Operation Instruction Manual

TOA 500 SERIES MIXER POWER AMPLIFIER

A-503A
A-506A
A-512A

Features

1. **High quality design and construction.**
2. **Full frequency response: 50 - 15,000Hz, ±3dB.**
3. **Low distortion and noise level.**
4. **4 microphone inputs, 3 auxiliary inputs and a mag. phono input.**
5. **Isolated-transformer outputs complete with 4 ohms, 25V and 70V.**
6. **AC/DC operation: 120V AC and 24V DC**
7. **Individual bass and treble tone controls.**
8. **Signal processing input/output.**
9. **Self-protection circuitry design.**
10. **Muting function.**
11. **Remote volume control circuit.**

General Description

The TOA 500 series Mixer Power Amplifiers A-512A, A-506A and A-503A are designed for PA system applications such as paging, announcements, intercommunications, background music and broadcasting in industrial plants, offices, schools, churches, department stores, shopping centers, night clubs, dining rooms, convention halls, auditoriums and recreation areas.

The Primary feature is their ability to withstand overload or short-circuits of output. Because of the TOA-engineered circuitry design, the TOA 500 -series amplifiers require no complicated protective circuit to withstand accidents and mismatched output connections that may occur during the installation or use of a PA system. This results in very high reliability.

The 500 series amplifiers come with 4 microphone inputs, 3 auxiliary inputs and a mag. phono input. Input 1 (Mic 1) and Input 2 (Mic 2) out of the 4 mic inputs are balanced inputs, while Input 3 (Mic 3) and Input 4 (Mic 4) are of unbalanced type. Input 3 and Input 4 can be changed to balanced type with the LI-51 microphone input module (optional). Two condenser microphone can be used with phantom power supplied from Input 1 and 2. And they have a remote volume control circuit on Input 2 as the volume can be adjusted at the microphone even when it is distant from the amplifier. The amplifiers are equipped with muting function.

They may be used in conjunction With a speaker rated at 4 ohms or with 25volt, 70volt constant-voltage speaker systems.

Three auxiliary inputs and a mag. phono input are provided with RCA pin jack. Preamp-Out and Power-Amp-In receptacles are provided for easy connection of a signal processor to the amplifier.

Emergency operation can be made by DC power source (24V DC) even in case of AC power failure.

TOA Corporation
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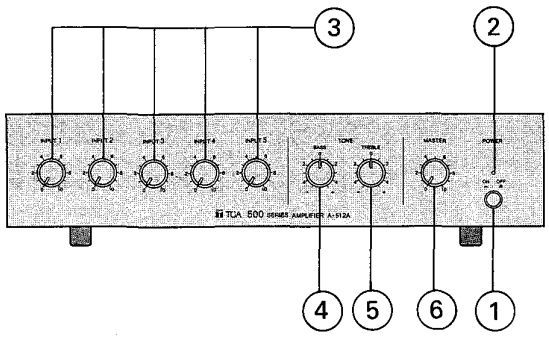
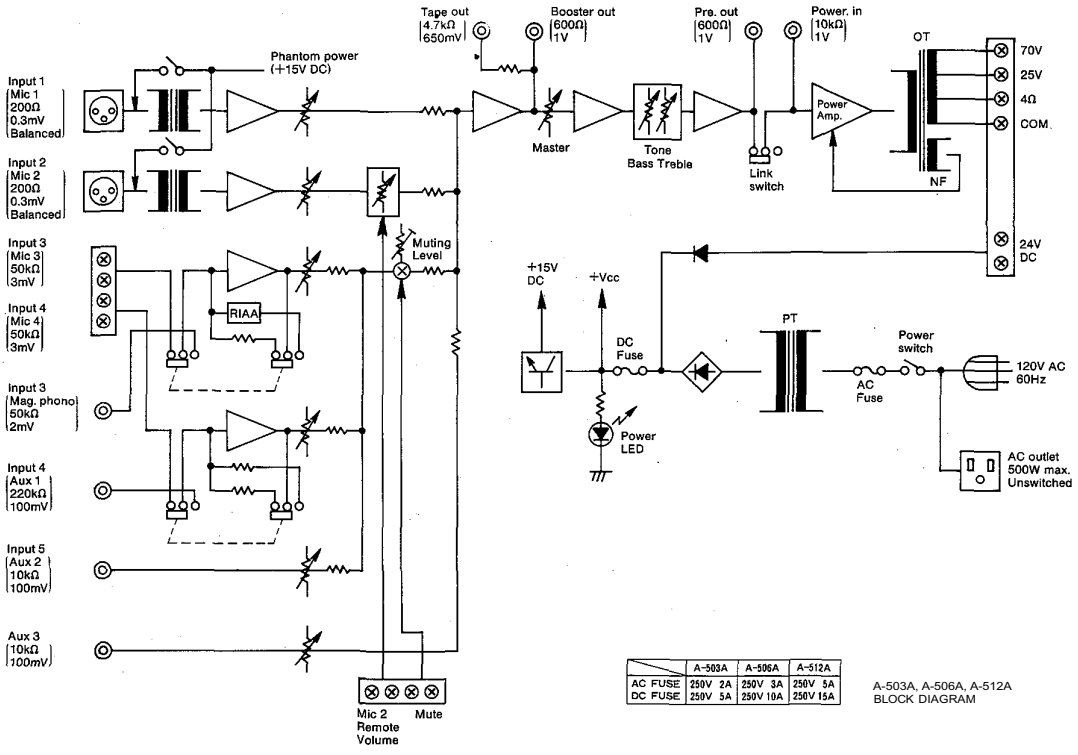
TOA 500 SERIES

Front Panel Controls and Features



No.	Name	Function/Description
1	Power on-off switch	Applies line power. Two position button switch for on-off modes.
2	Power indicator	Comes on when power is turned on.
3	Input 1 - 5 volume controls	Adjusts gain of Input 1-5 respectively.
4	Bass control	Adjusts bass response. Turn clockwise (CW) to boost and counterclockwise (CCW) to attenuate the bass response. Tone is flat at center.
5	Treble control	Adjusts treble response. Turn clockwise (CW) to boost and counterclockwise (CCW) to attenuate the treble response. Tone is flat at center.
6	Master volume control	Adjusts overall gain of unit.

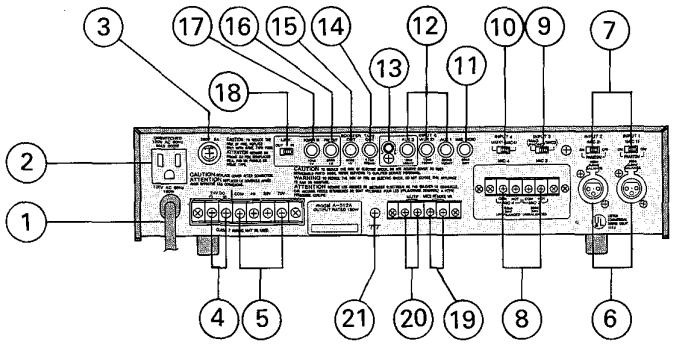
Block Diagram



	A-503A	A-506A	A-512A
AC FUSE	250V 2A	250V 3A	250V 5A
DC FUSE	250V 5A	250V 10A	250V 15A

A-503A, A-506A, A-512A
BLOCK DIAGRAM

Rear Panel Controls and Features



No.	Name	Function/Description
1	AC power supply cord	Connects to AC power supply.
2	AC outlet (unswitched)	Provides AC power for auxiliary equipment with power consumption of up to 500W.
3	AC fuse	Prevents excessive current flow.
4	24V DC terminals	Connect to DC power supply (24V).
5	Output terminals	Connect to speakers.
6	Input 1 (Mic 1), Input 2 (Mic 2) inputs	Connect to microphones of balanced 200 ohms with XLR connectors.
7	Pahntom power ON/OFF switch (Mic 1, Mic 2)	This switch is to be turned on when using the condenser microphone.
8	Input 3 (Mic 3), Input 4 (Mic 4) inputs	These screw terminal inputs connect to unbalanced 50k ohms microphone.
9	Input 3 (Mic 3/Mag. phono) select switch	Selects Mic 3 or Mag. phono input.
10	Input 4 (Mic 4/Aux 1) select switch	Selects Mic 4 or Aux 1 input.
11	Mag. phono input	Connects to the record player with MM type cartridge.
12	Aux 1 - 3 inputs	Connect aux inputs.
13	Aux 3 volume control	Adjusts gain of Aux 3.
14	Tape output	Provides connections for a tape recorder. The input impedance of the equipment should be more than 4.7k ohms.
15	Booster output	Provides connections for a booster amplifier. The input impedance of the equipment should be more than 600 ohms.
16	Preamp output	Connects to a signal processing equipment such as a limiter, equalizer etc. The input impedance of the equipment should be more than 600 ohms. In this case, Link switch should be set the "OUT" position.
17	Power amp input	When using this terminal, set Link switch to "OUT".
18	Link switch	Disconnects between preamplifier and power amplifier when this switch is set to "OUT", allowing the connection of other equipment.
19	Remote volume control terminals	Mic 2 volume can be adjusted by means of a 10k-ohms potentiometer connected to these terminals.
20	Mute terminals (adjustable muted level: 0 - 30dB)	Short-circuiting these terminals mutes input signals (inputs 3-5).
21	Earth terminal	Normally connects to record player's ground.

Installation

Do not block cover ventilation holes.
The amplifier should not be placed in areas;

1) with poor ventilation.
2) exposed to direct sunlight.
3) With high ambient temperature or adjacent to heat-generating equipment.
4) with high humidity or dust levels.
5) susceptible to vibration.

CAUTION
Do not remove the cover to prevents an electric shock.

Input Connections

A. Microphone

Four microphone inputs are provided. Two of them may be used with balanced low impedance (30 - 600 ohms) microphone, or with condenser microphone. The other may be used with an unbalanced high impedance (50k ohms) microphone. The microphone with the unbalanced connection cable of 30 - 70ft or balanced cable 70 - 230ft may be used depending on the microphone and its characteristic.

Mic 1 and Mic 2
1) for dynamic microphones — Low impedance (30 - 600 ohms) balanced microphone inputs are provided with a XLR connector.
2) for condenser microphones - Condenser microphones can be used with supplying DC 15V phantom power, while turning on the phantom power switch above the mic input connector.

Mic 3 and Mic 4 — High impedance (50k ohms) unbalanced type microphone inputs are provided with screw terminals.
Using Mic 3 input, the Input 3 select switch must be turned to Mic 3.
Using Mic 4 input, the Input 4 select switch must be turned to Mic 4.

B. Record player

Record player with MM (moving magnet type) cartridge may be connected to Mag. Phono input (2mV, 50k ohms).
Use single or double conductor shielded cable with a terminating RCA pin plug. It is recommended that a separate ground wire be connected between the record player base and the earth (⏚) screw terminal on the rear panel.

C. Radio tuner, cassette tape player and other BGM sources

A radio tuner, tape player, chime, mixer preamplifier, compact disk player or other high level signal sources may be connected to the AUX-1, AUX-2 or AUX-3 input.
Use single or double conductor shielded cable with a terminating RCA pin plug.

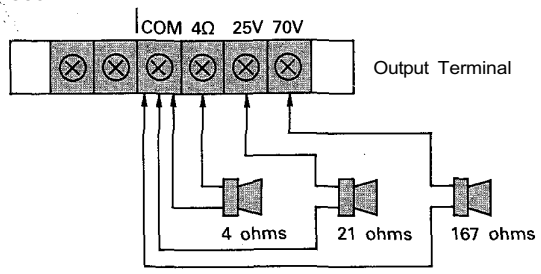
Output Connections

Speaker output

The speaker outputs of the amplifier are 4 ohms, 25V, and 70V. Connect the speakers cable to one of these outputs, after removing the screw terminal cover. Put the cover back on when finished the connection.
Class 2 wiring may be used.
Since these outputs consist of 4 ohms, 25V and 70V via the output transformer (matching transformer) the connecting method differs in each case.
See the following diagrams.

Note: Impedances indicated below imply total speaker system (load) impedances.

<A-503A>



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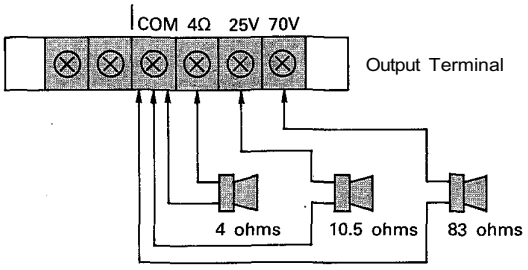
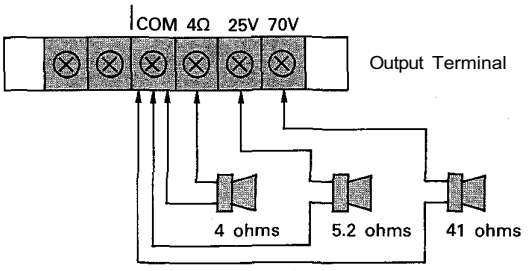


<A-512A>



CAUTION
When connecting speakers to any one of the outputs of 4 ohms, 25V or 70V.

Output Connections

Tape output
A tape recorder may be driven from the Tape output jack on the amplifier. In this case, the output is not subject to the volume or tone setting of the amplifier and is controlled at the tape recorder. A patch cable terminated in a. standard pin plug is connected between the Tape output jack on the amplifier and the input of the tape recorder.

Booster output
A booster amplifier may be driven from the Booster output jack on the amplifier. In this case, the output is not subject to the volume or tone setting of the amplifier and controlled at the booster amplifier. A patch cable terminated in a standard pin plug is connected between the Booster output jack on the amplifier and the input of the booster amplifier.

Link switch
Provision is made to insert signal processing equipment into the signal path, using the PREAMP OUT and POWER AMP IN.
Using signal processing equipments, LINK SWITCH must be turn-off.

Operation

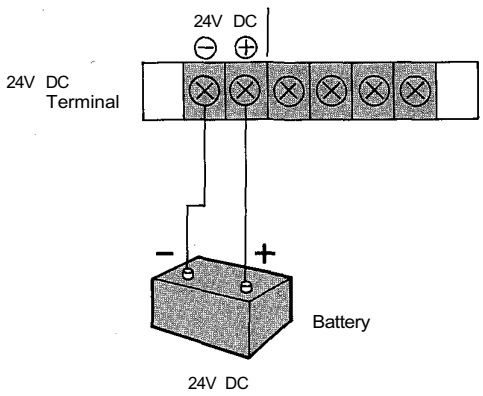
When all connections are completed, turn power switch on.
Then the power indicator is illuminated when the amplifier is on.

Adjustment of volume
Adjust the individual input and the master volume control to obtain appropriate output level.

Adjustment of tone quality
Each of the Bass and Treble control provides frequency-response characteristics of flat in center, boost in clockwise and attenuation in counterclockwise positions.

DC Power Operation

The unit will also operate from an external 24V battery or other direct current source with negative (-) as ground. Power connections are made at the DC terminal strip on the rear panel.
If AC power supply fails, transfer to DC power is instantaneous, automatic and silent.
The battery power supply is not operated by the primary power switch. If switching of battery power is desired, an external relay or switch should be installed by the qualified service personal.

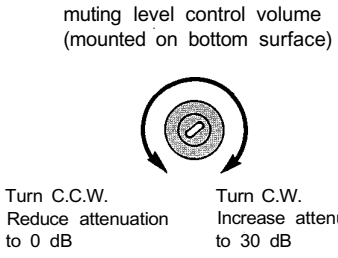


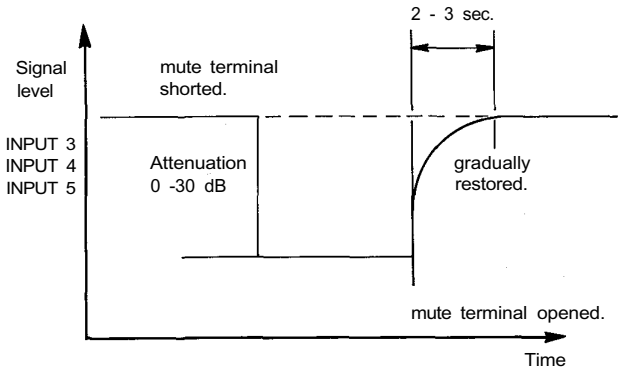
CAUTION
The unit should be used only with negative-grounded vehicle or frame when DC operation is required.
Do not use the unit with positive-grounded equipment of DC operation.

Connect the battery to DC terminal, after removing the screw terminal cover.
Put the cover back on when finished the connection.

Muting Function

Short-circuiting the mute terminal on the rear panel mutes Input 3, Input 4 and Input 5, allowing Input 1, Input 2 and Aux 3 to override the muted inputs.
The signal attenuation amount is pre-adjusted to 30dB at the factory and can be adjusted to 0 to 30 dB by means of muting level control. Adjusting the muting level is with the muting level control volume on bottom chassis as follows.

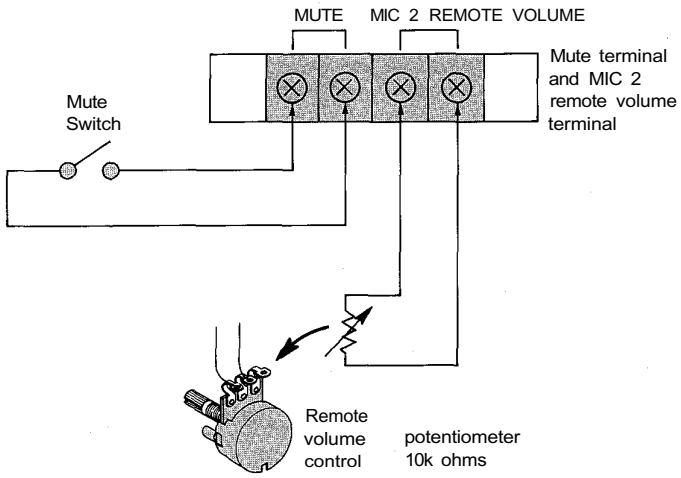




Remote Volume Control

Mic 2 input provides the remote volume control, the circuit is activated with a potentiometer 10k ohms connected to the remote volume control terminal.

CONNECTIONS



CAUTION
Use the potentiometer of 10k ohms.
Make wiring lest the interference from external noise should occur.

Servicing

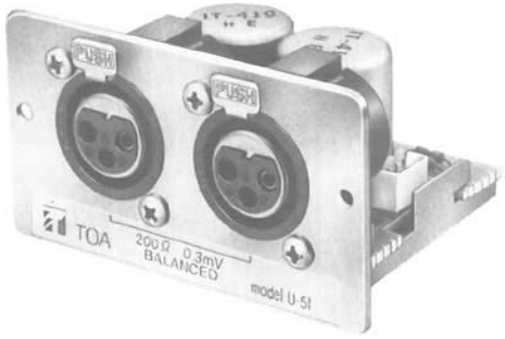
Unpacking
Upon receipt of the amplifier shipment, please inspect for any damage incurred in transit. If damage is found, please notify local TOA representative and the transportation company immediately.
State date, nature of damage, whether any damage was noticed on the shipping container, prior to unpacking. Please give waybill number of shipping order.

Failuer
Should amplifier fail, contact your nearest TOA authorized contractor or service center.

Optional Mic Input Module U-51

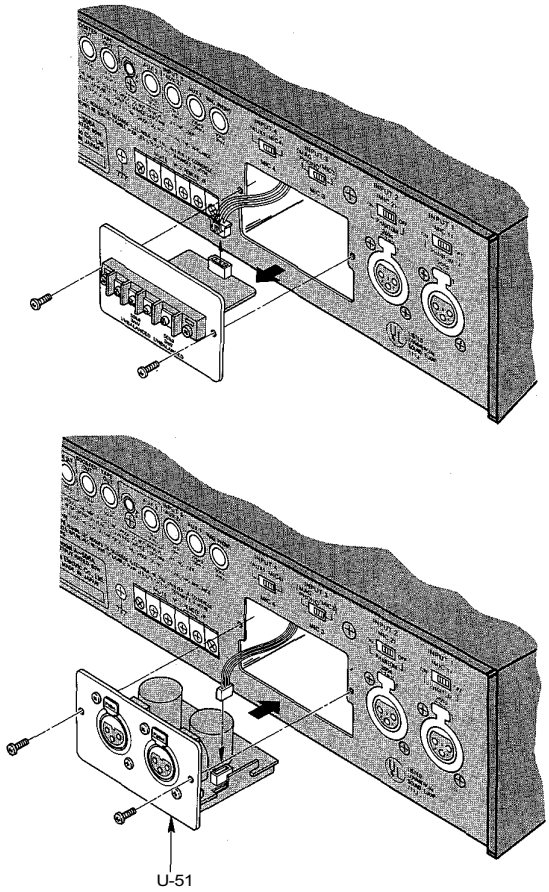
Mic 3 and 4 are provided in one plug-in module. It can be replaced to the optional mic input module "U-51".
If setting the U-51, XLR connectors may be provided with balanced low impedance (30 - 600 ohms) from standard screw type terminals with unbalanced high impedance (50k ohms).

OPTIONAL MIC INPUT MODULE "U-51"



**** Replacing of mic input 3 and 4 ****

1) Be sure to unplug the power cable from the wall AC outlet.
2) Unscrew the Mic 3 and Mic 4 input module and pull towards you.
3) Unplug a connector fitted to the mic input module and connect it to the Mic input module "U-51"
4) Insert the U-51 and tighten two screws.



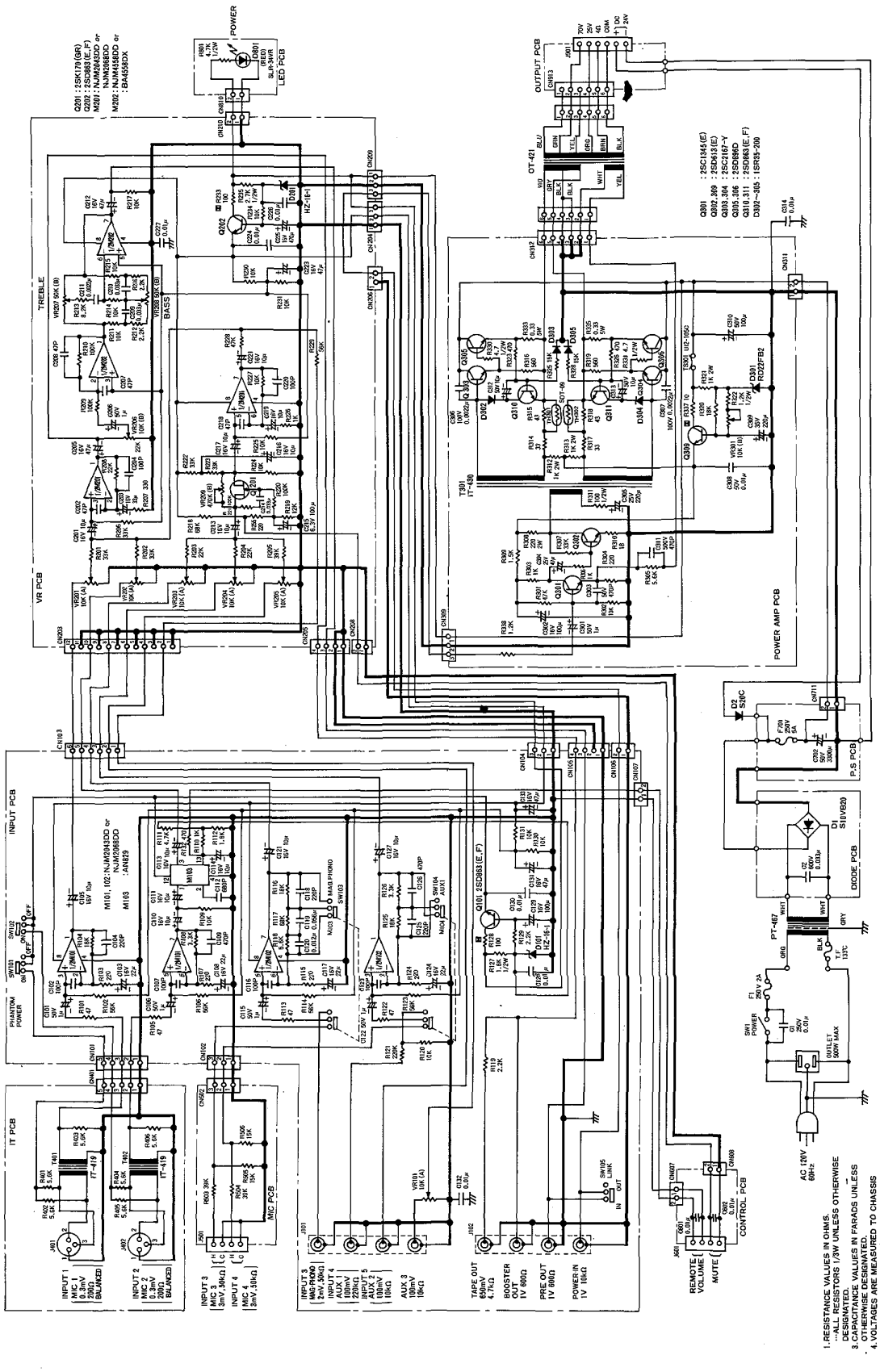
Specifications

Type	Mixer Power Amplifier		
Model	A-503A	A-506A	A-512A
Power output	Rated : 30 watts	Rated : 60 watts	Rated : 120 watts
Output regulation	Less than 2 dB, no load to full load		
Outputs	Speaker outputs : Balanced 4 ohms, 25 V and 70 V Tape output : 4.7k ohms 650 mV Booster output : 600 ohms 1 V Preamp output : 600 ohms 1 V		
Inputs	INPUT 1 : 200 ohms, 0.3 mV (MIC 1) INPUT 2 : 200 ohms, 0.3 mV (MIC 2) INPUT 3 : 50k ohms, 3 mV (MIC 3)/50k ohms, 2 mV (MAG. PHONO) INPUT 4 : 50k ohms, 3 mV (MIC 4)/220k ohms, 100 mV (AUX 1) INPUT 5 : 10k ohms, 100 mV (AUX 2) AUX 3 : 10k ohms, 100 mV Power amp input : 10k ohms, 1 V		
Frequency response	50 - 15,000 Hz ±3 dB		
Total harmonic distortion	Less than 2% at 1 kHz, rated power		
Signal to Noise Ratio (Tone controls centered)	All volume controls c.c.w. : 80 dB below rated power Microphone (MIC 1, MIC 2) : 60 dB below rated power (200 ohms terminated) AUX (AUX 2, AUX 3) : 70 dB below rated power Mag. phono : 60 dB below rated power		
Tone controls	Bass : ±10 dB at 100 Hz Treble : ±10 dB at 10 kHz		
Controls	INPUT 1 volume control INPUT 2 volume control INPUT 3 volume control INPUT 4 volume control INPUT 5 volume control AUX 3 volume control TONE controls (BASS, TREBLE) MASTER volume control Muting level control		
Indicator	Power indicator (LED)		
Power supply	120V AC 60 Hz and 24V DC		
AC power consumption	60 watts	100 watts	180 watts
DC power consumption	2.1 A at rated power	4.2 A at rated power	7.5 A at rated power
Other features	Muting function Phantom power : 15V DC (MIC 1, MIC 2) Remote volume control (MIC 2)		
Dimensions	88.5mm (high) x 420mm (wide) x 280mm (depth) (3.48" x 16.54" x 11.02")		
Weight	7.1 kg	8.1 kg	10.4 kg
Color	Black		

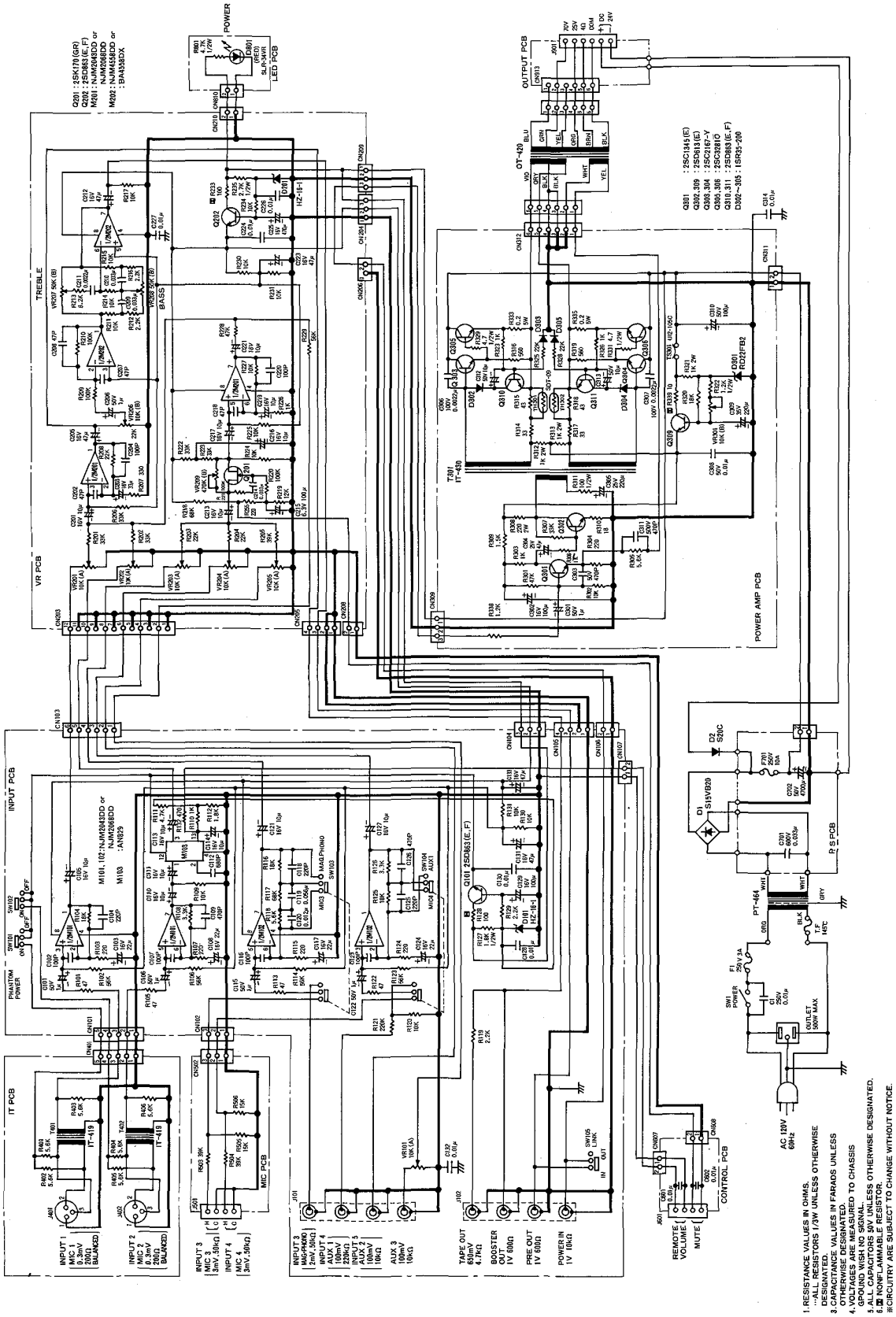
* Specifications are subject to change without notice.

TOA Corporation
KOBE, JAPAN

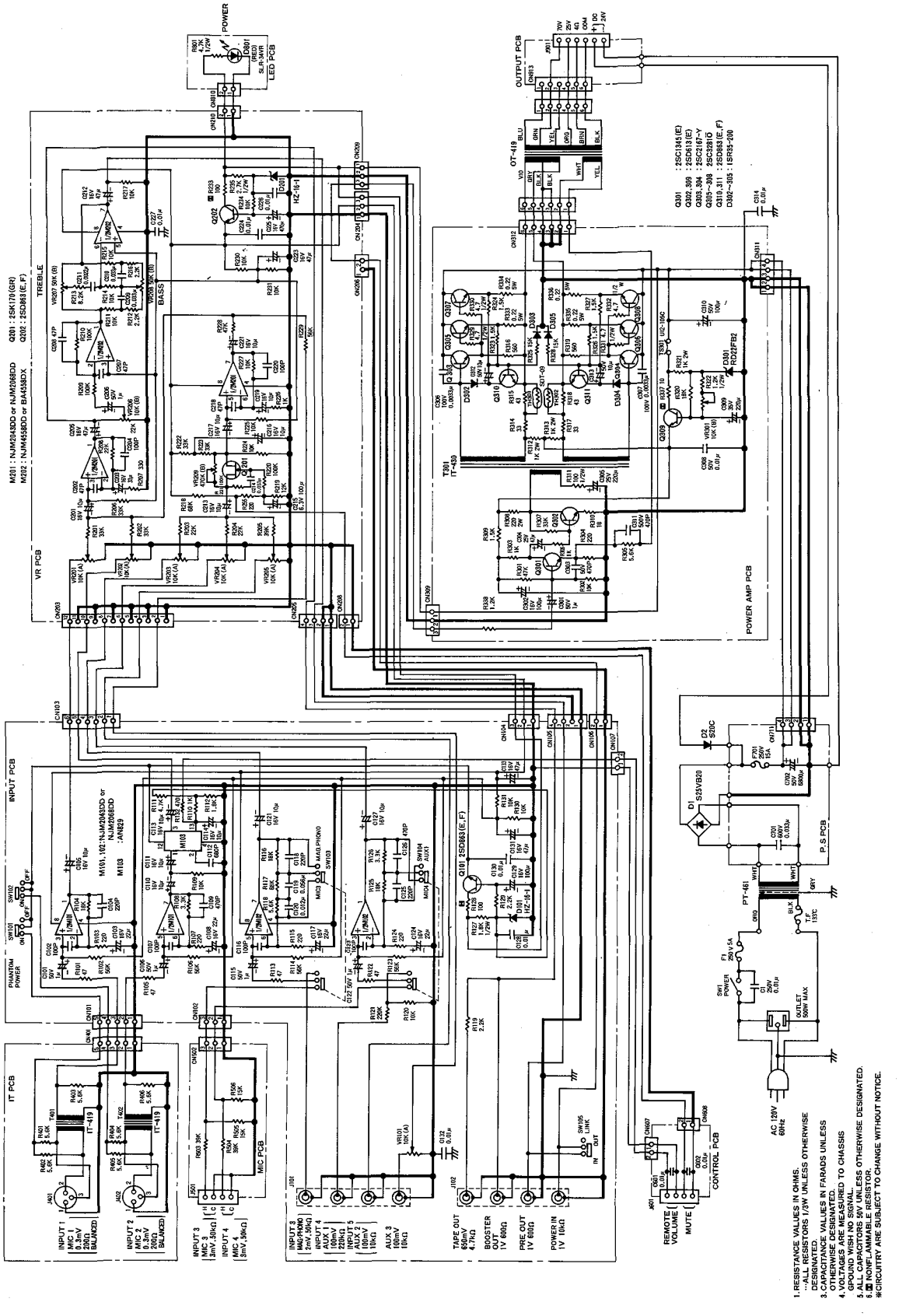
Schematic A-503A



Schematic A-506A



Schematic A-512A



1. RESISTANCE VALUES IN OHMS.
   K=1,000 OHMS, M=1,000,000 OHMS
   ALL RESISTORS 1/3W UNLESS OTHERWISE DESIGNATED.
3. CAPACITANCE VALUES IN FARADS UNLESS OTHERWISE DESIGNATED.
4. VOLTAGES ARE MEASURED TO CHASSIS WITH DIGITAL VOLTMETER.
5. ALL CAPACITORS 50V UNLESS OTHERWISE DESIGNATED.
6. ▲ NONFLAMMABLE RESISTOR.
*CIRCUITRY ARE SUBJECT TO CHANGE WITHOUT NOTICE.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