



YAMAHA

EM-150 Ensemble Mixer

SERVICE MANUAL

SPECIFICATIONS

Number of Inputs	6-input channels (each switchable for MIC, INST or LINE). 2-auxiliary stereo input (AUX and REC OUT). 1-auxiliary monaural input (FROM ECHO).
Input Channel Controls	VOLUME, BASS & TREBLE tone (± 12 dB of low and high frequency equalization), REVERB/ECHO, BALANCE (stereo pan), MIC/INST/LINE (Input Selector).
Mixing Buses	2-Program (stereo Left and Right), 1-Reverb/Echo.
Number of Outputs	2-SPEAKER, 2-MONITOR OUT, 2-RECORD OUT, 1-PHONES, 1-TO ECHO.
Master Controls	MASTER VOLUME, MONITOR VOLUME, MASTER REVERB/ECHO, AUX VOLUME, graphic equalizer ON/OFF (Left & Right).
Echo and Reverb	Built-in Accutronics spring-type reverberation unit; provisions for connection of external reverb, echo delay, or other effects devices.
Power Output	150-Watts RMS (2 X 75-W) amplifier. For 8-ohm speakers.
Graphic Equalizer	7-Band, for SPEAKER and PHONES outputs; 12dB of boost or cut at: 60Hz, 150Hz, 400Hz, 1kHz, 2.5kHz, 5kHz & 10kHz.
Level Indicators	2-illuminated VU meters; 0 VU=37.5 Watts (8-ohm termination).
Amplifier Type	All solid state, discrete and integrated circuit.
Power Requirements	110, 117, 130, 220 or 240 VAC, 50/60Hz.
Physical Dimensions	Width 24 $\frac{1}{4}$ " (61.5cm) X Height 7 $\frac{1}{4}$ " (18.2cm) X Depth 16 $\frac{1}{2}$ " (41.0cm), Weight 39.7lbs. (18kg).
Finish	Black, with protective aluminum trim.
Additional Features	Integral carrying strap, rubber feet, 2-way power switch to minimize hum, power ON indicators in VU meters, color-coded control knobs.

Connector, Level & Impedance Information

Circuit	Type Connector*	Nominal Level	Impedance
Inputs:			
LINE	standard phone (x6)	-27dBm(35mV)	50 kohms
INST	(same jack)	-33dBm(17mV)	50 kohms
MIC	(same jack)	-52dBm(2mV)	10 kohms
AUX	pin jack (x2)	-21dBm(69mV)	50 kohms
FROM ECHO	standard phone (x2)	-31dBm(22mV)	50 kohms
Outputs:			
SPEAKER	standard phone (x2)	75-Watts RMS	8 ohms
MONITOR OUT	standard phone (x2)	+4dBm (1.23V)	5 kohms
TO ECHO	standard phone	-20dBm(78mV)	50 kohms
RECORD OUT	pin jack (x2)	-22dBm(62mV)	50 kohms
PHONES	stereo phone	(varies w/SPEAKER)	8 ohms

**All connections are unbalanced.*

TOP CASE REMOVAL

1. Set the unit up on its side and remove the 6 wood screws, as shown in Figure 1.
2. Reset the unit in its normal position and lift up the top case, as shown in Figure 2.

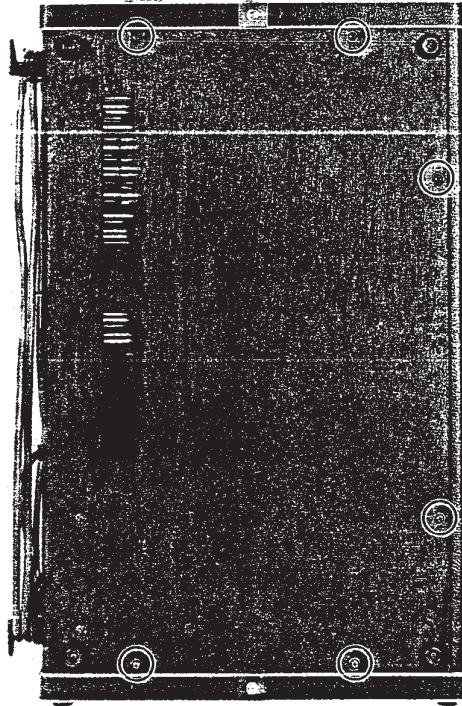


Figure 1

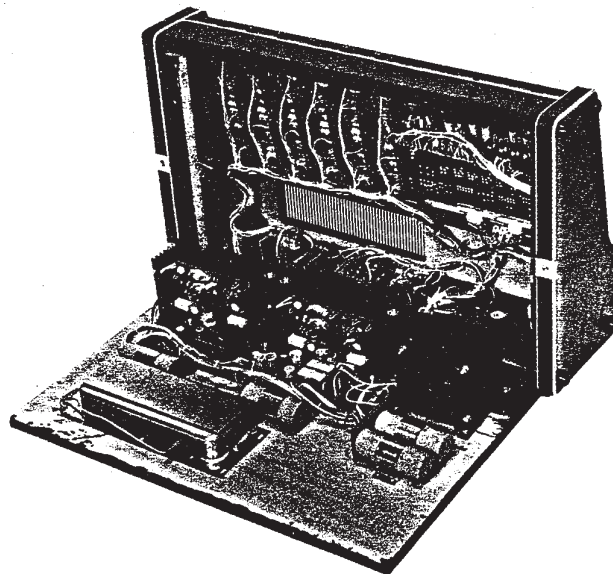


Figure 2

3. Feed a $-60\text{dBm}/1\text{kHz}$ signal through the input jack for that channel.
4. The output level at each channel should be within the limits indicated in Table 2.

Input Selector	Output Level (in dBm)
MIC	$+21.5 \pm 3$
INST	$+2.5 \pm 3$
LINE	-3.5 ± 3

Table 2.

Distortion (THD)

5. With all other settings as shown in Table 1, set the Volume control for the channel to be measured to maximum, all other channels to minimum.
6. Feed a 1kHz signal through the input jack. Set the input level so that the output level at the Speaker jack is $+27\text{dBm}$ (37.5 W).
7. The distortion factor should be less than 1% on each channel (L, R).
8. At an output of $+30\text{dBm}$ (75 W) distortion factor should be less than 3% .

Frequency Response

9. Feed -60dBm signals from 20kHz down to 20Hz observing the output on a level meter.
10. The indicated response should be within $\pm 3\text{dB}$ of the specified response curves.

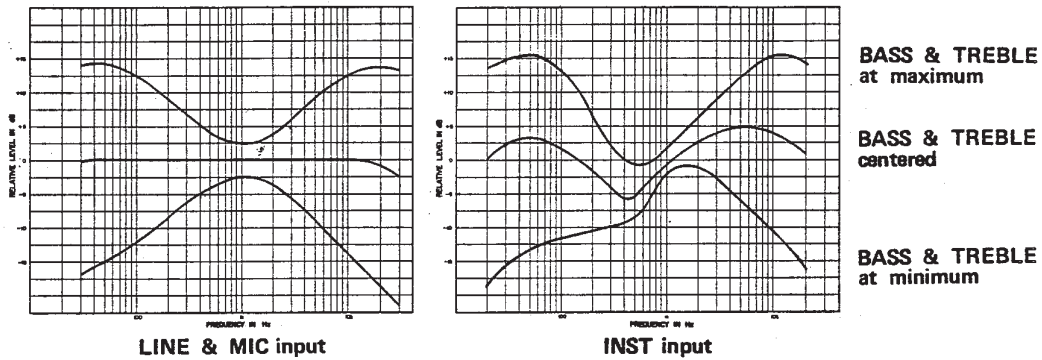


Figure 5 Frequency Response Curves

Treble Control

11. Feed a 10kHz signal through the input jack.
12. When the Treble knob is turned from maximum to minimum, variation must be $26 \pm 3\text{ dB}$.

Bass Control

13. Feed a 100Hz signal through the input jack.
14. When the Bass knob is turned from maximum to minimum, variation must be $24 \pm 3\text{ dB}$.

Graphic Equalizer

15. Set the Equalizer switch to ON.
16. Feed a -65dBm signal through the input jack.
17. Slide that frequency level control from maximum to minimum. The variation should be within the limits indicated in Table 3.

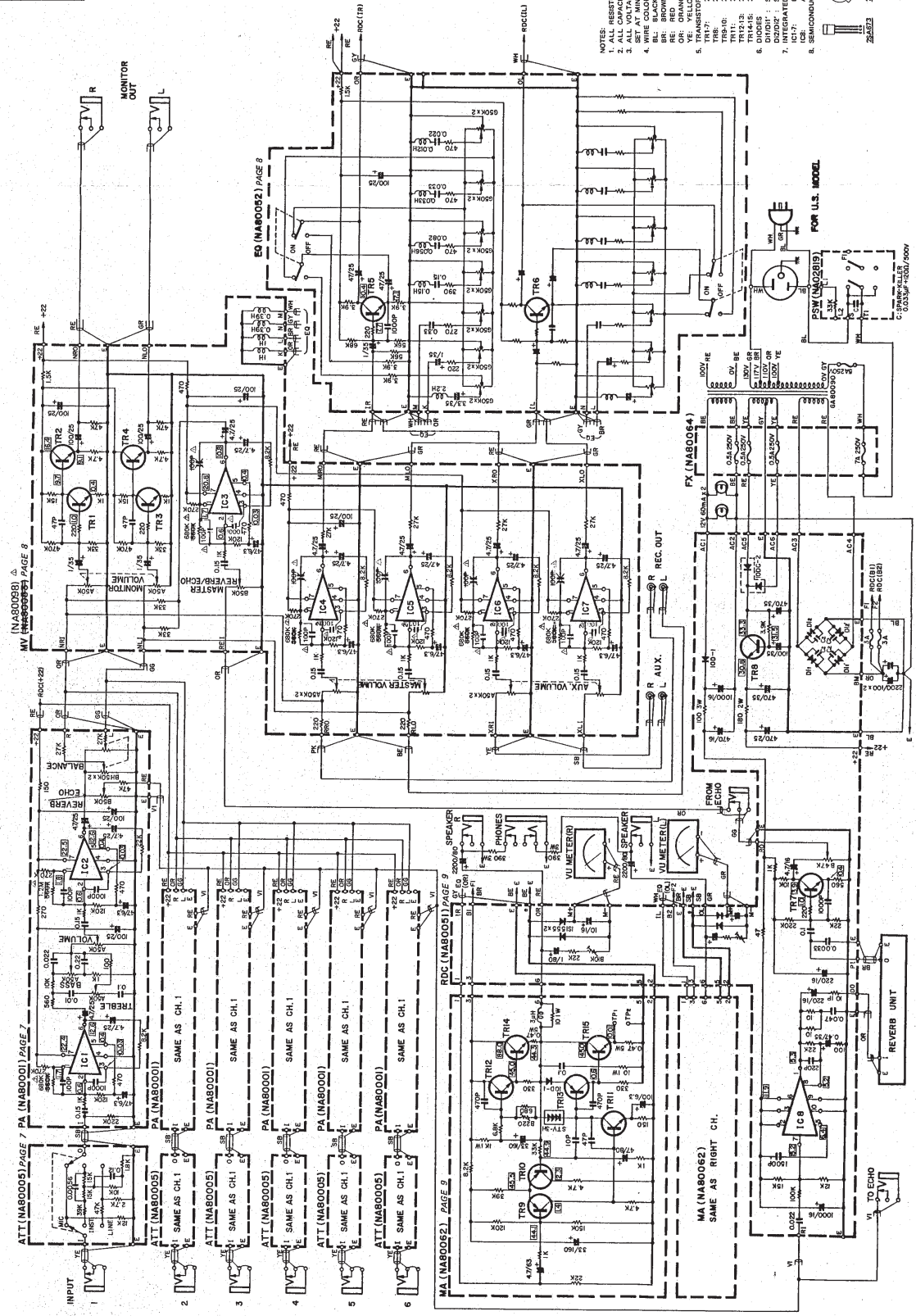
Level Controls Settings	60Hz	150Hz	400Hz	1kHz	2.5kHz	5kHz	10kHz
Max. (+12)	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$
Min. (-12)	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3

Table 3

Noise Level

18. Set the Input Selector switch to MIC.
19. At no input condition noise level should be below -25dBm . During this check, make sure the power switch is set to the On position which provides the lower hum level.

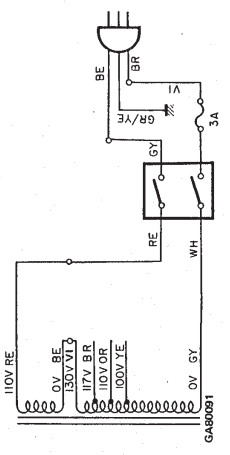
REVISIONS			
REF	DATE	UNITS AFFECTED	
△	9/20/75	S/# 2881 ~ up	
△	12/24/75	S/# 3061 ~ up	
△	4/26/76	S/# 5066 ~ up	



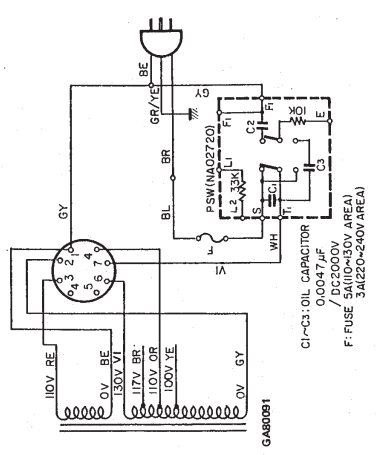
- NOTES:
1. ALL RESISTORS IN OHMS 3/4 WATT UNLESS OTHERWISE NOTED.
 2. ALL VOLTAGES MEASURED WITH A VTVM WITH ALL CONTROLS SET AT MINIMUM.
 3. ALL VOLTAGES MEASURED WITH A VTVM WITH ALL CONTROLS SET AT MINIMUM.
 4. SET AT MINIMUM.
 5. RESISTOR COLOR ABERRATIONS:
 - GG: LIGHT GREEN
 - GR: GREEN
 - BL: BLACK
 - BR: BROWN
 - OR: ORANGE
 - YE: YELLOW
 - TR: TRANSPARENT
 - WH: WHITE
 - TP: TIN PLATED
 6. DIODES:
 - TRR: 28C85
 - TRR1: 28C85
 - TRR2: 28C85
 - TRR3: 28C85
 - TRR4: 28C85
 - TRR5: 28C85
 - TRR6: 28C85
 - TRR7: 28C85
 - TRR8: 28C85
 - TRR9: 28C85
 - TRR10: 28C85
 - TRR11: 28C85
 - TRR12: 28C85
 - TRR13: 28C85
 - TRR14: 28C85
 - TRR15: 28C85
 - TRR16: 28C85
 - TRR17: 28C85
 - TRR18: 28C85
 - TRR19: 28C85
 - TRR20: 28C85
 - TRR21: 28C85
 - TRR22: 28C85
 - TRR23: 28C85
 - TRR24: 28C85
 - TRR25: 28C85
 - TRR26: 28C85
 - TRR27: 28C85
 - TRR28: 28C85
 - TRR29: 28C85
 - TRR30: 28C85
 - TRR31: 28C85
 - TRR32: 28C85
 - TRR33: 28C85
 - TRR34: 28C85
 - TRR35: 28C85
 - TRR36: 28C85
 - TRR37: 28C85
 - TRR38: 28C85
 - TRR39: 28C85
 - TRR40: 28C85
 - TRR41: 28C85
 - TRR42: 28C85
 - TRR43: 28C85
 - TRR44: 28C85
 - TRR45: 28C85
 - TRR46: 28C85
 - TRR47: 28C85
 - TRR48: 28C85
 - TRR49: 28C85
 - TRR50: 28C85
 - TRR51: 28C85
 - TRR52: 28C85
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 - TRR55: 28C85
 - TRR56: 28C85
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 - TRR58: 28C85
 - TRR59: 28C85
 - TRR60: 28C85
 - TRR61: 28C85
 - TRR62: 28C85
 - TRR63: 28C85
 - TRR64: 28C85
 - TRR65: 28C85
 - TRR66: 28C85
 - TRR67: 28C85
 - TRR68: 28C85
 - TRR69: 28C85
 - TRR70: 28C85
 - TRR71: 28C85
 - TRR72: 28C85
 - TRR73: 28C85
 - TRR74: 28C85
 - TRR75: 28C85
 - TRR76: 28C85
 - TRR77: 28C85
 - TRR78: 28C85
 - TRR79: 28C85
 - TRR80: 28C85
 - TRR81: 28C85
 - TRR82: 28C85
 - TRR83: 28C85
 - TRR84: 28C85
 - TRR85: 28C85
 - TRR86: 28C85
 - TRR87: 28C85
 - TRR88: 28C85
 - TRR89: 28C85
 - TRR90: 28C85
 - TRR91: 28C85
 - TRR92: 28C85
 - TRR93: 28C85
 - TRR94: 28C85
 - TRR95: 28C85
 - TRR96: 28C85
 - TRR97: 28C85
 - TRR98: 28C85
 - TRR99: 28C85
 - TRR100: 28C85
 7. INTEGRATED CIRCUITS:
 - IC1-7: 28C85
 - IC8-7: 28C85
 - IC9-7: 28C85
 - IC10-7: 28C85
 - IC11-7: 28C85
 - IC12-7: 28C85
 - IC13-7: 28C85
 - IC14-7: 28C85
 - IC15-7: 28C85
 - IC16-7: 28C85
 - IC17-7: 28C85
 - IC18-7: 28C85
 - IC19-7: 28C85
 - IC20-7: 28C85
 - IC21-7: 28C85
 - IC22-7: 28C85
 - IC23-7: 28C85
 - IC24-7: 28C85
 - IC25-7: 28C85
 - IC26-7: 28C85
 - IC27-7: 28C85
 - IC28-7: 28C85
 - IC29-7: 28C85
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 - IC31-7: 28C85
 - IC32-7: 28C85
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 - IC38-7: 28C85
 - IC39-7: 28C85
 - IC40-7: 28C85
 - IC41-7: 28C85
 - IC42-7: 28C85
 - IC43-7: 28C85
 - IC44-7: 28C85
 - IC45-7: 28C85
 - IC46-7: 28C85
 - IC47-7: 28C85
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 - IC61-7: 28C85
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 - IC65-7: 28C85
 - IC66-7: 28C85
 - IC67-7: 28C85
 - IC68-7: 28C85
 - IC69-7: 28C85
 - IC70-7: 28C85
 - IC71-7: 28C85
 - IC72-7: 28C85
 - IC73-7: 28C85
 - IC74-7: 28C85
 - IC75-7: 28C85
 - IC76-7: 28C85
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 - IC78-7: 28C85
 - IC79-7: 28C85
 - IC80-7: 28C85
 - IC81-7: 28C85
 - IC82-7: 28C85
 - IC83-7: 28C85
 - IC84-7: 28C85
 - IC85-7: 28C85
 - IC86-7: 28C85
 - IC87-7: 28C85
 - IC88-7: 28C85
 - IC89-7: 28C85
 - IC90-7: 28C85
 - IC91-7: 28C85
 - IC92-7: 28C85
 - IC93-7: 28C85
 - IC94-7: 28C85
 - IC95-7: 28C85
 - IC96-7: 28C85
 - IC97-7: 28C85
 - IC98-7: 28C85
 - IC99-7: 28C85
 - IC100-7: 28C85
 8. SEMICONDUCTOR LEAD IDENTIFICATION:
 - 28C85: 28C85
 - 28C86: 28C85
 - 28C87: 28C85
 - 28C88: 28C85
 - 28C89: 28C85
 - 28C90: 28C85
 - 28C91: 28C85
 - 28C92: 28C85
 - 28C93: 28C85
 - 28C94: 28C85
 - 28C95: 28C85
 - 28C96: 28C85
 - 28C97: 28C85
 - 28C98: 28C85
 - 28C99: 28C85
 - 28C100: 28C85

YAMAHA EM-150 ENSEMBLE MIXER SCHEMATIC DIAGRAM

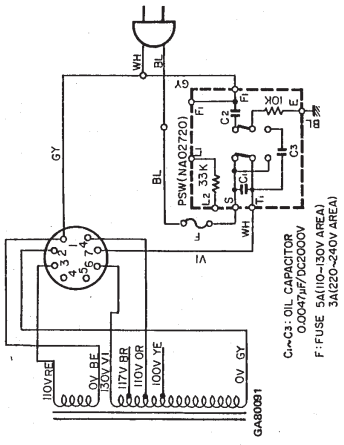
▼ FOR AUSTRALIAN MODEL



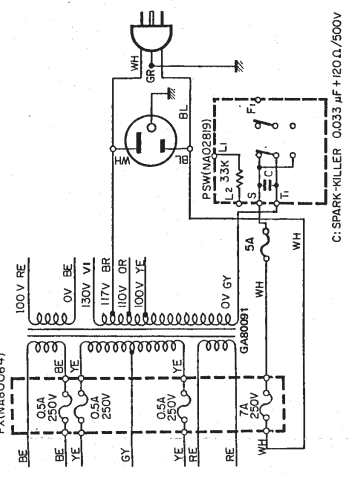
▼ FOR SOUTH AFRICAN MODEL



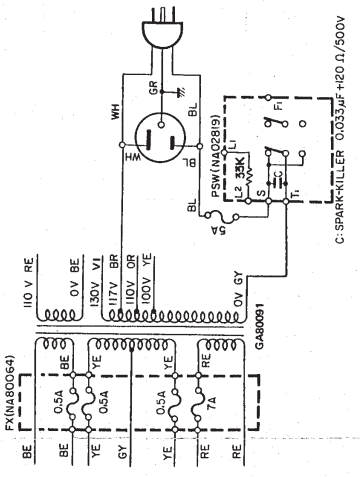
▼ FOR GENERAL MODEL



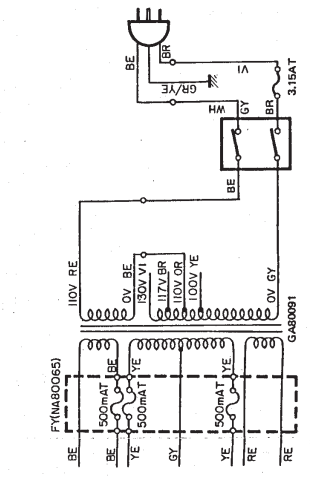
▼ FOR U.S. MODEL



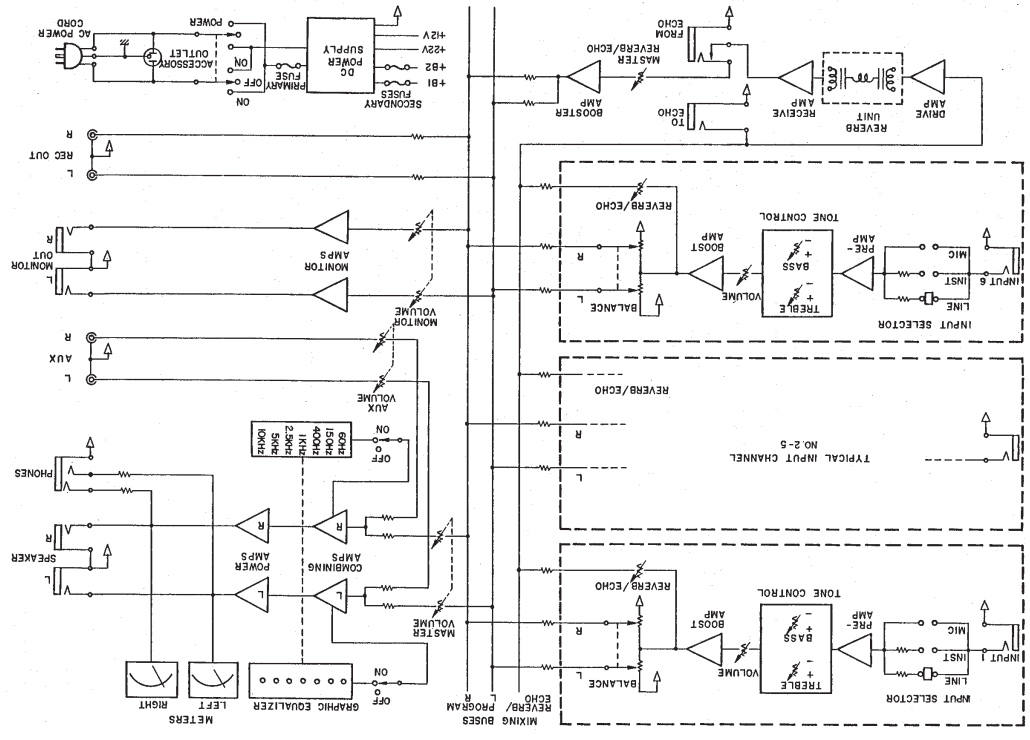
▼ FOR CANADIAN MODEL



▼ FOR EUROPEAN MODEL



POWER CIRCUIT ARRANGEMENTS



BLOCK DIAGRAM

