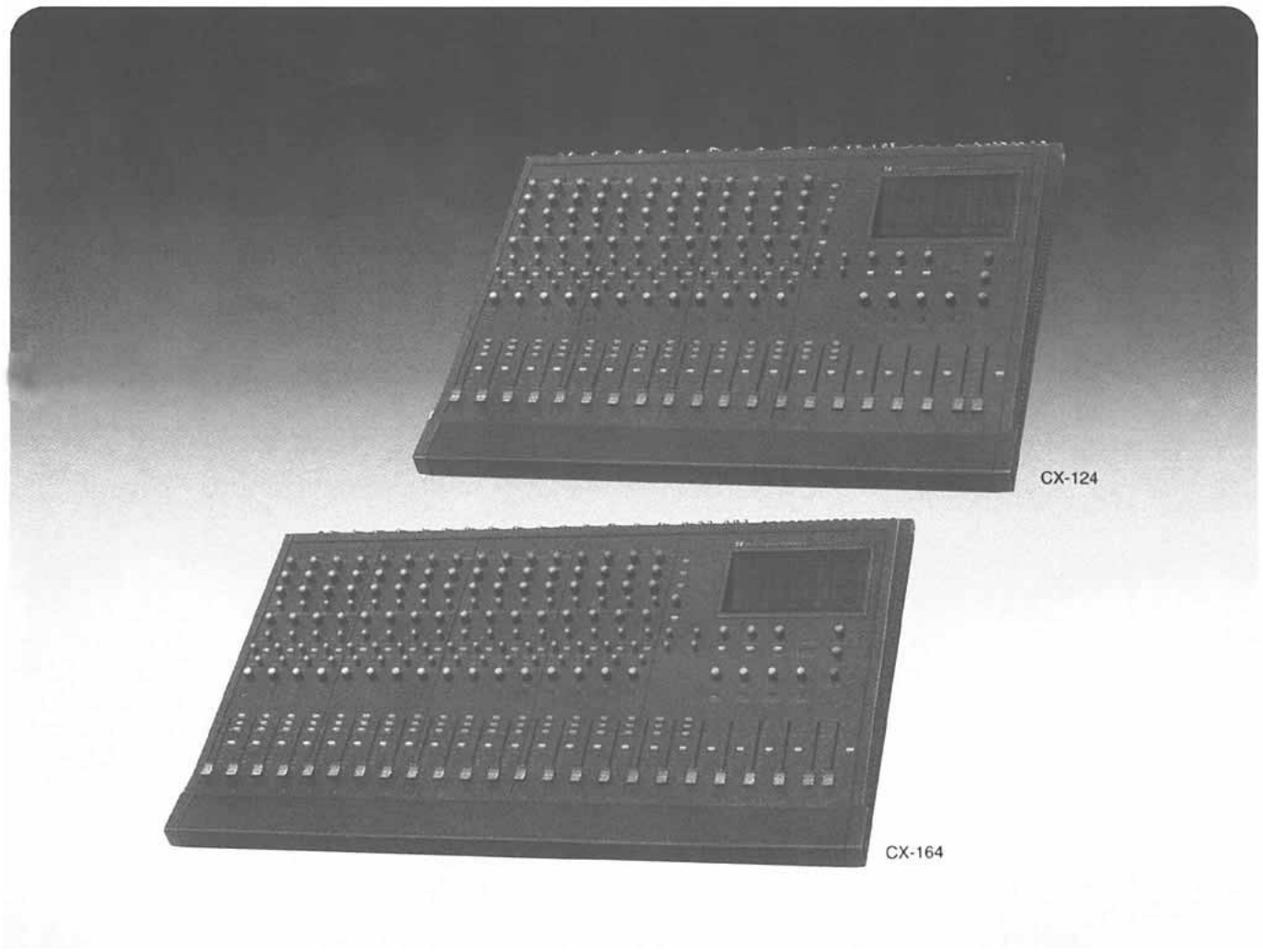
Operating Instructions

TOA **MIXING CONSOLE**

CX-124
CX-164



Please follow the instructions in this manual to obtain the optimum results from these units. We also recommend you to keep this manual handy for future reference.

TOA Corporation
KOBE, JAPAN

Contents

Precautions

- Power supply
  Use within AC mains ± 10% (50Hz/60Hz)
- Power switch
  The power switch should be ON after all connections have been completed.
  When the power switch is turned to ON/OFF, turn all of the output level controls to minimum position to prevent damage to speakers, etc.
- XLR type audio connectors are factory-wired as follows:
  Pin 1 ground (shield), pin 2 cold (low, minus) and pin 3 hot (high, plus).
- Where microphone cables connected to unit close to the cables of the lighting system, noise may arise from it. Do not close each cable. In such the case, use the 4-quad shielded microphone cables.
- Do not spill a liquid like water nor place inflammables or metal like hairpins inside unit. Their entry will result in an electric shock and equipment failure.
- Avoiding to install unit at following places:
  - exposing to direct sunlight
  - with high ambient temperature or adjacent to heat-generating equipment
  - exposing to high humidity or dust levels
  - susceptible vibration
  - close to equipment arising hum or noise.

General description

The TOA CX-124 is a mixing console with 12 input channels, 4 Group outputs, 1 Stereo output (L-R) and 1 Sum output, and the TOA CX-164 is a mixing console with 16 input channels, 4 Group outputs, 1 Stereo output (L-R) and 1 Sum output. These mixing consoles are designed for use in professional sound reinforcement systems such as various concerts, recordings in the studio, etc., and provide the versatility necessary to meet a wide range of requirements. The high performance and modular construction assures reliability, easy maintenance, and service-ability.

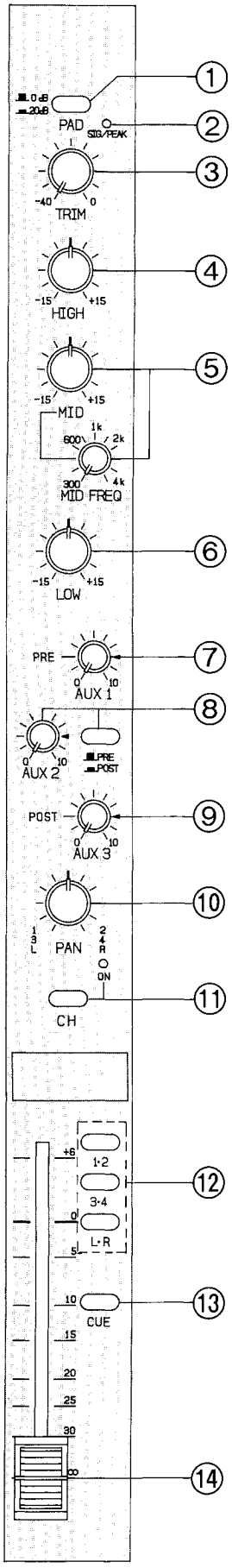
Features

1. 2-channel Stereo input is provided in addition to the channel input, and can be connected to a stereo playback deck and other auxiliary equipment without reducing the channel inputs.

2. An input transformer can be assembled optionally.

3. Pan pot control on each input channel directly assigns the fader output signal of the channel to Stereo L and R, which is used as either six Group out busses or four Group out busses + Stereo L and R busses.

Panel facilities (Front panel)



[Channel input section]

① **Pad Switch [PAD]**
Pad switch inserts a –20 dB pad ahead of the head amplifier. Adjust the PAD switch, depending on the output level of microphones or associated equipment.

② **Signal/Peak LED Indicator [SIG/PEAK]**
The dual color LED indicator lights green when the pre-EQ signal level reaches 20 dB before from nominal level, and turns red when the signal level reaches 6 dB below clipping, giving a visual reference for optimum setting of the trim control.

③ **Input Trim Control [TRIM]**
The Trim control adjusts the gain of the preamplifier stage of the associated channel, providing 40 dB of gain control. The Trim control and Pad switch of each channel should be properly adjusted so that the peak LED is just being to turn red from green or only flash red occasionally. This will ensure lowest distortion level and optimum signal to noise ratio.

④ **High Equalizer Control [HIGH]**
The High EQ control alters the high frequency response of the input channel, providing ±15 dB at continuously variable active shelving equalization. The "0" detent position provides flat audio response.

⑤ **Mid Equalizer Control [MID]/Mid Equalizer Center Frequency Control [MID FREQ]**
The Mid EQ frequency control alters the center frequency of the Mid EQ control in the range from 300 Hz to 4 kHz.
The Mid EQ control alters the mid frequency response of the input channel, providing ±15 dB at the center frequency of peaking equalization. The "0" detent position provides flat audio response.

⑥ **Low Equalizer Control [LOW]**
The Low EQ control provides ±15 dB at continuously variable active shelving equalization. The "0" detent position provides flat audio response.

⑦ **Aux 1 Control [AUX 1]**
This control determines the level of the pre-EQ and pre-fader input signal to be fed to the Aux 1 buss. The "◀" position provides nominal level.

⑧ **Aux 2 Control [AUX 2]/Pre-fader, Post-fader Select Switch**
This control determines the level of the input signal to be fed to the Aux 2 buss. The Aux 2 control is associated with the pre-post EQ and fader selector switch, which permits its assign to be either pre or post EQ and fader.
The "◀" position provides nominal level.

⑨ **Aux 3 Control [AUX 3]**
This control determines the level of the post-fader input signal to be the Aux 3 buss. The "◀" position provides nominal level.

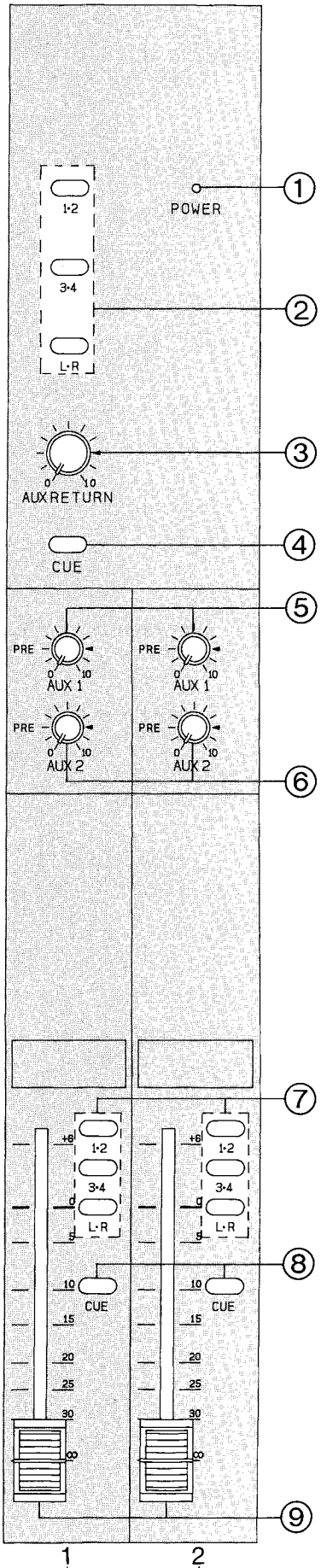
⑩ **Pan Pot [PAN]**
This control assigns the input signal of each input to the Group 1 and 2, or 3 and 4, or Stereo L and R busses selected by assign switch for localization of sound image.

⑪ **Channel Switch [CH]**
This switch connects or disconnects the input signal to the mixing busses. The LED indicator lights orange when the channel on/off switch is "on".

⑫ **Assign Switch [1·2, 3·4, L·R]**
This switch selects the buss the signal input to each channel is to be transmitted to. It is possible to place busses assigned by the Pan pot control. Setting all of the Group to Stereo switches on the output section to OFF turns the Stereo L and R busses into Group busses, increasing the number of Group busses to six.

⑬ **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-fader signal in each input channel through Headphones and Cue output. The switch is a "push-on push-off" type. When more than two switches are "on", the signals are combined.

⑭ **Channel Fader**
The fader provides continuously variable adjustment of the channel's output to the mixing busses. The nominal level is at the "0" position, with the fader retaining a 6 dB margin.



[Aux Return input/Stereo IN input section]

① **Power LED indicator [POWER]**
The green LED indicator lights when the power switch is set to "on" position.

② **Aux Return Assign Switch [1·2, 3·4, L·R]**
This switch selects the buss the signal input to Aux Return is to be transmitted to. The signal can be transmitted to the Group 1 and 2, or 3 and 4, or Stereo L and R busses.

③ **Aux Return Level Control [AUX RETURN]**
This control determines the amount of aux signal returned the Group or Stereo busses through the Aux return jack on the rear panel.
The "◀" position provides nominal level.

④ **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-Aux return control signal through Headphones and Cue output.

⑤ **Stereo Input Aux 1 Control [AUX 1]**
This control determines the level of the pre-fader stereo input signal to be fed to the Aux 1 buss.

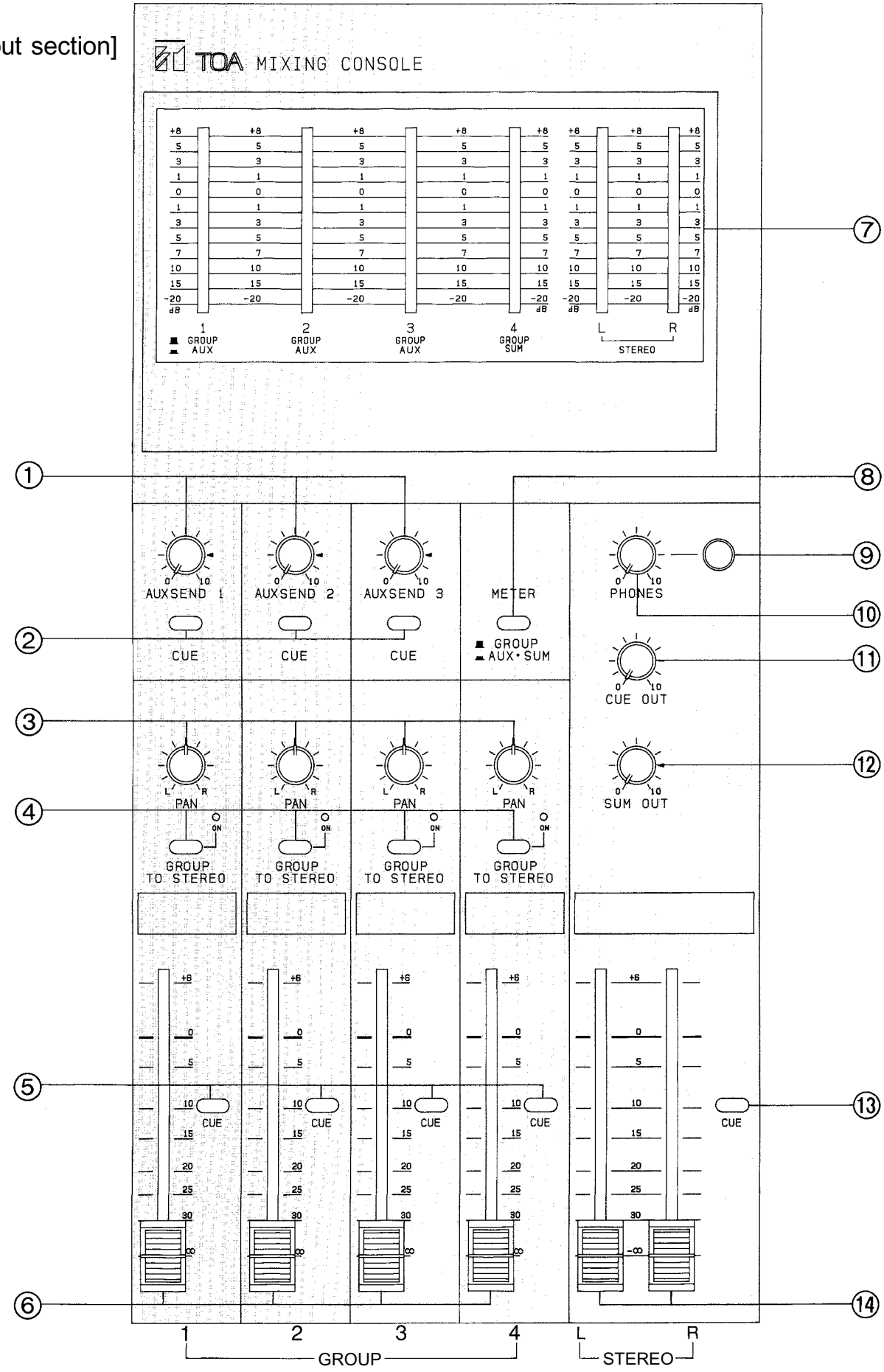
⑥ **Stereo Input Aux 2 Control [AUX 2]**
This control determines the level of the pre-fader stereo input signal to be fed to the Aux 2 buss.

⑦ **Stereo Input Assign Switch [1·2, 3 0·4, L·R]**
This switch selects the buss the signal input to Stereo in 1 and 2 is to be transmitted to. The signal can be transmitted to the Group 1 and 2, or 3 and 4, or Stereo L and R busses.

⑧ **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-Stereo input fader signal through Headphones and Cue output.

⑨ **Stereo Input Fader 1, 2**
The fader provides continuously variable adjustment of the stereo channel's output to the mixing busses. The nominal level is at the "0" position, with the fader retaining a *6* dB margin.

[Output section]



① **Aux Send Control [AUX SEND 1, 2, 3]**
This control is provided to adjust the overall signal level of the aux mix to the Aux Send outputs. The "◀" position provides nominal level.

② **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-Aux send control signal through Headphones and Cue output.

③ **Group Pan Pot [PAN]**
This control assigns the Group fader output signal of the each Group to the Stereo L, R mixing busses when "GROUP TO STEREO" switch is "on".
Setting all of the Group to Stereo switches on the output section of OFF turns the Stereo L and R busses into Group busses, increasing the number of Group busses to six.

④ **Group to Stereo Switch [GROUP TO STEREO]**
This switch connects or disconnects the group output signal to the stereo mixing busses. LED indicator lights orange when the Group to Stereo switch is "on".

⑤ **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-Group output fader signal through Headphones and Cue output.

⑥ **Group Output Fader**
The Group output fader provides continuously variable adjustment of the group's output signal to the Group output connector and Stereo L, R busses. The nominal level is at the "0" position, when the fader retaining a 6 dB margin.

⑦ **Output Meter**
The LED bargraph meter indicates the Group output 1, 2, 3, 4, Aux Send 1, 2, 3, Sum output or Stereo output L, R. The meter indicates 0 dB with +4 dB nominal output.

⑧ **Meter Select Switch [METER]**
The meter indicates the Group output 1, 2, 3, 4 when the meter select switch is set in the "release" position, and indicates the Aux 1, 2, 3 and Sum output when the meter select switch is set in the "push" position.

⑨ **Headphone Jack**
The Headphone jack will accept any stereo headphones with 8 ohms impedance or higher.

⑩ **Headphone Level Control [PHONES]**
The Headphone level control adjusts the corresponding cue signal fed to the Headphone output when the Cue switch is on. When two or more of the Cue switches are on, the control adjusts the corresponding combined cue signals.

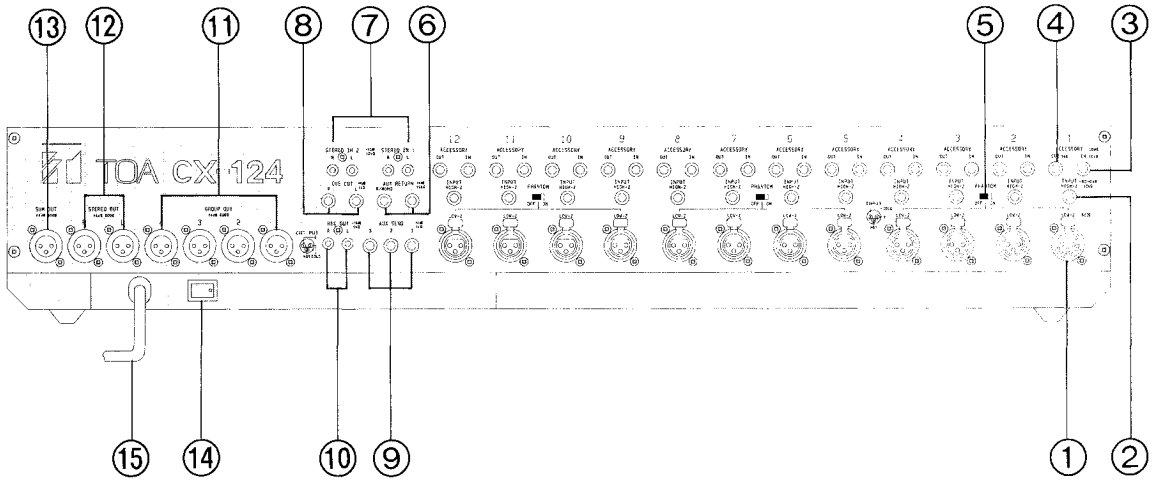
⑪ **Cue Output Control [CUE OUT]**
The Cue output control adjusts the corresponding combined cue signal fed to the Cue output jacks.

⑫ **Sum Output Control [SUM OUT]**
The Sum output control adjusts the corresponding combined post-Stereo output fader signal to the Sum output connector. The "◀" position provides nominal level.

⑬ **Cue Switch [CUE]**
The Cue switch is for monitoring the pre-Stereo output fader signal through Headphones and Cue output in stereo signal.

⑭ **Stereo Output Fader**
Fader provides continuously variable adjustment of the Stereo L-R output to the Stereo output connector. The nominal level is at the "0" position, when the fader retaining a 6 dB margin.

Panel facilities (Rear panel)



① **Channel Input Connector [LOW-Z]**
The XLR-type input connectors are electronically balanced with a nominal level of –60 dB and an impedance of 600 ohms, and will accept signals from –60 dB to 0 dB. Phantom powering is provided for use with condenser-type microphones (see PHANTOM), and once again the proper adjustment of Pad and Trim control [PAD/TRIM] and input fader will insure optimum signal to noise ratio and minimum distortion.
LOW-Z input connector is automatically disconnected when the corresponding HIGH-Z input jack is used.

② **Channel Input Jack [HIGH-Z]**
This standard 1/4" phone jack is balanced, with a nominal level of –60 dB and an impedance of 10k ohms, and will accept signal from –60 dB to 0 dB.

③ **Accessory Input Jack [ACCESSORY IN]**
This standard 1/4" phone jack is unbalanced, with a nominal level of –10 dB and an impedance of 10k ohms. The Accessory jacks allow signal processing and effect devices to be inserted into the signal path. The regular signal path is interrupted when a plug is inserted into the Accessory in jack.

④ **Accessory Output Jack [ACCESSORY OUT]**
This standard 1/4" phone jack is unbalanced, with a nominal level of –10 dB and an impedance of 1k ohms.

⑤ **Phantom Power Switch [PHANTOM]**
The Phantom power switch on each 4 channels permits the user to supply 24 V DC through the XLR-type channel input connectors to condenser microphones. If phantom power is not required, the switch must be in the "off" position.

⑥ **Aux Return Input Jack [AUX RETURN]**
These 1/4" phone jacks are unbalanced, and can be used in conjunction with the Aux send jack to connect an outboard effect device (ie., Delay or Reverb) to this mixing console. The Aux return jack should be connected to the output of the effect. Nominal input level is +4 dB with an impedance of 10k ohms.

Note: Connect to both "AUX RETURN L-R" when an outboard effect device has a Stereo output from two unbalanced 1/4" phone plugs. The outboard effect device's stereo Left and Right channels are then assigned to the Group 1 and 2, or Group 3 and 4, or Stereo L and R busses, respectively.
Connect to "AUX RETURN R/MONO" when the outboard effect device has a mono-output, the mono signal will automatically be assigned to both Group 1 and 2, or Group 3 and 4, or Stereo L and R busses.

⑦ **Stereo Input Jack [STEREO IN]**
These RCA pin jacks are unbalanced, with a nominal of –10 dB and an impedance of 10k ohms. The Stereo input jacks should be connected to an outboard stereo unit (ie., Tape deck, CD player).

⑧ **Cue Output Jack [CUE OUT]**
These 1/4" phone jacks are unbalanced, and provide the same signal as the Headphone output, and are used for monitoring the signals of the Cue busses through monitor speakers. This jack has a nominal output level of +4 dB and an impedance of 1k ohms.

⑨ **Aux Send Jack [AUX SEND]**
These 1/4" phone jacks can be used in conjunction with the Aux return jack to connect an outboard effects device (ie., Delay or Reverb) to this mixing console. The Aux send jack should be connected to the input of the effect. Nominal output level is +4 dB with an impedance of 1k ohms.

⑩ **Recording Output Jack [REC OUT]**
These RCA pin jacks are unbalanced, with a nominal output level of –10 dB and an impedance of 1k ohms. These jacks provide pre-Stereo fader signals for connection to tape recorders.

⑪ **Group Output Connector [GROUP OUT]**
The electronically balanced XLR connectors have a nominal output level of +4 dB and an impedance of 600 ohms.

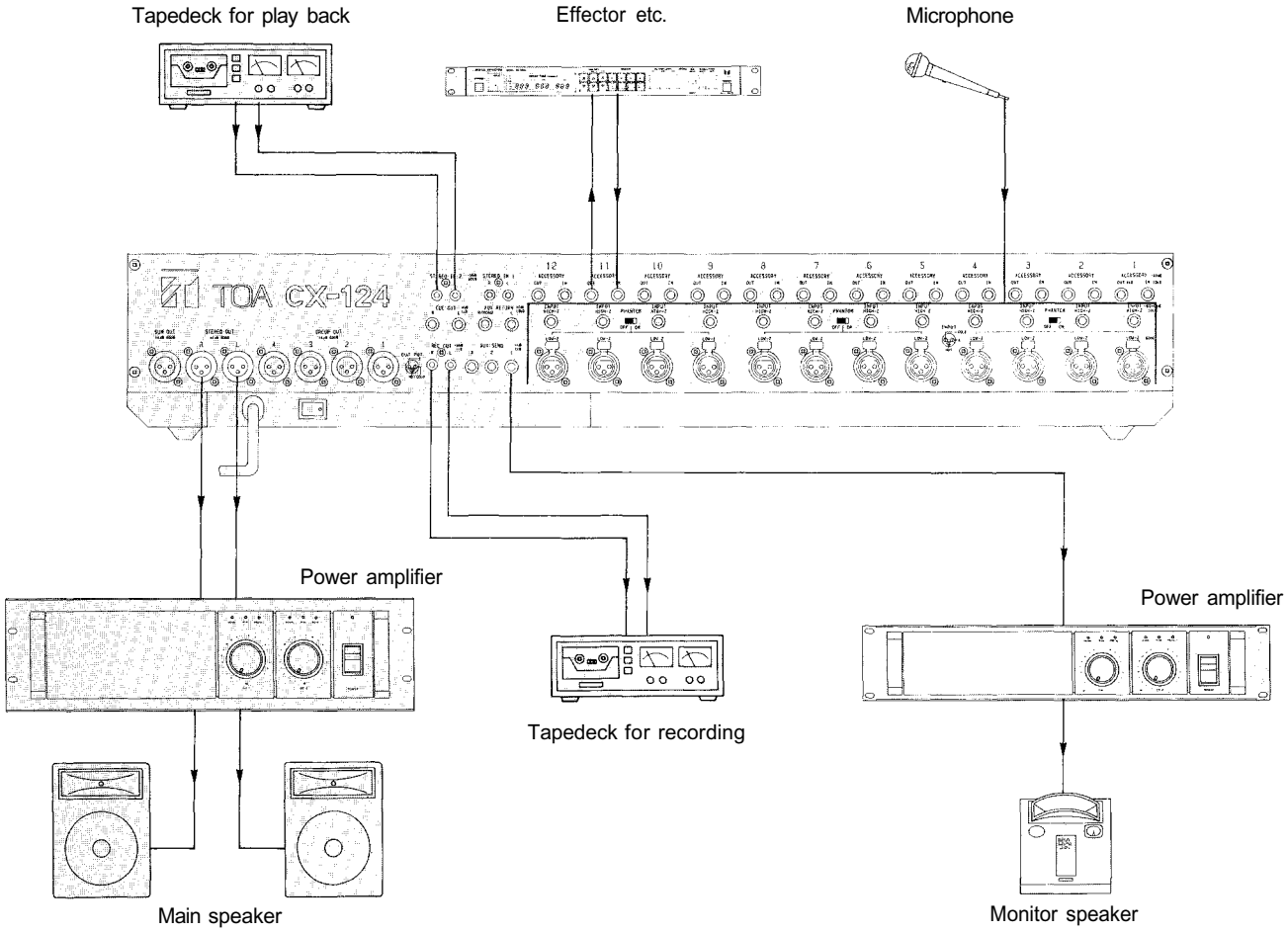
⑫ **Stereo Output Connector [STEREO OUT]**
The electronically balanced XLR connectors have a nominal output level of +4 dB and an impedance of 600 ohms.

⑬ **Sum Output Connector [SUM OUT]**
The electronically balanced XLR connector has a nominal output level of +4 dB and an impedance of 600 ohms.

⑭ **Power Switch [POWER]**
This switch provides AC power to the mixer. Power should only be applied after all audio connections have been completed. The power LED indicator lights when the switch is "on".

⑮ **AC Power Cord**

Connection diagram for CX-124 and CX-164



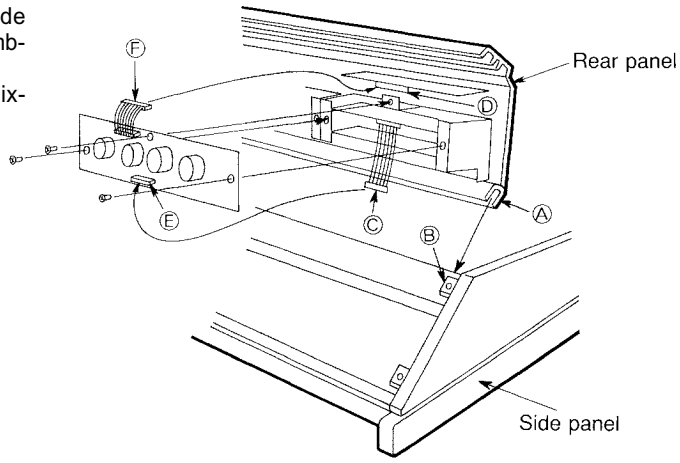
Assembling input transformers

The CX-124 and the CX-164 are designed with the electronically balanced inputs, however, optional input transformer IT-M4CX (for microphone input) or IT-L4CX (for microphone or line inputs) can be built-in the consoles, and their specifications are changed into the transformer input system. The input transformer is used only for four channels.

How to assemble the input transformer.

① Turn the Power switch to OFF and ensure to unplug the AC power cord from the AC outlet.
② Remove the eight fixing screws on the rear panel.
③ Lift the rear panel up to remove it, and for fixing, insert Ⓐ groove of rear panel into Ⓑ both metals on the left and right side panels.
④ Take out Ⓒ connector from Ⓓ part.
⑤ Fix the input transformer using the attached three screws as shown in the figure.
⑥ Insert Ⓒ connector into Ⓔ part.
⑦ Insert Ⓕ connector into Ⓓ part.
⑧ Assemble the rear panel in reverse manner of removing it (③~①).

Note: Do not touch other parts inside unit than instructed in this assembling manual.
This will lead to failures of the mixing console.



Specifications for input transformers

Models	**IT-M4CX**	**IT-L4CX**
Frequency Response	50 Hz~15 kHz within ±1.0 dB	30 Hz~20 kHz within ±0.15 dB
Distortion	Less than 0.4% (50 Hz, –20 dB)	Less than 0.2% (50 Hz, +5 dB)
Maximum Input Level	–2 dB 50 Hz 1%	+ 11 dB 50 Hz 1%
Constant Loss	Within 1.5 dB at 1 kHz	Within 1.5 dB at 1 kHz
Impedance	600 Ω/600 Ω	600 Ω/600 Ω

Input and output specifications

- **INPUT SPECIFICATIONS**

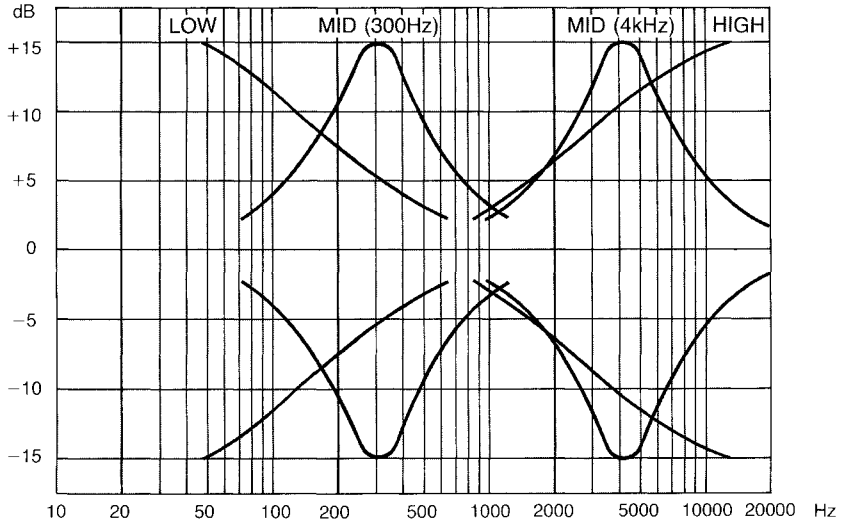
Contents in ( ) stand for CX-164 data. 0dB is referenced to 0.775V rms.

Input			For Use with Norminal	Input Level		Connector
	PAD	TRIM		Nominal	MAX. Before Clip	
CH INPUT 1~12 (16)	ON[20dB]	–40	LOW-Z 50-600Ω Mics or Lines HIGH-Z 10kΩ Lines	0dB	+ 20dB	XLR-3-31 or equivalent [Balanced] Phone Jack [Balanced]
	OFF [0dB]			–20dB	+ 10dB	
		0		–60dB	–30dB	
ACCESSORY IN 1~12(16)			10kΩ Lines	–10dB	+ 10dB	Phone Jack [Unbalanced]
STEREO IN L, R 1, 2			10kΩ Lines	–10dB	+ 14dB	Pin Jack
AUX RETURN L, R/MONO			10kΩ Lines	+4dB	+20dB	Phone Jack [Unbalanced]

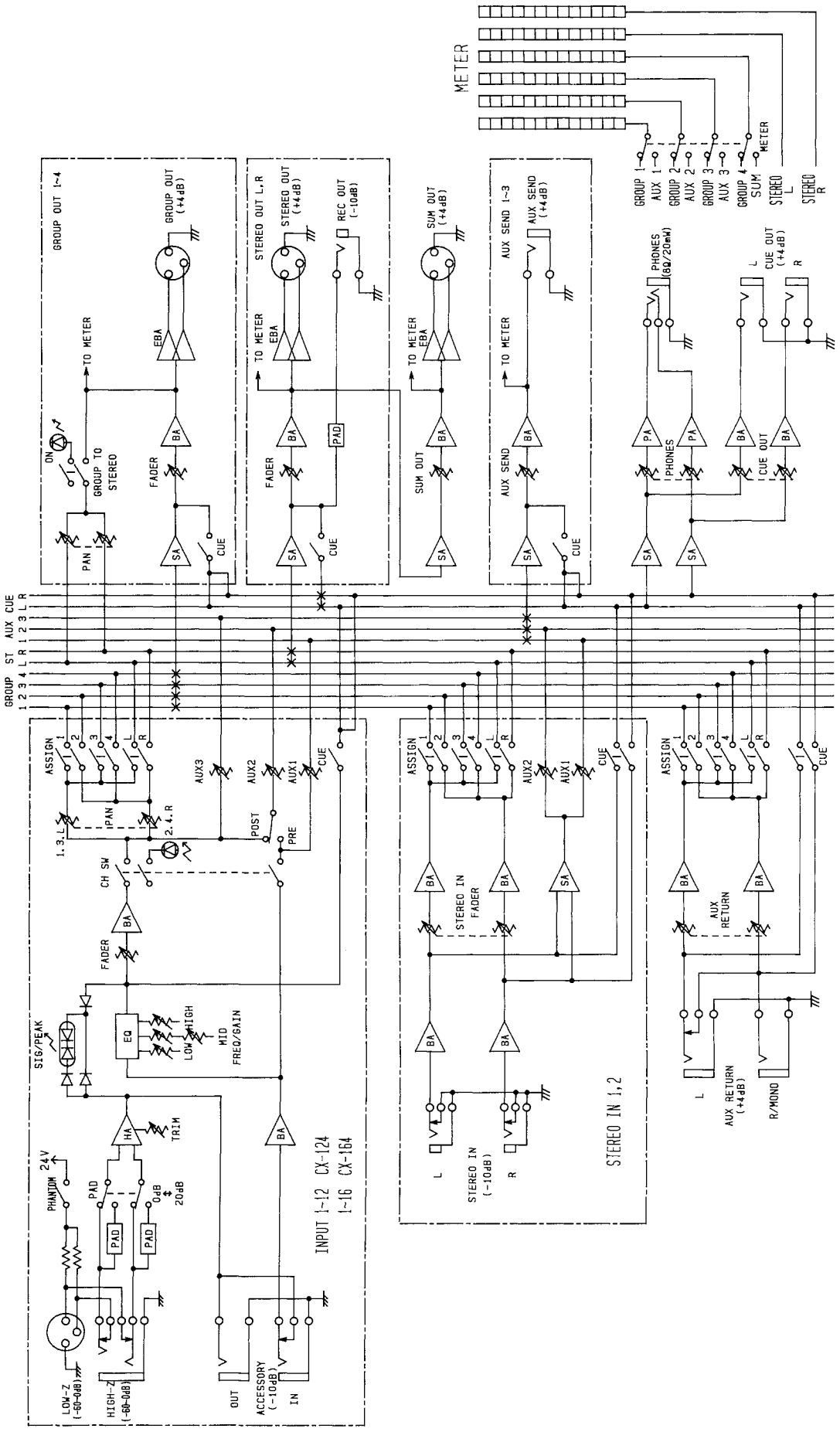
- **OUTPUT SPECIFICATIONS**

Output	For Use with Norminal	Output Level		Connector
		Nominal	MAX. Before Clip	
GROUP OUT 1~4 STEREO OUT L, R SUM OUT	600Ω Lines	+4dB	+ 26dB	XLR-3-32 or equivalent [Balanced]
AUX SEND 1, 2, 3	10kΩ Lines	+4dB	+20dB	Phone Jack [Unbalanced]
ACCESSORY OUT 1~12(16)	10kΩ Lines	–10dB	+ 20dB	Phone Jack [Unbalanced]
CUE OUT L, R	10kΩ Lines	+4dB	+ 20dB	Phone Jack [Unbalanced]
REC OUT L, R	10kΩ Lines	–10dB	+8dB	Pin Jack
PHONES	8Ω	1.5mW[8Ω]	20mW[8Ω]	Phone Jack [TRS]

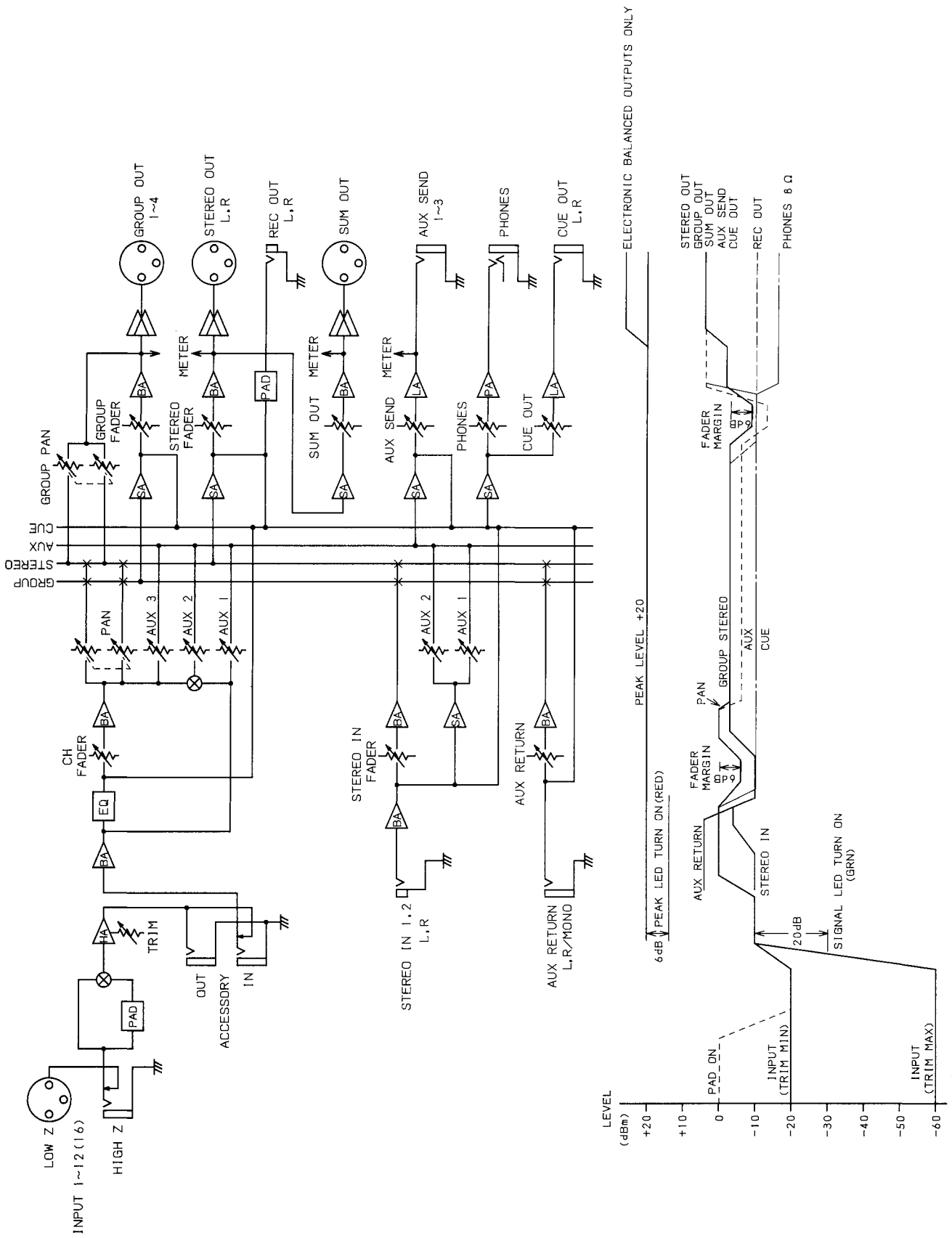
Characteristic diagrams (Input EQ Characteristics)



Block diagram



Level diagram



General specifications

Frequency Response
+0.5, –1.0 dB 50 Hz~15 kHz
+0.5, –3.0 dB 20 Hz~20 kHz

Total Harmonic Distortion
0.1% at +4 **dB 1 kHz**

Equivalent Input Noise (Rs=150 Ω)
-130 dB (IHF-A)

S/N (Rs-150 Ω)
69 dB (20 Hz~20 kHz) GROUP OUT or
70 dB (IHF-A) STEREO OUT

Crosstalk
–60 dB at 1 kHz

Maximum Voltage Gain
76 dB INPUT → GROUP OUT
82 dB INPUT → GROUP OUT → STEREO OUT
26 dB STEREO IN → AUX SEND

Channel Equalizer
LOW 20 Hz ± 15 dB Shelving
MID 300 Hz~4 kHz variable ±15 dB Peaking
HIGH 20 kHz ±15 dB Shelving

Peak Indicator
LED turns on when the pre-fader and post EQ signal reaches 6dB before clip.

Phantom Power
+24V DC

AC Line Voltage
AC Mains, 50/60 Hz

Power Consumption
CX-124 48 W
CX-164 52 W

Weight
CX-124 23 kg (50.7 lb.)
CX-164 27 kg (59.5 lb.)

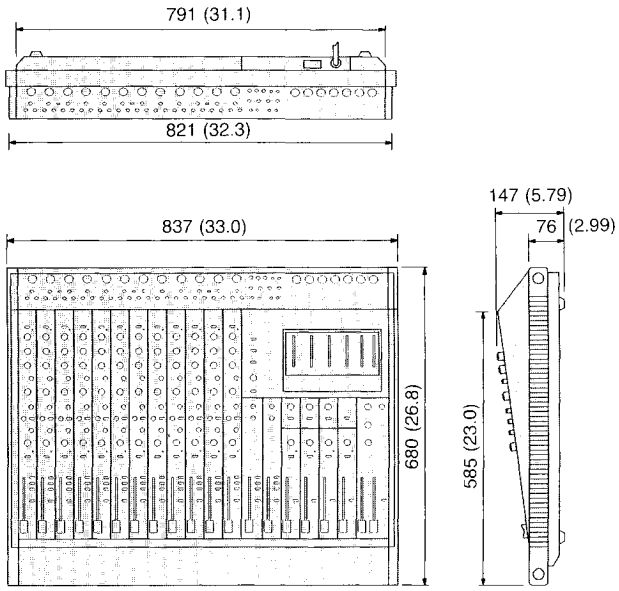
※ Specifications are subject to change without notice.

0dB is referenced to 0.775V rms.

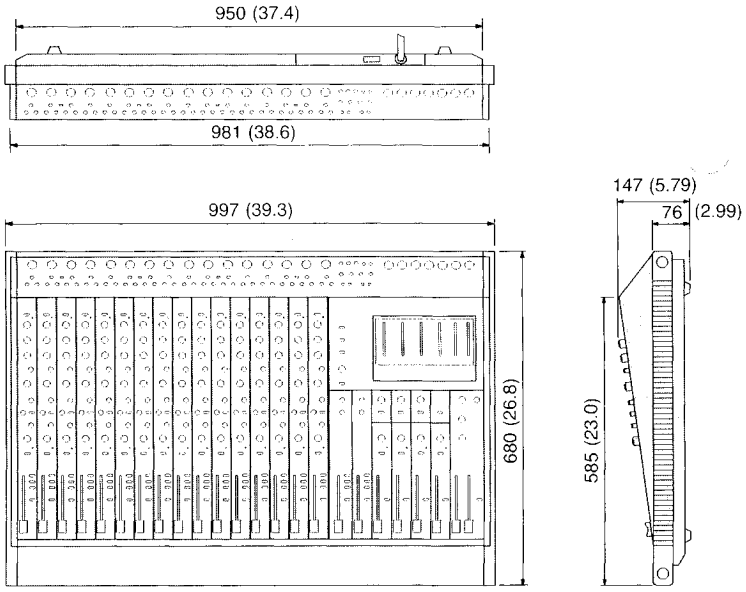
- **Accessories**
  Operating instructions 1
  Warranty card (for USA and Canada only) 1

Dimensional diagrams

CX-124



CX-164



mm (in.)

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133-12-003-70