained at Outputs (L) and (R) on Absolute Rectifier P.C.B.
 - (a) Defective IC001, 002, 003, 004 or 005
 - (b) Abnormality of logic signals or defective bilateral switches
 - (c) Defective D703, 704, 803 or 804
- (8) 1 V rms is not obtained at Inputs (L) and (R) on Linear/Log. Converter P.C.B.
 - (a) Abnormality of logic signals or defective bilateral switches on Analog Multiplier P.C.B.
- (9) Incorrect operating waveform at IC302-1 on Linear/Log. Converter P.C.B. (refer to Fig. 6.8.1)
 - (a) Defective IC302
 - (b) Defective Micro Fork TF301 or disconnection of lead wire
- (10) Incorrect operating waveform at collectors Q105 and 205 on Linear/Log. Converter P.C.B. (refer to Fig. 6.8.1)
 - (a) Defective exponential waveform generator
 - (b) Defective differential amp. circuit
- (11) +2.2 V DC is not obtained at Outputs (L) and (R) on Linear/Log. Converter P.C.B.
 - (a) Defective L.P.F. circuit
 - (b) Abnormality of logic signals or defective bilateral switch Q302
 - (c) Bilateral switch Q305 on Wow & Flutter P.C.B. is ON
- (12) +2.2 V DC is not obtained at Inputs (L) and (R) on Display P.C.B.
 - (a) Poor contact or disconnection of wire of CN-22
- (13) Approx. 60 V AC is not obtained at AC voltage input on Display P.C.B.
 - (a) Poor contact or disconnection of wire of CN-23
- (14) Approx. 250 V DC is not obtained at emitter of Q709 on Display P.C.B.
 - (a) Defective high-voltage generator
 - (b) Defective ripple filter
- (15) Incorrect operating waveforms at various parts
 - (a) Defective ICs
 - (b) Defective transistors or bilateral switches
- (16) When all of the above are normal, this will indicate
 - (a) Poor contact or disconnection of wire of CN-24
 - (b) Defective Bar-graph, etc.

10.2.2. Indicators do not indicate the proper value when Function Control is set to "Level T.H. Dist. L or R"

Conditions: Input Signal — 400 Hz 1 V rms (Distortion: 1% @ 1 kHz)
 Input Level SW — 0 dB
 Meter Range SW — 0 dB
 Function Control — Level T.H. Dist. L or R

- (1) 400 Hz 1 V rms is not obtained at Input on Distortion P.C.B.
 - (a) Poor contact or disconnection of wire of CN-19 or CN-17 on Volume P.C.B.
- (2) 1 kHz 320 mV rms is not obtained at Output on Distortion P.C.B. (or Input (R) on Absolute Rectifier P.C.B.)
 - (a) Defective active filter circuit (IC801 or 802)
 - (b) Abnormality of logic signals or defective bilateral switch Q801 on Distortion P.C.B.
 - (c) Abnormality of logic signals on IHF-A WTD Network P.C.B. or Wow & Flutter P.C.B.
- (3) 400 Hz 1 V rms is not obtained at Output (L) on IHF-A WTD Network P.C.B. (or Input (L) on Absolute Rectifier P.C.B.)
 - (a) Abnormality of logic signals on IHF-A WTD Network P.C.B.
- (4) -1.5 V DC and -580 mV DC are not obtained at Output (L) and Output (R) on Absolute Rectifier P.C.B. (or Input (L) and Input (R) on Analog Multiplier P.C.B.)
 - (a) Abnormality of logic signals on Absolute Rectifier P.C.B.
- (5) -1.5 V DC is not obtained at Output on Analog Multiplier P.C.B. (or Input (R) on Linear/Log. Converter P.C.B.)
 - (a) Defective IC751, VF Converter or differential amp. circuit (refer to operating waveform in Fig. 6.13.1)
 - (b) Abnormality of logic signals or defective bilateral switch
- (6) +2.2 V DC is not obtained at Output on Linear/Log. Converter P.C.B.
 - (a) Abnormality of logic signals on Linear/Log. Converter P.C.B.
 - (b) Abnormality of logic signals on Wow & Flutter P.C.B.

10.2.3. Indicator does not indicate the proper value when Function Control is set to "Speed Cal."

Condition: Function Control — Speed Cal.

- (1) Sine wave 3 kHz approx. 0.7 V rms is not obtained at 3 kHz Output on Linear/Log. Converter P.C.B.
 - (a) Abnormality of logic signals, or short circuit of Q303
 - (b) Defective IC302
- (2) 3 kHz approx. 0.7 V rms is not obtained at W/F Output on Volume P.C.B.
 - (a) Poor contact or disconnection of wire of CN-19
 - (b) Abnormality of logic signals or defective bilateral switch Q302
 - (c) Defective Q307
- (3) 3 kHz approx. 0.7 V rms is not obtained at Input on Wow & Flutter P.C.B.
 - (a) Poor contact or disconnection of wire of CN-17
- (4) Incorrect operating waveform at IC302-3 on Wow & Flutter P.C.B. (refer to Fig. 6.4.2)
 - (a) Defective limiter circuit, differential circuit or VF converter circuit
 - (b) Abnormality of logic signals
 - (c) Defective Q302
- (5) +1.6 V rms (varied by Speed Cal. VR302 on Wow & Flutter P.C.B.) is not obtained at Speed on Wow & Flutter P.C.B.
 - (a) Defective L.P.F. circuit or DC amp. circuit
 - (b) Defective VR302 on Volume P.C.B.
 - (c) Abnormality of logic signals on Linear/Log. Converter P.C.B.

10.2.4. Indicators do not indicate the proper value when Function Control is set to "Noise-A"

Conditions: Input Signal — 1 kHz 100 mV rms for L and R channels
 Input Level SW — -20 dB
 Meter Range SW — 0 dB
 Function Control — Noise-A

- (1) 1 V rms is not obtained at Outputs (L) and (R) on IHF-A WTD Network P.C.B.
 - (a) Abnormality of logic signals or defective bilateral switch Q101, 102, 104, 201, 202 or 204
 - (b) Defective D101, 102, 103, 201, 202 or 203
- (2) Disconnect input signals. But still appearance of unwanted oscillation on Scope Out indicates;
 - (a) Abnormality of logic signals or defective Q304 on Oscillator P.C.B.
 - (b) Defective D304 on Oscillator P.C.B.

10.2.5. Indicators do not indicate the proper value when Function Control is set to "Peak Level"

Conditions: Input Signal – 1 kHz 1 V rms for L and R channels

Input Level SW – 0 dB

Meter Range SW – 0 dB

Function Control – Peak Level

- (1) 640 mV rms is not obtained at Inputs (L) and (R) on Absolute Rectifier P.C.B.
 - (a) Abnormality of logic signals or defective bilateral switch Q101 or 201 on Volume P.C.B.
 - (b) Defective D101 or 201 on Volume P.C.B.
- (2) –1.5 V DC is not obtained at Outputs (L) and (R) on Absolute Rectifier P.C.B.
 - (a) Abnormality of logic signals or defective bilateral switch Q702, 703, 802 or 803
 - (b) Defective D705, 706, 805 or 806

10.2.6. Indicator does not indicate the proper speed value when Function Control is set to "Speed Wow/Flutter" or "Speed Unweighted"

Conditions: Input Signal – 3 kHz $\pm 0.1\%$ 30 mV rms or more

Input Level SW – 0 dB

Speed Cal. Control – Center position

Function Control – Speed Wow/Flutter or Speed Unweighted

- (1) 3 kHz signal is not obtained at W/F Output on Volume P.C.B. (or Input on Wow & Flutter P.C.B.)
 - (a) Abnormality of logic signals or defective bilateral switch Q301 or 302 on Volume P.C.B.
- (2) +1.6 V DC is not obtained at Speed on Wow & Flutter P.C.B.
 - (a) Abnormality of logic signals on Wow & Flutter P.C.B. or Linear/Log. Converter P.C.B.

10.2.7. Indicator does not indicate the proper wow/flutter value when Function Control is set to "Speed Wow/Flutter" or "Speed Unweighted"

Conditions: Input Signal – 3 kHz (modulated with 4 Hz sine wave by 1%)

4 Hz : 380 mV rms

3 kHz: 760 mV rms

Input Level SW – 0 dB

Meter Range SW – 0 dB

Function Control – Speed Wow/Flutter or Speed Unweighted

- (1) 4 Hz 1 V peak-to-peak is not obtained at Output on Wow & Flutter P.C.B. (or Input (R) on Absolute Rectifier P.C.B.)
 - (a) Defective IC304

- (b) Abnormality of logic signals or defective bilateral switch Q306 or 307 on Wow & Flutter P.C.B.

- (c) Abnormality of logic signals on Distortion P.C.B. or IHF-A WTD Network P.C.B.

- (2) –1.5 V DC is not obtained at Output (L) on Absolute Rectifier P.C.B.

- (a) Defective IC003

- (b) Abnormality of logic signals or defective bilateral switch Q804 or 805

- (3) –1.5 V DC is not obtained at Output (L) on Analog Multiplier P.C.B.

- (a) Abnormality of logic signals

10.2.8. Oscillator Outputs do not show the proper value when Function Control is set to "Level" and Oscillator Control is set to "20 Hz – 20 kHz"

Conditions: Oscillator Control – 20 Hz – 20 kHz

Oscillator Output Control – Max.

Function Control – Level

- (1) 1.2 V rms is not obtained at OSC Output on Oscillator P.C.B.

- (a) Poor contact or disconnection of wire of CN-11 on Switch P.C.B.

- (b) Abnormality of logic signals or defective bilateral switch Q302 or 304

- (c) Defective IC304, Q301, 303, 305 or 306

- (2) 1.2 V rms is not obtained at pin 4 of CN-19 on Volume P.C.B.

- (a) Poor contact or disconnection of wire of CN-19

- (3) 1.2 V rms is not obtained at pin 1 of CN-16 on Volume P.C.B.

- (a) Defective VR301

- (b) Defective Q303 or 304

- (4) 1.2 V rms is not obtained at Oscillator Output Jacks

- (a) Poor contact or disconnection of wire of CN-16

10.2.9. Oscillator Outputs do not show the proper value when Function Control is set to "Level" and Oscillator Control is set to "Pink Noise"

Conditions: Oscillator Control – Pink Noise

Oscillator Output Control – Max.

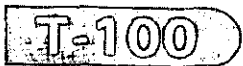
Function Control – Level

- (1) Noise of 50 mV rms is not obtained at Pink Output on Oscillator P.C.B.

- (a) Poor contact or disconnection of wire of CN-11 on Switch P.C.B.

- (b) Abnormality of logic signals or defective bilateral switch Q307

- (c) Defective IC302, 303, Q308 or 309



11. SPECIFICATIONS

General

| | |
|-----------------|---------------|
| Input Impedance | 50 kilohms |
| Scope Out | Low Impedance |

Oscillator (CR-type spot oscillator)

| | |
|--------------------|---|
| Spot Frequencies | 20, 40, 63, 100, 160, 250, 400, 630, 1 k, 1.5 k, 2 k, 3 k, 4 k, 5 k, 6.3 k, 8 k, 10 k, 12 k, 15 k, 18 k, 20 kHz plus pink noise (± 2 dB, 20 – 20,000 Hz) |
| Output Voltage | 1.2 V max. (variable) |
| Level Deviation | ± 0.2 dB (20 – 20,000 Hz) |
| Output Distortion | Less than 0.3% (20 – 20,000 Hz) Less than 0.01% 400 Hz (for THD measurement) |
| Frequency Accuracy | $\pm 2\%$ |
| Output Impedance | 600 ohms |

Level Measurement

| | |
|--------------------|---|
| Range | -80 dB – +30 dB (ref.: 0 dB = 1 V) |
| Frequency Response | 20 – 20,000 Hz ± 0.3 dB |
| Ballistics | Average (rms): 0.3 sec ("VU") Peak: 10 ms rise time 2 sec fall time (DIN peak) |

Wow & Flutter Measurement

| | |
|---------------------------|-------------------------------------|
| Center Frequency | 3 kHz |
| Input Level Range | 3 mV – 30 V |
| Indication | DIN peak (wtd or unwtd, selectable) |
| Frequency Range | 0.2 – 200 Hz |
| Calibration (test signal) | 3 kHz ± 4.5 Hz ($\pm 0.15\%$) |
| Tape Speed Range | $\pm 3\%$ |

Distortion Meter

| | |
|-------------------------------|--|
| Measurement frequency | 400 Hz |
| Input Voltage Range | 100 mV – 30 V |
| Distortion Range | 0.01% – 0.3%, 0.1% – 3% |
| Automatic Input Control Range | 20 dB (-10 dB – +10 dB) |
| Frequency Characteristics | 800 Hz – 10 kHz (± 0.3 dB) |
| Residual Noise | 90 dB (input range: 0 dB) 85 dB (input range: -20 dB) |

Noise Level Measurement

| | |
|---------------------------|---|
| Frequency Characteristics | IHF-A Curve |
| Range | -100 dB – -10 dB (0 dB = 1 V) |
| Indication | Average Value |
| Power Requirements | 100, 120, 220 – 240 Volts AC, 50/60 Hz |
| Power Consumption | 15 VA |
| Dimensions | 343(W) x 75(H) x 240(D) millimeters 13½(W) x 3(H) x 9½(D) inches |
| Weight | 4.3 kilograms, 9.5 pounds |

- Specifications and appearance design are subject to change for further improvement without notice.

T-100

Service Manual

Nakamichi T-100

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