

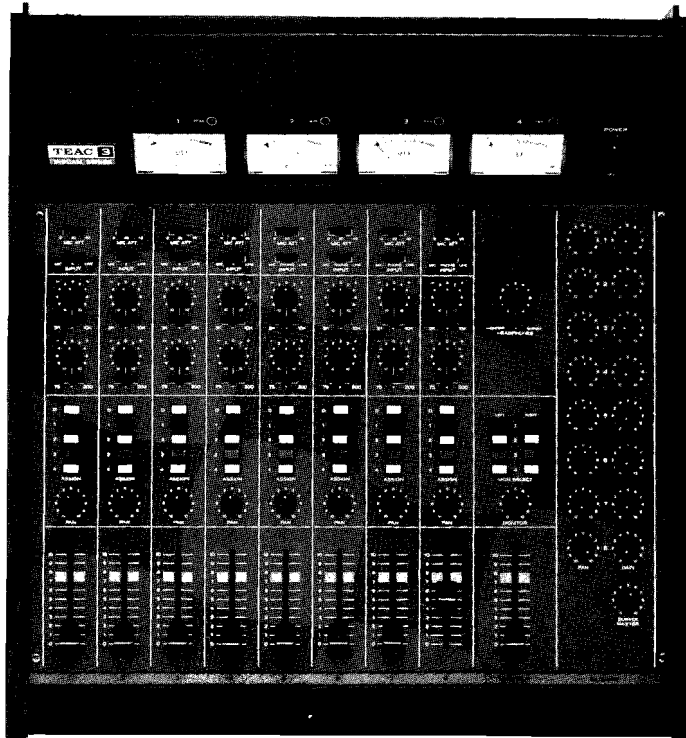
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SERVICE MANUAL

**TEAC Tascam Series
MODEL 3 AUDIO MIXER**

TEAC®

9050-15



I. INTRODUCTION

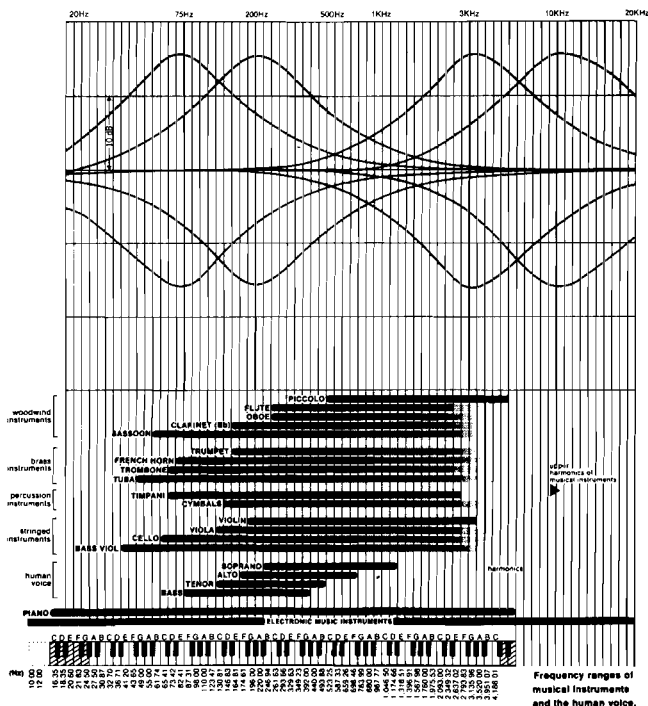
Fulfilling the needs of people with more talent than money is the fundamental premise on which TEAC Tascam Series recording gear is built. So we designed the Model 3 to be as versatile as possible. With the right combination of features and functions for home or studio recording, PA or disco mixing. The Model 3 just about does it all. You'll find it a surprisingly functional mixer, and it's with a certain pride that we now begin to tell you how it works, some of the many things you can do with it, and how to service it.

The Model 3 is manufactured in our professional products division, and incorporates the same design philosophy as the highly successful TEAC Tascam Series Model 10 mixing console. Many of the parts, circuits, and production assembly procedures are the same. Also, the design alternatives that were chosen for cost purposes were exhaustively researched and tested to avoid any compromise in performance.

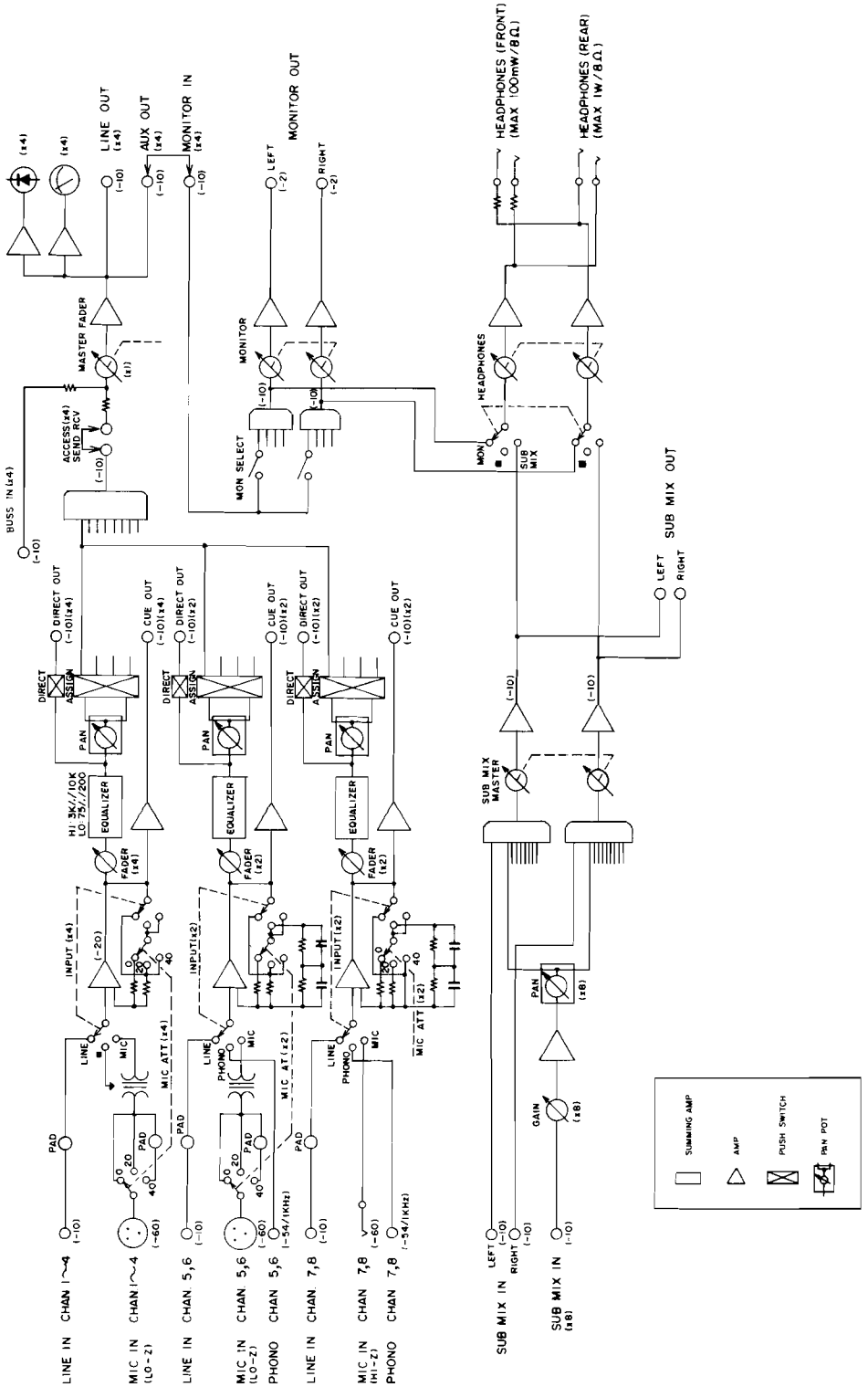
2. SPECIFICATION

Input/output channels	8 input/4 output
Input selector	Chan. 1 ~ 4 MIC (LOW Z)/OFF/LINE Chan. 5 ~ 6 MIC (LOW Z)/PHONO/LINE Chan. 7 ~ 8 MIC (HIGH Z)/PHONO/LINE
Mic input	
Mic impedance	Hi-Z: 10K ohms Lo-Z: 200 ohms
Input impedance	Hi-Z: greater than 100K ohms Lo-Z: greater than 1K ohms
Nominal input level	-50dB (3 mV)
Minimum input level	-66dB (0.5 mV)
Maximum input level	+10dB (3V) w/40dB attenuator
Phono input	
Input impedance	Greater than 45K ohms
Nominal input level	-54dB (at 1KHz)
Minimum input level	-60dB (at 1KHz)
Line input	
Line impedance	Greater than 20K ohms
Nominal input level	-10dB (0.3V)
Minimum input level	-16dB
Maximum input level	+24dB (15V)
Line output/Aux. output	
Load impedance	Greater than 10K ohms
Nominal output level	-10dB (0.3V)
Maximum output level	+14dB (5V)
Monitor output	
Load impedance	Greater than 10K ohms
Nominal output level	-2dB (0.78V)
Maximum output level	+16dB (6.3V)
Headphones	
Load impedance	8 ohms
Maximum output level	1W (rear panel), 100mW (front panel)
Frequency response	30Hz ~ 20KHz, ± 2 dB
Signal to noise ratio, overall (measured at nominal input levels)	
One mic input	Hi-Z: greater than 65dB WTD, 60dB UNWTD Lo-Z: greater than 75dB WTD, 70dB UNWTD
8 mic inputs	Greater than 60dB WTD, 55dB UNWTD
One line input	Greater than 75dB WTD, 70dB UNWTD
8 line inputs	Greater than 73dB WTD, 68dB UNWTD
One phono input	Greater than 65dB WTD, 55dB UNWTD

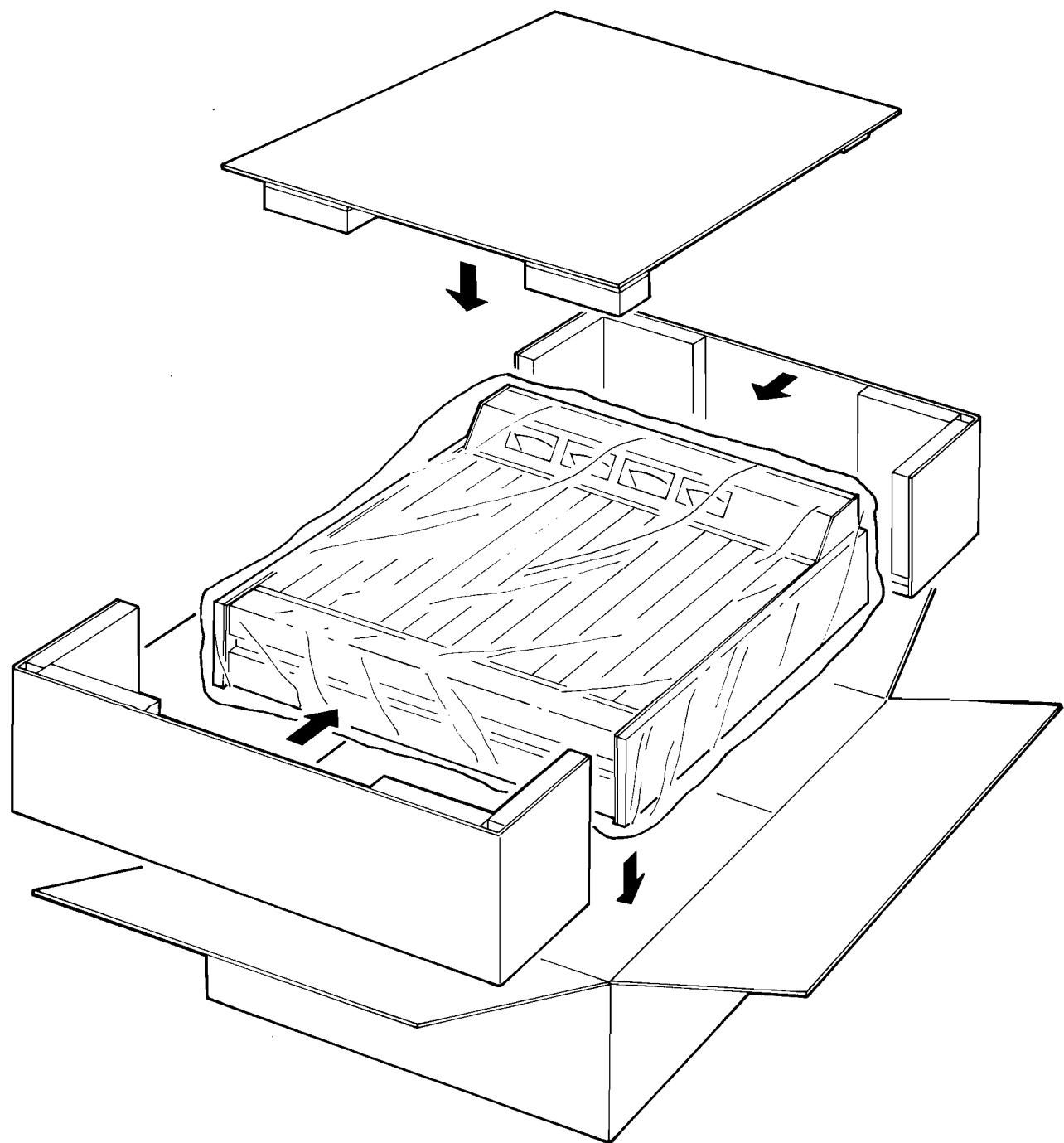
Equalization	Peak and dip type, $\pm 15\text{dB}$ continuously variable Hi-band - 3KHz \sim 10KHz, switchable lo-band - 75Hz \sim 200Hz, switchable
Crosstalk	Greater than 60dB (at 1KHz)
Distortion, overall (Mic input to output)	0.3% THD maximum
Fader attenuation	Greater than 60dB
Send and receive data	
Accessory send level	Nominal -10dB (0.3V) into 10K ohms or higher
Accessory receive level	Nominal -10dB (0.3V) into 10K ohms or higher
Bus input, sub-mix buss input	
Input impedance	Greater than 10K ohms
Nominal level	-2dB (0.78V)
Monitor input	
Input impedance	Greater than 10K ohms
Nominal level	-2dB (0.78V)
Sub-mix input	
Input impedance	Greater than 10K ohms
Nominal level	-10dB (0.3V)
Cue output	
Load impedance	Greater than 10K ohms
Nominal level	-10dB (0.3V)
Direct output	
Load impedance	Greater than 10K ohms
Nominal level	-10dB (0.3V)
Power requirements	117V (200V, 220V \sim 240V, 250V) AC, 50/60Hz, 40W



3. SIMPLIFIED BLOCK DIAGRAM



4. OPENING THE PACKAGE



5. THE CONTROLS AND THEIR FUNCTION

INPUT SECTION



Attenuation: A 3-position switch for 0, 20, or 40dB of padding for MIC signals. The pad is located before the mic transformer and preamp to prevent them from being overdriven, a common cause of distortion.

Input select: A 3-position switch that determines the signal to be passed - mic or line. The center position on inputs 1 thru 4 is OFF. The center position on inputs 5 thru 8 is for PHONO when a standard, magnetic cartridge turntable is plugged into the PHONO IN jacks on the rear panel.

Equalization: The peak and dip equalizers provide 15dB of boost or cut, continuously variable, at the following frequencies: 3 KHz or 10 KHz, selectable; 75 Hz or 200 Hz, selectable. The center position is OFF.

Channel assign: D is a direct output post EQ and fader when it is desirable to bypass the summing amplifiers. The color-coded, numbered channel assign buttons allow any signal to be assigned to ANY or ALL of the four output busses.

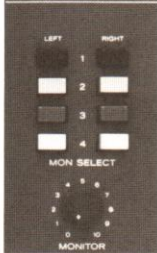
Pan: Whenever more than one output is assigned, PAN is automatically engaged. The apparent acoustic image may then be placed at its desired position within the panoramic perspective. Rotating the pan control COUNTER-CLOCKWISE moves the acoustic image towards the monitors connected with the lower numbered output busses. CLOCKWISE moves the image to the higher numbered busses. In most situations, you'll be panning in stereo - between two channels - but you can create some interesting effects by selecting 3 or 4 assignment buttons in a 4-channel application (see diagram). In the normal situation, say between 1 and 3, you will notice approximately a 3dB drop when the pan control is centered (0), and the signal is distributed equally between the monitors. This dip compensates for what would otherwise be an audible peak in the center. So, as you move the apparent acoustic image from extreme left to extreme right, you will notice a smooth, even pan.

Straight line fader: Regulates the overall send level of that input section. The shaded grey area on the fader scale represents the relatively optimum operating range of the fader - it is not a critical reference.

MASTER SECTION



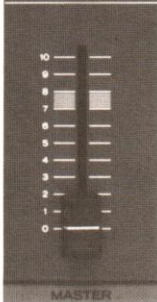
Headphones: A 3-position switch with level control that determines the output signal to be fed to the headphones. The center position is OFF. MONITOR is the signal from the MONITOR SELECT (4 X 2 mixer) circuit; SUBMIX is from the SUBMIX (8 X 2) section.



Monitor select: Acts as a 4 X 2 mixer, generally tied into the four output busses. The color-coded, numbered buttons allow you to select any signal assigned to the output busses and deliver it to the left, right, or both (center) control room monitors.

Monitor: A continuously variable level control for the monitor circuit.

Master fader: A 4-ganged pot for overall level control of the Model 3 program line output.



SUBMIX SECTION

Pan: A special design pot for distributing the SUBMIX OUT to the left and right channels. When this control is centered, the level will drop by about 3dB in the same way as the PAN pot in the INPUT SECTION.

Gain: Pot for controlling the gain of the SUBMIX IN signals prior to mixdown into two channels.

Submix master: A 2-ganged pot for controlling the SUBMIX OUT signals which had been adjusted and mixdowned into 2 channels by the above PAN and GAIN pots.

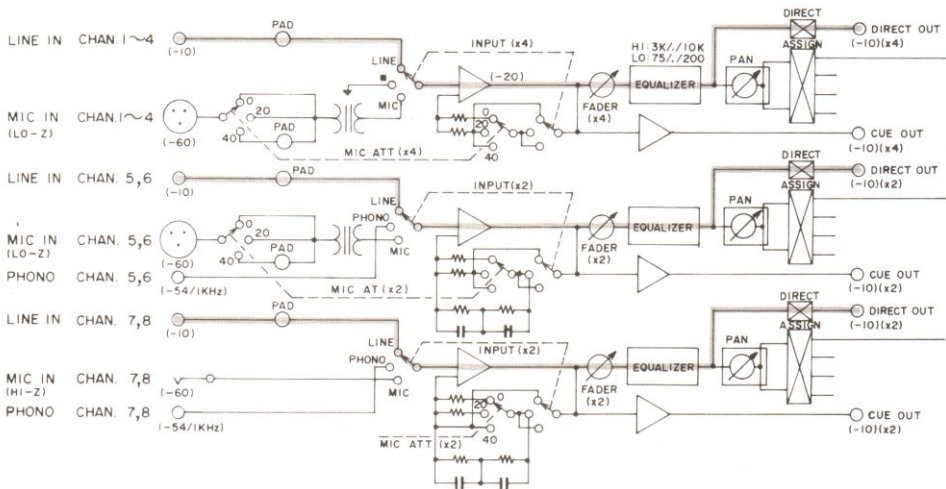


6. LEVEL SETTING AND OPERATION CHECK

6.1 Circuit check of LINE IN → DIRECT OUT

- 1) Apply a 1KHz, -10dB (0.3V) signal to the LINE IN pin jack.
- 2) Plug in a level meter to the DIRECT OUT pin jack.
- 3) Set the Input Section controls as follows:

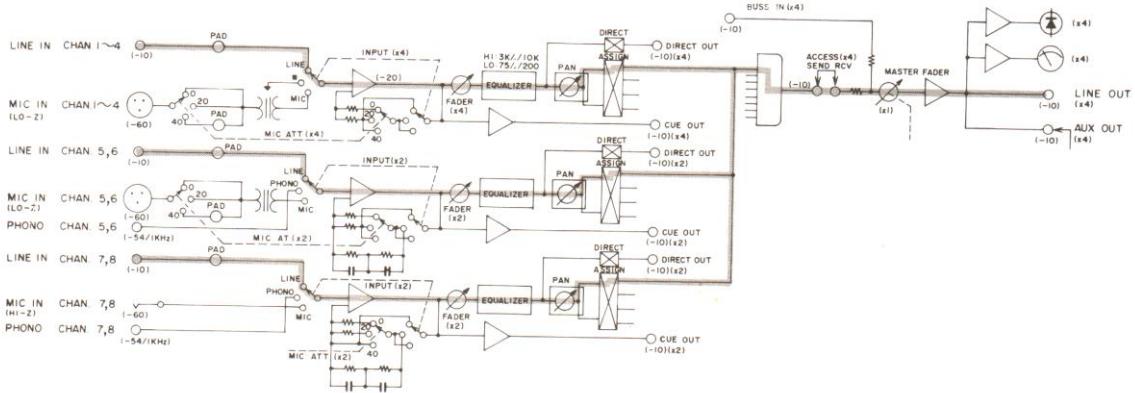
INPUT	Set to LINE
EQUALIZER	Set switch to OFF, and pot to "0"
ASSIGN	Depress "D"
PAN	Set to "0"
- 4) Adjust the Input Fader for a -10dB reading on the Level Meter (Input Z = >10K Ω , range of measurement = -60dB ~ +40dB)
- 5) The Input Fader should then come to the shaded grey area.
- 6) Sweep the LINE IN signal from 30Hz through 20KHz and check that the frequency response is within ± 2 dB.
- 7) Check the remaining channels by the same procedure.



6.2 Circuit check and adjusting of LINE IN → LINE OUT

- 1) Apply a 1KHz, -10dB (0.3V) signal to the LINE IN pin jack.
- 2) Plug in a Level Meter to the LINE OUT 1 pin jack.
- 3) Depress ASSIGN button "1" with all other controls set as described in Item 6.1.
- 4) Set fader of the Master Section to the shaded grey area.
- 5) Adjust the Input Section Fader to obtain a -10dB reading on the Level Meter connected to LINE OUT 1.
- 6) The Input Section Fader should then come to the shaded grey area.
- 7) Sweep the LINE IN signal from 30Hz through 20KHz and check that the frequency response is within ± 2 dB.

- 8) Remove the oscillator connection to LINE IN, raise sensitivity of the Level Meter, and check the noise level. The S/N ratio should normally be greater than 70dB.
- 9) Check all Input channels 1 through 8 in various combinations with LINE OUT 1 through 4.
- 10) Refer to Items 6.8 and 6.9 for calibration of the VU meters and peak indicators.



6.3 Circuit check of CUE OUT

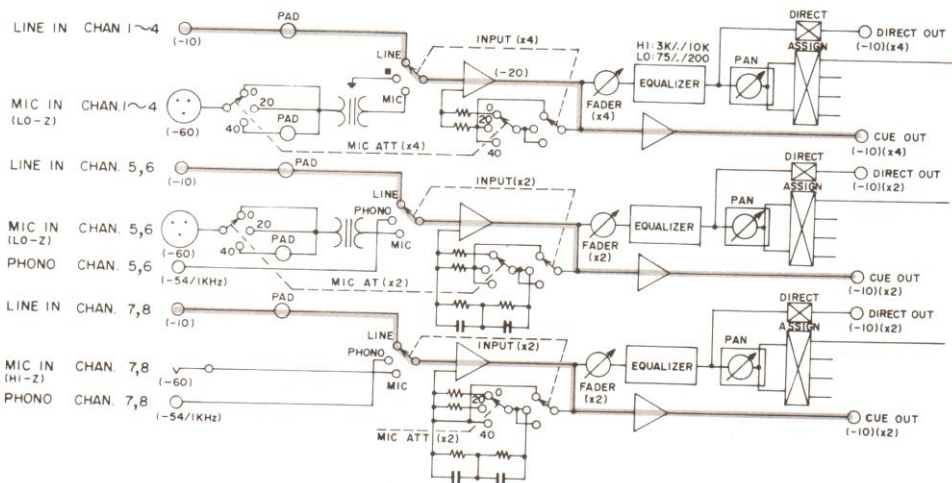
The CUE OUT circuits has nothing to adjust, such as a pot, either on the panel or on the PCB.

Plug the Level Meter into CUE OUT, Channel 1 and apply an operating level signal (-10dB) to LINE IN, Channel 1.

The Level Meter should normally read -10dB.

Check the remaining Channels 2 through 8 by the same method.

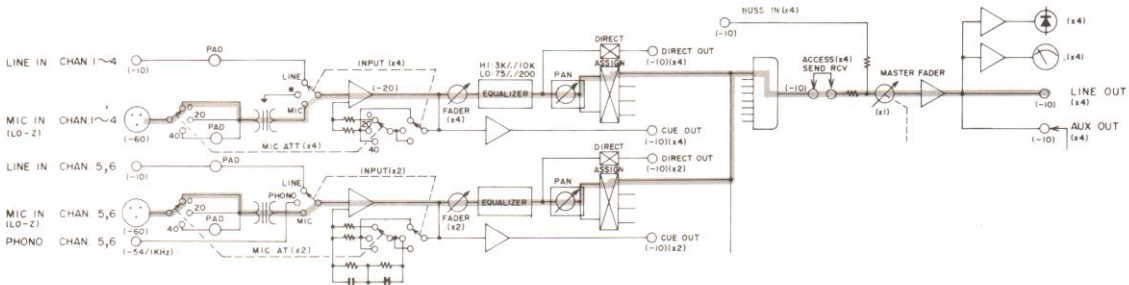
As CUE OUT is normally connected to SUBMIX IN, refer to Item 6.7.



6.4 Circuit check of MIC IN (Lo-Z) → LINE OUT

- 1) Apply a 1KHz, -60dB (1mV) signal to MIC IN 1.
- 2) Plug in a Level Meter to the LINE OUT 1 jack.
- 3) Set the Input Section controls as follows:

INPUT	Set to MIC
MIC ATT	Set to "0"
EQUALIZER	Set switch to OFF, and pot to "0"
ASSIGN	Depress 1
PAN	Set to "0"
- 4) Set MASTER fader to the shaded grey area.
- 5) Adjust the Channel 1 INPUT fader for a -10dB reading on the Level Meter. If the fader knob is then at the shaded grey area, the circuit is in good condition.
- 6) After adjusting the INPUT fader for a reading of -10dB on the Level Meter at the LINE OUT 1 jack with a MIC IN signal level of -50dB, remove the oscillator output Cannon plug connected to MIC IN 1, raise the Level Meter sensitivity range and check the S/N ratio. It should normally be greater than 70dB.
- 7) Sweep the MIC IN signal from 30Hz through 20KHz and check that the frequency response is within ± 2 dB.
- 8) Check the remaining MIC IN Channels 2 through 6 in various combinations with LINE OUT 1 through 4.

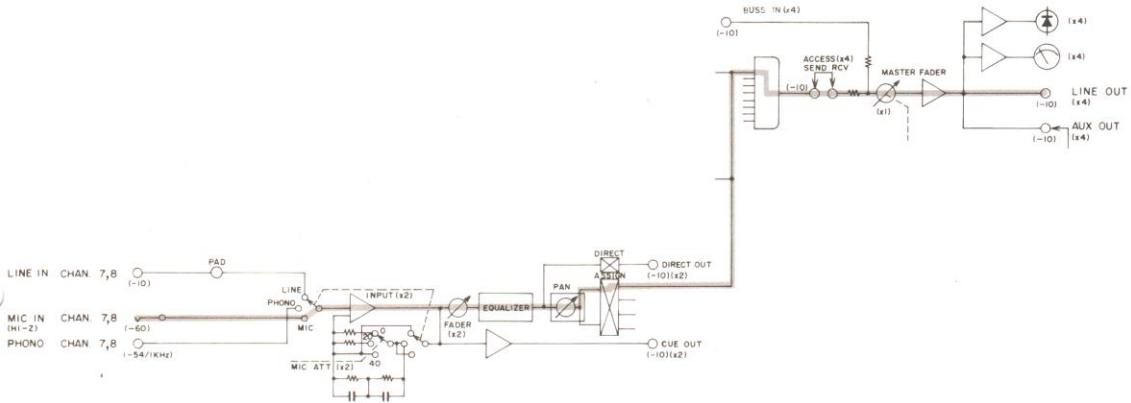


6.5 Circuit check of MIC IN (Hi-Z) → LINE OUT

- 1) Apply a 1KHz, -60dB (1mV) signal to MIC IN 7.
- 2) Plug in a Level Meter to the LINE OUT 1 jack.
- 3) Set the Channel 7 INPUT Section controls as follows:

INPUT	Set to MIC
MIC ATT	Set to "0"
EQUALIZER	Set switch to OFF, and pot to "0"
ASSIGN	Depress 1
PAN	Set to "0"

- 4) Set MASTER fader to the shaded grey area.
- 5) The circuit should be in good, normal condition if the Channel 7 INPUT fader comes to rest within the shaded grey area when adjusted for a -10dB reading on the Level Meter.
- 6) After adjusting the INPUT fader for a reading of -10dB on the Level Meter at the LINE OUT 1 jack with a MIC IN signal level of -50dB, remove the oscillator out-put phono plug connected to MIC IN 7, raise the Level Meter sensitivity range and check the S/N ratio. It normally should be greater than 60dB.
- 7) Sweep the MIC IN signal from 30Hz through 20KHz and check that the frequency response is within ± 2 dB.
- 8) Repeat the above check procedures on the INPUT Section MIC IN 7 and 8 in various combinations with LINE OUT 1 through 4.



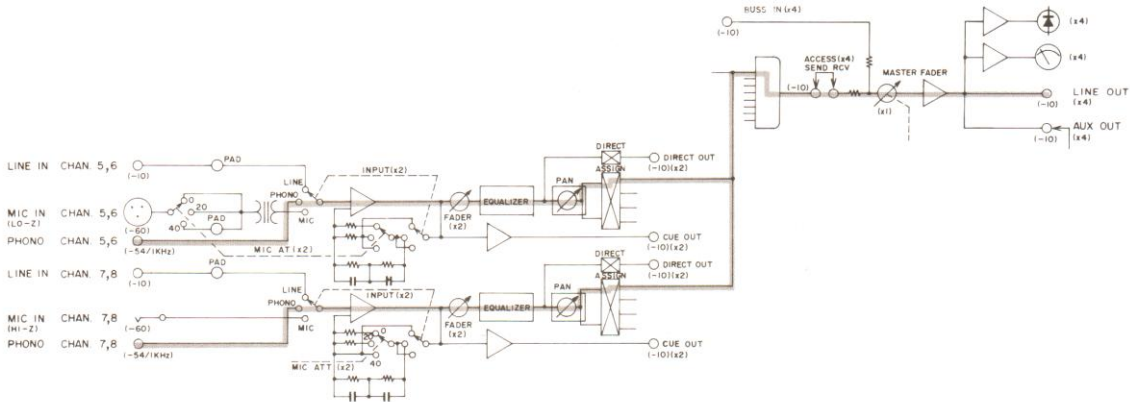
6.6 Circuit check of PHONO → LINE OUT

- 1) Apply a 1KHz, -54dB signal to PHONO 5.
- 2) Plug in a Level Meter to the LINE OUT 1 jack.
- 3) Set the Channel 5 INPUT Section controls as follows:

INPUT	Set to PHONO
EQUALIZER	Set switch to OFF, and pot to "0"
ASSIGN	Depress 1
PAN	Set to "0"
- 4) Set MASTER fader to the shaded grey area.
- 5) Adjust the Channel 5 INPUT fader for a -10dB reading on the Level Meter. In doing so, the fader knob may be slightly offset from the shaded grey area but this can be tolerated if the INPUT fader is in the shaded grey area for normal operating level during check of the MIC or LINE circuits.
- 6) The circuit should be in good, normal condition if the frequency response is $+18$ dB ± 1 dB for 50Hz, and -13.5 dB ± 1 dB for 10KHz, both in reference to 1KHz when

the signal frequency applied to the PHONO input is swept from 30Hz through 20KHz.

- 7) Short circuit the PHONO input and check the S/N ratio. It normally should be greater than 55dB.
- 8) Check PHONO Channels 6 through 8 in the same way.

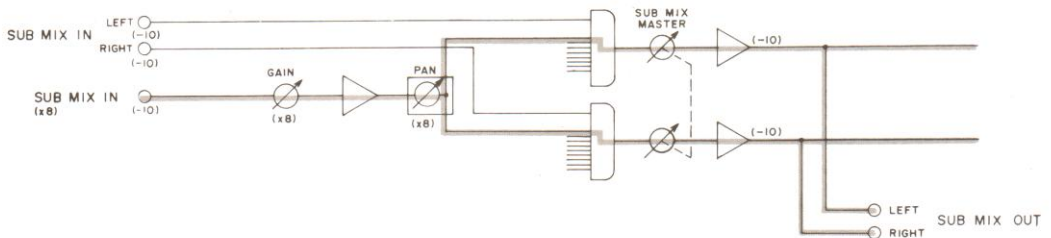


6.7 Circuit check of SUBMIX IN → SUBMIX OUT

- 1) Apply a 1KHz, -10dB (0.3V) signal to the LEFT or RIGHT Channel jack of the SUBMIX IN on the extreme left side of the rear panel.
- 2) Connect a Level Meter to the LEFT or RIGHT jack of SUBMIX OUT. The circuit is in normal condition if the SUBMIX MASTER pot setting comes between 7 and 8 of its scale for a -10dB (0.3V) reading on the Level Meter.

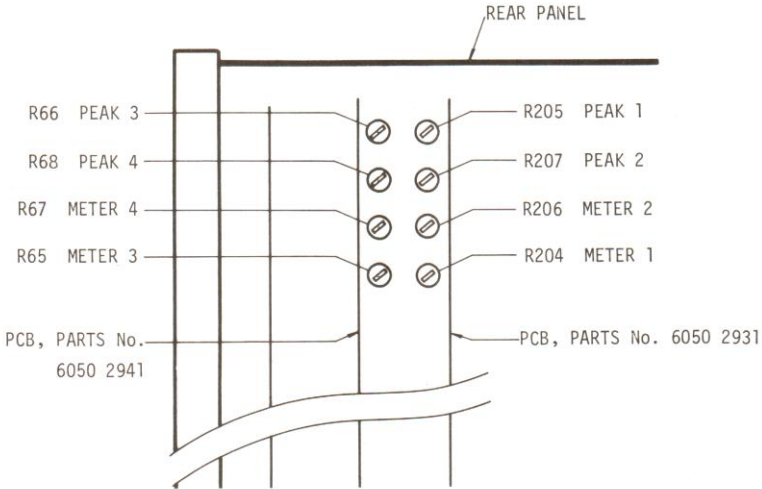
Do not touch the SUBMIX MASTER pot at the following check procedures.

- 3) The SUBMIX IN's in the INPUT Section are generally strapped with a short cable (Parts No. 6049 0520) to the corresponding CUE OUT jacks. Under the setting described in Items 6.2 and 6.3, apply a 1KHz, -10dB (0.3V) signal to the LINE IN 1 pin jack.
- 4) The circuit should be in good, normal condition if the GAIN 1 pot setting comes between 7 and 8 of its scale for a -10dB (0.3V) reading of SUBMIX OUT with the SUBMIX Section PAN 1 pot at "0".
- 5) Check the remaining LINE IN Channels 2 through 8 in the same way.



6.8 Calibrating the VU meter

- 1) There should be no need to change the test instrument connections if the setting described in Item 6.2 is used for calibrating the VU meter.
- 2) The calibration is correct if the VU meter indication is $0\text{VU} \pm 0.5\text{V}$ when reading of the Level Meter connected to LINE OUT is -10dB (0.3V).
- 3) If the VU meter does not indicate 0VU , turn the M-3 upside down, remove the base board (Parts No. 6037 2291) and adjust the calibrating pots, shown in schematic below, which correspond to the off spec meter.

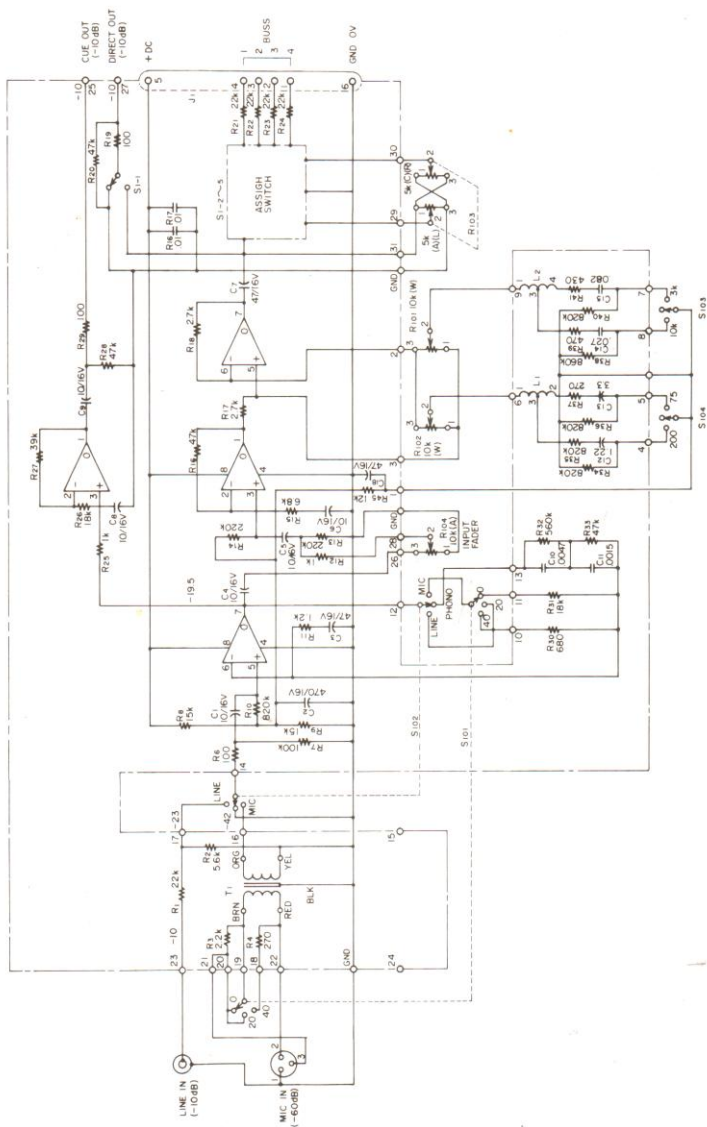


6.9 Calibrating the peak indicator

- 1) The peak indicators are checked following calibration of the VU meters.
- 2) Either raise the LINE IN input level or advance each fader and read the Level Meter connected to LINE OUT.
- 3) Adjust each pot, shown in schematic above, corresponding to the proper LED so that it ignites when the Level Meter reads 10dB above 0VU .

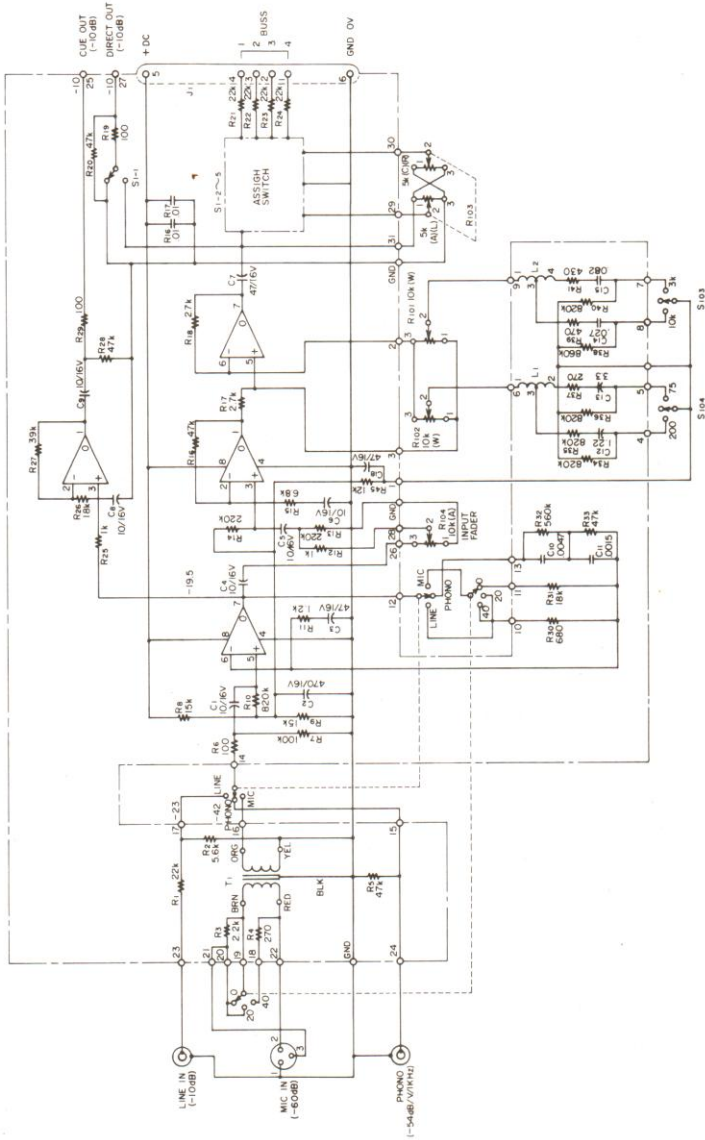
9. CIRCUIT SCHEMATICS

9.1 Input amplifier (Chan. 1 ~ 4)



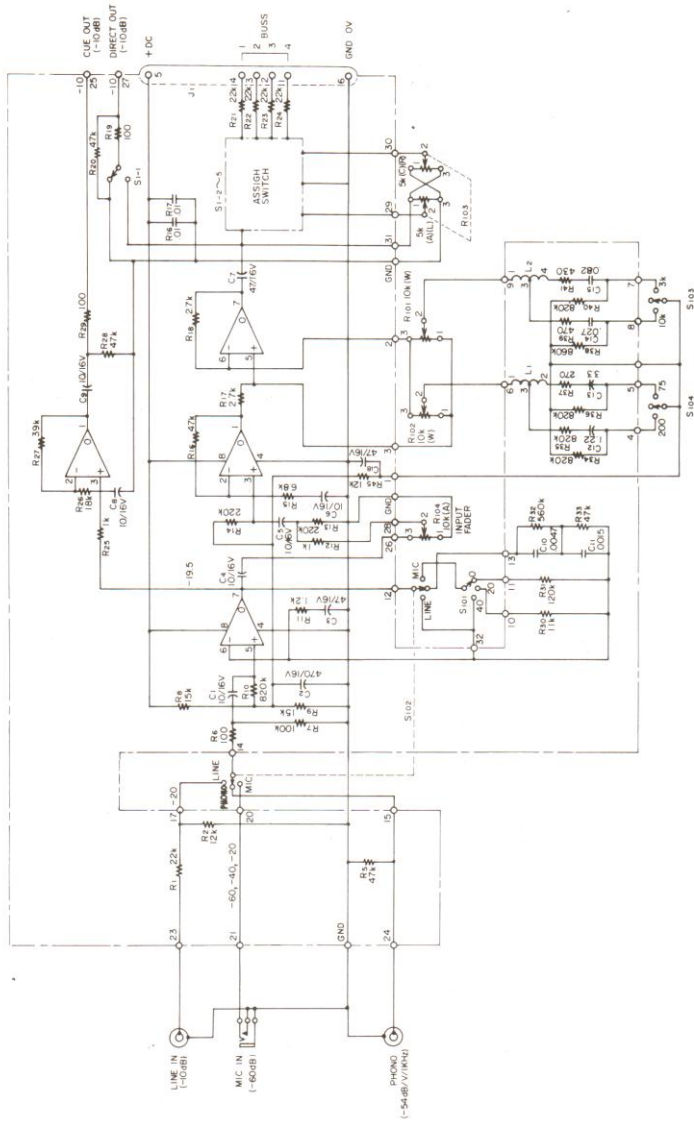
SCHEMATIC
Input amp. (Ch. 1~4)
DWG. _____ REV. _____

9.2 Input amplifier (Chan. 5, 6)



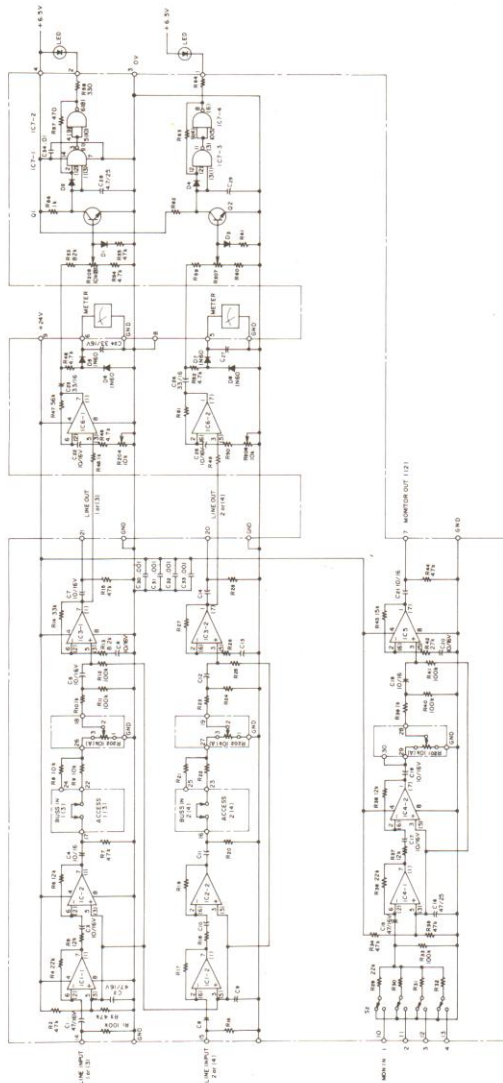
SCHEMATIC
Input amp. (Ch. 5, 6)
DWG. _____ REV. _____

9.3 Input amplifier (Chan. 7, 8)



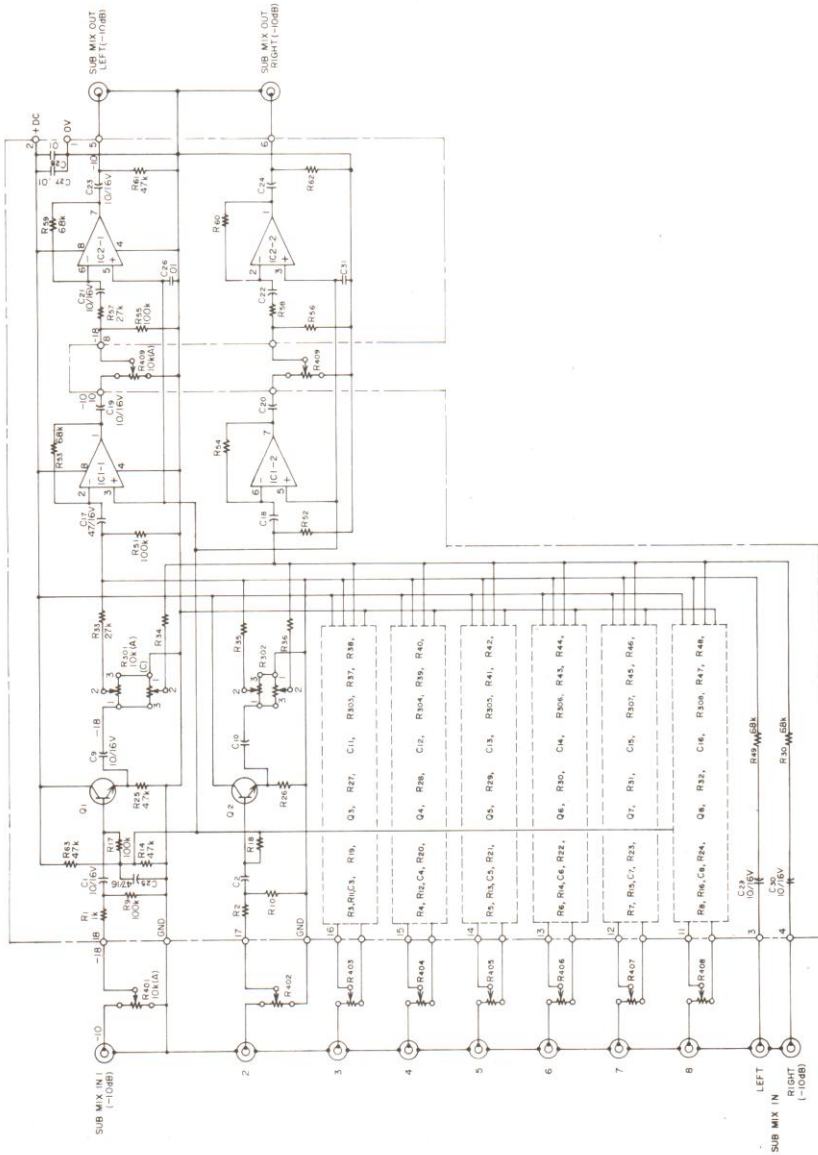
SCHEMATIC
Input amp. (Ch. 7, 8)
DWG. _____ REV. _____

9.4 Master/monitor/meter amplifier



SCHEMATIC
Master/monitor/meter amplifier
DWG. _____ REV. _____

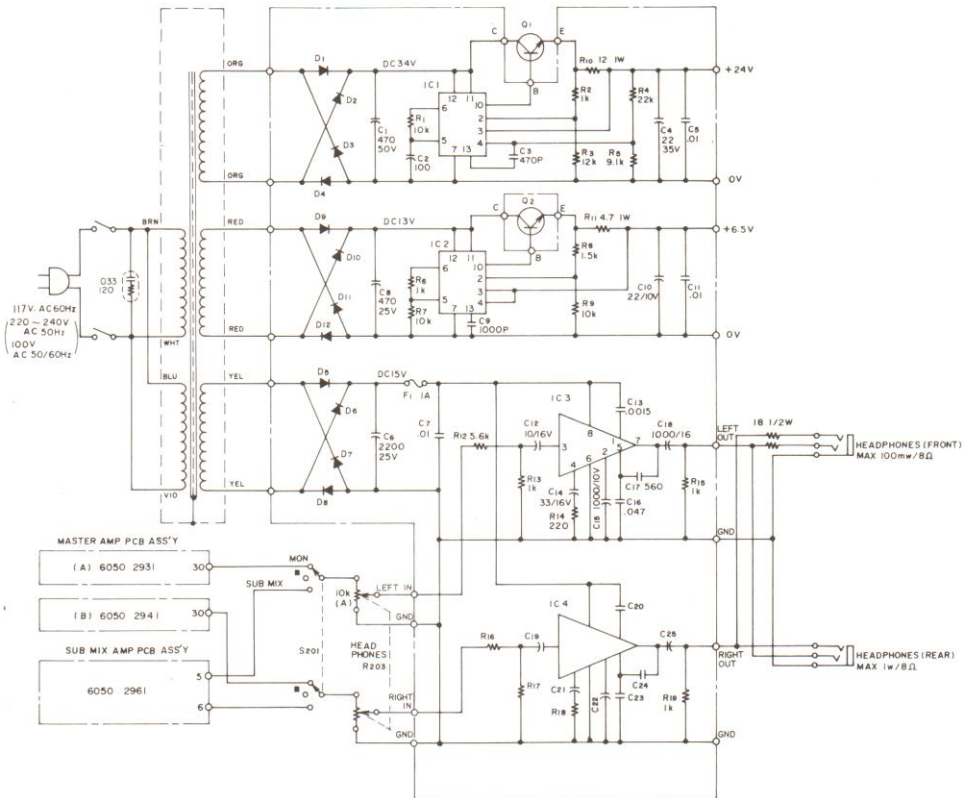
9.5 Submixing amplifier



SCHMATIC
Submixing amplifier
DWG. _____ REV. _____

9.6 Power supply unit

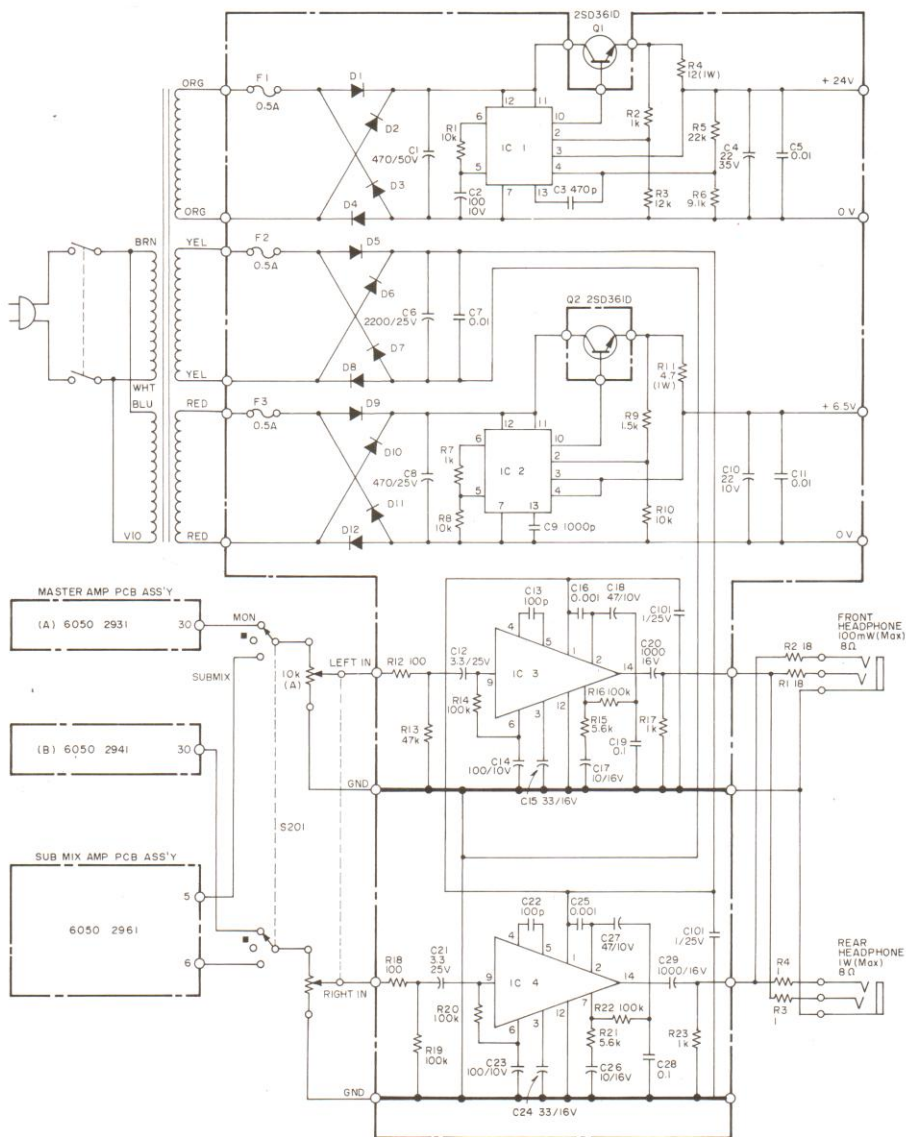
Note: This is only applicable to models up to serial number --4000. For models with serial numbers higher than --4000, refer to the inserted sheets on pp. 42 to 45.



SCHMATIC
Power supply unit
DWG. _____ REV. _____

9.6A Power supply unit

(Applicable from Serial No. --4001 and later)



SCHEMATIC
Power supply unit
DWG. _____ REV. _____

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