The Yamaha MC-series mixers have been designed to meet a broad variety of applications with uncompromising overall electronic performance and superior control capability. Their broad versatility and plentiful complement of control features make them ideal for sound reinforcement, recording, theater and production applications. Further, state-of-the-art design and technology has made it possible to offer such exceptional flexibility and performance at significantly reduced cost.

Your MC-series mixer should provide you with years of trouble-free performance. To make the most of all the features and performance it provides, however, we recommend that you read this operating manual thoroughly before use.

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FRONT PANEL OPERATION

Input Channels

1. **PAD switch, GAIN control and PEAK LED**
   These adjust the input sensitivity of the MC mixers over a wide range. The PAD switch inserts a 20 dB pad ahead of the head amplifier, and the GAIN control continuously adjusts the sensitivity of the head amplifier between -20 and -60 dB. The PEAK LED lights whenever the channel's post-EQ, pre-fader signal comes within 3 dB of clipping, warning the operator of impending channel overload.

2. **HIGH, MID FREQ/MID and LOW EQ controls**
   These continuously variable controls allow ±15 dB of equalization in the following frequency ranges:
   - **HIGH**: 10 kHz shelving.
   - **MID/FREQUENCY**: 350 Hz—5 kHz peaking.
   - **LOW**: 100 Hz shelving.
   Response is flat at the center position.

3. **FB 1 and FB 2 send controls**
   These controls feed a pre-EQ, pre-fader signal to the Foldback 1 and Foldback 2 busses which feed the FB 1 and FB 2 outputs, respectively. These busses would normally be used for stage foldback or monitor speaker systems. Internal P.C. board jumpers are provided for changing the foldbacks to post-EQ and fader for use as additional echo/effect sends. This modification can be made at any Yamaha Service Center.

4. **ECHO 1 and ECHO 2 controls**
   Adjusts the amount of post-EQ, post-fader signal fed from that channel to the ECHO 1 and ECHO 2 busses, which feed the ECHO 1 and ECHO 2 outputs, respectively. The echo busses may be used to feed outboard effect devices or as additional foldback/monitor sends.
① PAN control and Group 1-2/3-4 Assignment Switches
The PAN control assigns the channel fader output to group busses 1-2 and/or 3-4 according to the setting of the buss assignment switches. When group assignment switch 1-2 is engaged, the signal is panned between busses 1 and 2. If 3-4 is engaged the signal is panned between busses 3 and 4. Both switches can be engaged, in which case the signal is panned between group busses 1-3 and 2-4. Panning left delivers more signal to busses 1 and 3, while panning right delivers more signal to busses 2 and 4.

② CUE button
Pressing the CUE button on any channel permits monitoring of only the selected channel signal via the headphone output. All other outputs are not affected. If more than one channel is “cued”, their signals are summed and fed to the headphone output.

③ CH ON button
The CH ON button turns the respective channel ON or OFF. This is handy for rapid punch-ins or punch-outs, or for temporarily killing a channel without disturbing the mix fader level.

④ Channel Fader
These set the mix level of each channel. These smooth linear faders also provide a good visual indication of the overall mix levels. Rated output (nominal) level is achieved with the fader set at “6” (▲) on the scale.
Echo Return and Group Out Sections

1. **Echo PAN control and 1-2/3-4/STEREO assign switches**
The PAN control assigns the echo return signal received at the appropriate ECHO RTN jack to group busses 1-2 and/or 3-4 according to the setting of the buss assignment switches. The same signal can also be set to and panned across the L/R stereo buss by engaging the STEREO switch. When group assignment switch 1-2 is engaged, the signal is panned between busses 1 and 2. If 3-4 is engaged the signal is panned between busses 3 and 4. Both switches can be engaged, in which case the signal is panned between group busses 1-3 and 2-4. Panning left delivers more signal to busses 1 and 3, while panning right delivers more signal to busses 2 and 4.

2. **ECHO RETURN control**
This control is used to match the sensitivity of the corresponding ECHO RTN input to the output level of the external echo device used. Setting this control to “8” on the scale delivers rated output for a +4 dB input level.

3. **CUE button**
Pressing the CUE button permits monitoring of only the selected echo signal via the headphone output. All other outputs are not affected.

4. **GROUP OUT control**
This control adjusts the overall level at the corresponding GROUP OUT XLR type connector. The GROUP master fader does not affect the level at the GROUP OUT XLR type connector. Rated output (nominal) level is achieved at a setting of “8” on the GROUP OUT control scale.

5. **GROUP PAN control**
The GROUP PAN control assigns the corresponding group signal to the L and R STEREO busses.
CUE button
Pressing the CUE button permits monitoring of only the selected group signal via the headphone output only. Signals inserted at the GROUP INSERT jacks are included.

GROUP ON button
The GROUP ON button turns the respective GROUP output ON or OFF. This is handy for rapid group punch-ins or punch-outs, or for temporarily killing a group without disturbing the mix level. The GROUP ON button affects both the group XLR type outputs and the group feed to the L and R stereo buss.

GROUP Master Fader
The GROUP master fader controls the overall level of the corresponding group signal sent to the L/R STEREO program buss. Rated output (nominal) level is achieved with the fader set to "6" (▲▲) on the scale.
Foldback Out, Echo Send and Stereo Out Sections

1. **FB master controls**
   The FB 1 and FB 2 master controls control the overall level of the mix on the respective FB busses to be delivered to the FB OUT connectors. Rated output (nominal) level is achieved with the FB master controls set at "8" on the scale. These outputs could be used to feed the on-stage foldback/monitor power amplifiers and speakers.

2. **CUE button**
   Pressing the CUE button permits monitoring of only the selected FB signal via the headphone output only.

3. **ECHO master controls**
   The ECHO 1 and ECHO 2 master controls control the overall level of the mix on the respective ECHO busses to be delivered to the ECHO SEND connectors. Rated output (nominal) level is achieved with the ECHO master controls set at "8" on the scale.

4. **CUE button**
   Pressing the CUE button permits monitoring of only the selected echo signal via the headphone output only.

5. **STEREO L CUE button**
   Pressing the CUE button permits monitoring of only the stereo signal via the L headphone output only.

6. **STEREO L ON button**
   The STEREO ON button turns the respective STEREO L output channel ON or OFF. These are useful for turning off the console outputs after the sound check and all levels have been set.

7. **STEREO L master fader**
   Controls the overall level of the corresponding STEREO L output channel—including all GROUP, and ECHO RETURN signals assigned to the respective stereo channel. Rated output (nominal) level is achieved with the fader set at "0" (max.) on the scale.

The above applies in the same way to the R channel.
Phones and Talkback Section

1. PHONES jack
   This jack accepts a standard pair of stereo headphones. When a CUE button is pressed, headphone output consists of the corresponding cue signal.

2. CUE/PHONES LEVEL control
   Controls the volume of the headphone output. Rated output is achieved with the control set at "8" on the scale.

3. Talkback Assign Switches
   These switches determine to which mixing bus the talkback signal is sent. Talkback can be sent to the group 1, 2, 3 or 4 buses, the FB buses or the main stereo bus by engaging the corresponding switch.

4. Talkback INPUT connector
   A low-impedance talkback microphone can be connected here. Input level/impedance at this connector is -50 dB/50—250 ohms.

5. INPUT LEVEL control
   Controls the level of the talkback signal. Rated (nominal) level is achieved with the control set at "8" on the scale.

6. TALKBACK switch
   Engaging this switch activates the talkback send to the selected mixing bus. The talkback system is a very useful feature for audience announcements and communication between the engineer and performers.
REAR PANEL CONNECTIONS

1. CHANNEL INPUTS
   Each input channel has an electronically balanced low-impedance (LO Z) XLR-type input connector and a high-impedance (HI Z) balanced 1/4" TRS (Tip-Ring-Sleeve) phone jack. The inputs are designed for 50—250 ohm microphone or 600 ohm line sources with an input level from −60 to 0 dB. An internal phantom power supply (+48 V) is provided for phantom-powered mics.

2. CHANNEL INSERT IN/OUT connectors
   These tip-ring-sleeve connectors provide an unbalanced insert patch point between the channel gain control and equalizer stages. The IN line accepts a 600 ohm, −10 dB signal, and the OUT line delivers a −10 dB signal capable of driving a 10 k-ohm load impedance. The CHANNEL INSERT input may be used to insert an effect device on a specific channel.

3. PHANTOM switch
   The internal phantom power supply can be switched ON and OFF in 4-input-channel sections. When the PHANTOM switch is ON, 48 volts DC is applied across pins 2 and 3 of the corresponding XLR type connectors. The phantom supply is disconnected if a plug is inserted into the HI Z TRS phone jack. Always be sure to turn the PHANTOM supply OFF when not in use.

4. GROUP INSERT IN/OUT connectors
   These tip-ring-sleeve connectors provide an unbalanced insert patch point between the corresponding group mixing buss and the group cue, ON/OFF and master fader. The IN line accepts a 600 ohm, −10 dB signal, and the OUT line delivers a −10 dB signal capable of driving a 10 k-ohm load impedance. The GROUP INSERT input is a convenient way of patching in a device such as a compressor/limiter for use on an entire group of instruments.

5. SUB IN (GROUP, FB, ECHO) connectors
   These inputs are intended mainly for connection to a second MC-series mixer in order to increase the number of available input channels. These are all unbalanced inputs with a matching level/impedance of +4 dB/600 ohms. The outputs of the second console or submixer would be connected to the appropriate SUB IN connectors, thus increasing the number of input channels and allowing the master controls of the main console to control both units (with the submixer master controls at nominal settings).
CD ECHO RETURN connectors
These connectors accept the output signal from external echo, delay or reverb devices fed by the ECHO SEND connectors. These are unbalanced inputs with an input level/impedance of +4 dB/600 ohms.

ECHO SEND connectors
The signal from these connectors is sent to external echo, delay, or reverb devices. These are unbalanced outputs with an output level/impedance of +4 dB/600 ohms.

GROUP OUT connectors
These connectors deliver the main group output signals to the power amplifiers which will drive the main house speakers in a sound reinforcement system, or a tape deck for recording applications. These are electronically balanced outputs with a rated level/impedance of +4 dB/600 ohms.

FB OUT connectors
The output from these connectors will mainly be used to drive the power amplifiers which will feed the stage monitor speakers in a sound reinforcement system. In a recording system, both FB OUTs could be used to drive the "control room" monitor system, or only one FB OUT could be used for the control room monitors, and one used to drive a studio monitor or cue system. For theater sound applications, the FB OUTs could be used to drive a "fill" speaker system. These are electronically balanced outputs with a rated level/impedance of +4 dB/600 ohms.

STEREO OUT connectors
The stereo outputs can be used to feed the power amplifiers which will drive the main house speakers in a sound reinforcement system, or a stereo tape deck for recording. These are balanced outputs with a rated output level/impedance of +4 dB/600 ohms.

POWER switch
Turn this switch ON to apply AC power to the mixer. The VU meters light to indicate power ON.

AC POWER CORD
This 3-wire cord is for connection to any 120 V AC, 60 Hz grounded outlet. (General model: 110-120 V, 220-240 V, 50/60 Hz).

VU METERS

VU Meters
These are VU-ballistic level meters with built-in peak indicator LEDs. The VU meters can be used to monitor the GROUP 1—4, FB 1 and 2, ECHO 1 and 2, and STEREO L and R output levels. A VU meter reading of 0 dB corresponds to rated output. The PEAK LEDs light at 8 dB above 0 VU.

VU METER READING

<table>
<thead>
<tr>
<th>VU METER READING</th>
<th>-30 VU</th>
<th>-20 VU</th>
<th>-10 VU</th>
<th>-5 VU</th>
<th>0 VU</th>
<th>+3 VU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs (mV)</td>
<td>(-245 mV)</td>
<td>(-138 mV)</td>
<td>(-77.5 mV)</td>
<td>(-34 mV)</td>
<td>(-16 mV)</td>
<td>(+4 dB)</td>
</tr>
<tr>
<td>Outputs (V)</td>
<td>(-1.23 V)</td>
<td>(-0.62 V)</td>
<td>(-0.31 V)</td>
<td>(-0.15 V)</td>
<td>(-0.07 V)</td>
<td>(+7 dB)</td>
</tr>
</tbody>
</table>

Meter Function Switches (MC1204, MC1604 only)
These switches determine the function of the GROUP/FB and GROUP/ECHO VU meters. The GROUP/FB meters can be switched to read either GROUP 1 and 2 or FB 1 and 2 levels, while the GROUP/ECHO meters can be switched to read either GROUP 3 and 4 or ECHO 1 and 2 levels.
INSTALLATION

AC Power Connection (for models with 3-conductor power cable)
Mixers provided with a 3-wire power cable should be AC grounded for safety and optimum shielding against noise. If a 3-wire AC outlet is not available, or there is any chance the AC outlet may not be grounded, a separate ground wire must be connected from the mixer chassis to an earth ground. Gold water pipes generally provide good grounds unless they are insulated by a length of PVC (plastic) pipe or a water meter. Avoid hot water pipes and gas pipes. When a convenient, confirmed ground is not available, use a length of copper pipe driven into moist, salted earth to a depth of at least 1.5 meters (5 feet). Alternately, use a chemical type grounding rod.

Hook-Up Cables and Hum Avoidance
The mixer's primary inputs and outputs feature electronically balanced circuits and connectors. When these connectors are used with the appropriate 2-conductor shielded cables (e.g., standard microphone cables), these circuits provide optimum protection against hum and noise pickup. The XLR type connectors are wired with pin 2 as “audio high” and pin 3 as “audio low” in accordance with DIN and JIS standards. In the balanced TRS connectors, the tip is audio high and the ring is audio low. Pin 1 in the XLR type connectors, and the sleeve in the TRS connectors are ground. Some professional audio equipment and microphones are wired with pins 2 and 3 (XLR) reversed. Generally, this will cause no problem other than a polarity reversal. However, if such a piece of equipment uses a balanced-type connector for an unbalanced input, or an adaptor is used to match an unbalanced connector to a balanced input, the high side of the audio circuit could be grounded. In this case, reverse the audio high and audio low wiring at one end of the connecting cable, or use a suitable polarity-reversal adaptor. Regardless of connector polarity, if hum is encountered try cutting the shield connection at one end of the cable. All unbalanced phone jacks are intended for use with standard tip-sleeve 1/4” phone plugs and single-conductor shielded cable. Do not attempt to reduce hum by cutting the shield connection on these cables. Rather, restrict unbalanced cables to about 10 feet (3 meters), and try to set up the system so that either (a) the equipment involved is all connected to the same AC circuit, or (b) the third-wire AC mains ground is used on only one piece of equipment, typically the mixer. Breaking the ground path can create a SHOCK HAZARD. When routing cables, especially unbalanced cables, avoid strong sources of electro-magnetic interference or radio frequency interference generated by electric motors, fluorescent lights, dimmer panels, etc. To avoid crosstalk-induced feedback, never bundle microphone input cables with mixer output cables: these cables should cross at right angles where practical.

Grounding
Careful grounding procedures are essential for proper operation, not only of the mixer, but of the entire audio system. Many grounding techniques exist, and a number of books have been written on the subject. The following are good sources of grounding information:

THE AUDIO CYCLOPEDIA by Howard M. Tremaine (Pub. Howard W. Sams)
SOUND SYSTEM ENGINEERING by Don and Carolyn Davis (Pub. Howard W. Sams)
GROUNDING AND SHIELDING IN INSTRUMENTATION by Ralph Morrison (Pub. John Wiley & Sons)

“Ground loops” are often caused by multiple paths from the equipment grounds to the AC mains ground (or earth ground). Ground loops are a major cause of hum and noise in an audio system. In severe cases, ground loops can even cause the equipment involved to break into oscillation. This can cause distortion and even damage to amplifiers and speakers. One way to avoid ground loops is to make sure that there is only one path to the AC ground for the entire audio system. A popular method is to cut the shield ground of balanced cables at the input end of the cable. Another technique is to ground all shields at one piece of equipment, typically the console, and cut the shields at the other ends of the cables. (This is NOT possible with unbalanced cables).

Check Mains Voltages
Connect the mixer to the AC mains only after confirming that the line voltage and frequency are correct. A simple check with a voltmeter can save your equipment—and the show. It is also a good idea to check for proper polarity at the AC outlet. The power switch on the mixer should be OFF before connecting the the mixer to the mains. As a further precaution, disconnect the mixer from the mains while audio cables are being installed.
OPERATING TIPS

Matching Input Channel Sensitivity with the Source

The pad switch and continuously variable gain control provided on the mixer's input channels permit setting the input sensitivity of each channel anywhere between -60 dB and 0 dB. With the pad switch set at 0 dB (pad out) the gain control adjusts sensitivity between -60 and -20 dB, while with the pad switch set at -20 dB (pad in) the gain control adjusts sensitivity between -40 and 0 dB. This makes it possible to ideally match the mixer's input sensitivity with a broad range of input sources.

In general, an input sensitivity setting of about -50 dB is commonly used with low output dynamic microphones, -40 dB with medium output condenser microphones, -20 dB with electric instruments (preamplified) and low level (creative audio or hi-fi) line sources, and 0 dB with high level line sources (such as some professional equipment line outputs). Set the input level switch to the input jack. Here is one suggested procedure:

1. Connect all input sources to their respective channels. Plug in and wear your headphones to hear the program mix. DO NOT CONNECT any power amplifiers or speakers yet.
2. Set up the mixer so that the signal from each input channel feeds the STEREO mixing buss, and set all channel faders at infinity (minimum). Raise the STEREO L master fader to about "6" on the scale.
3. Start with the lowest input sensitivity (pad in, gain at -20). Bring the channel fader up to "6" on the scale. If necessary, gradually increase sensitivity using the gain control until the input is clearly audible. If sensitivity is still too low, return the gain control to the -20 dB setting and set the pad switch to 0 dB, then gradually increase the gain control setting once again. The STEREO L program VU meters should peak around "0 VU". If the meter consistently shoots past "0 VU", or if the signal sounds distorted in your headphones, the input sensitivity is set too high; decrease the input sensitivity until the levels are correct.

The input peak LED may also be used as a visual aid in adjusting the gain control. If the peak LED is on continuously the gain control is set too high—reduce the gain control level. Normally, the peak LED will light occasionally on louder musical passages (peaks or transients).

4. Repeat the procedure for each input channel, until all channels are set for proper input sensitivity. Turn the Mixer Power Off, and connect your outputs. Turn the mixer power ON again. You are now ready to adjust the remaining controls on each channel.

NOTE: The console and all signal processing devices connected to it MUST be turned on before the power amplifiers are turned on, or the turn-on transient could easily cause irreparable damage to your loudspeakers. This procedure should be reversed when the system is turned off.

Using the Channel EQ Controls

The Low-EQ control adjusts the channel’s frequency response through the low-frequency range. The control has no effect ("flat response") when centered. Low-EQ boost (clockwise rotation) gives more "fullness" to vocals, guitars, etc., and more of a mellow character to horns and woodwinds. Low-EQ cut (counterclockwise rotation) removes boominess, avoids some of the excessive energy from drums, and reduces 50 or 60 cycle hum, and stage rumble.

The Mid-EQ control permits peaking boost or cut equalization at the frequency determined by the setting of the MID FREQ control (0.35—5 kHz). Boosting the midrange (especially at around 2.5 or 3 kHz) can greatly increase the overall "presence" of the sound. Vocalists will seem to come forward and stand out from the instrumental backing. Cutting the mid-frequencies has the opposite effect—vocals seem to recede and the overall sound becomes "thinner". It is often effective to cut the midrange response of the instrumental backing just slightly, and boost the vocal channel midrange a little in order to make the vocals stand out with exceptional clarity.

The High-EQ control adjusts the channel’s frequency response through the high-frequency range. High-EQ boost (clockwise rotation) gives more "edge" or "bite" to string instruments and more "attack" to percussive instruments. High-EQ cut (counterclockwise rotation) removes some of the breath sound from wind instruments, reduces guitar-string fingering sounds, lessens hiss, and avoids sibilant (lispy) vocal sounds. High-EQ cut also helps to make a performer sound farther away, particularly if reverb is added. The equalizer can be helpful in avoiding feedback, too. Care should be taken not to "over-equalize" any given channel. Using drums as an example, moving the microphone as little as one inch (2.5 cm) can alter its tonality significantly—without having to adjust the channel equalizer. Also, the type of microphone used can greatly affect the tone achieved. Experiment with different microphones and microphone placement for the best results in your application. A little care in mic placement can save a lot of time trying to "fix it in the mix".
The MC1204 will be used in the following application examples. Actual application may require more input channels, in which case the MC1604 or MC2404 are recommended.

A Sound Reinforcement System
Balanced microphones are plugged directly into the channel XLR input connectors, while unbalanced electronic instrument outputs (synthesizers, etc.) are connected via a balancing transformer type direct box. Compressors are connected at the insert jacks of the vocal mic channels, and a "flanger" effect is connected at the insert jack on one of the instrument channels. The ECHO 1 SEND and RETURN connectors are hooked up to a digital delay unit, while a reverb unit is connected to the ECHO 2 SEND and RETURN.
A Recording System

As in the sound reinforcement system shown previously, balanced microphones are plugged directly into the channel XLR input connectors, while unbalanced electronic instrument outputs (synthesizers, etc.) are connected via a balancing transformer type direct box. In this case, however, the last four input channels are connected to the outputs from a 4-channel multitrack tape recorder. Compressors are connected at the insert jacks of the vocal mic channels. The ECHO 1 and 2 SEND and RETURN connectors are connected to a high-quality stereo plate reverb unit. The FB 1 and 2 OUT connectors feed separate headphone amplifiers providing two different headphone cue mixes for the performers. The STEREO OUT connectors feed the control room monitor system, and the GROUP OUT connectors feed the 4-channel multitrack recorder.
A Theatrical Production System

In this application the inputs consist of stage floor and overhead mics, wireless mic receivers and a stereo tape player. The ECHO 1 and 2 SEND and RETURN connectors are hooked up to a stereo echo system for special effects. The GROUP OUT connectors feed the power amplifiers which drive the main stage speakers, and one of the FB OUTs are used to drive a "back fill" amp/speaker system. The remaining FB OUT drives a foldback system for the dressing rooms and lighting staff. The STEREO OUTs are available to drive a tape deck to record the performance, or a remote broadcast feed.
**SPECIFICATIONS**

**Frequency Response**
- 20 Hz – 20 kHz 0.1% (@ 600 Ω, +4 dB)
- 0~1 dB (@ 600 Ω, +4 dB)

**Total Harmonic Distortion**
- Less than 0.1% (20 Hz – 20 kHz @ 600 Ω, +4 dB)

**Noise Level**
- Equivalent Input Noise: -128 dB (Rs-1 S0)
- Residual Noise: 95 dB
- GROUP OUT: 86 dB GROUP Level Volume \(\pm 0\) dB
  - All CH Assign Switches: off
  - One Input Fader: nominal
- STEREO OUT: 76 dB GROUP Fader: maximum
  - All GROUP Faders: minimum
  - One Input Fader: maximum
  - One Input Fader and One GROUP Fader: nominal
- FB OUT: 67 dB GROUP Level control: nominal
  - All Input FB Volumes: minimum
  - One Input FB Volume: nominal
- ECHO SEND: 67 dB GROUP Level control: nominal
  - All Input ECHO Volumes: minimum
  - One Input ECHO Volume: nominal

**Maximum Voltage Gain**
- INPUT: 76 dB
  - GROUP OUT: 76 dB
  - STEREO OUT: 76 dB
  - ECHO SEND: 82 dB
- INPUT: 12 dB
  - GROUP OUT: 12 dB
  - TALKBACK INPUT: 66 dB
  - ECHO RTN: 6 dB
  - GROUP SUB IN: 6 dB
  - FB SUB IN: 6 dB
  - ECHO SUB IN: 6 dB

**Equalizer Characteristics**
- LOW EQ: ±15 dB (100 Hz Shelving)
- MID EQ: ±15 dB (350 Hz – 5 kHz Peaking)
- HIGH EQ: ±15 dB (10 kHz Shelving)

**Crosstalk (1 kHz)**
- MIXBUS to MIXBUS: Less than –60 dB
- INPUT CH to INPUT CH: Less than –60 dB

**VU Meter**
- MC1204, MC1604: GROUP 1/FB 1, GROUP 2/FB 2, GROUP 3/ECHO 1, GROUP 4/ECHO 2, STEREO L/R
- MC2404: GROUP 1 – 4, FB 1, ECHO 1, 2, STEREO L/R

**Peak Indicator**
- INPUT (Red): Lights 3 dB below clipping
- VU (Red): Lights 8 dB above 0 VU

**Power Requirements**
- U.S. & Canadian models: 120 V 60 Hz
  - General Model: 110-120/220-240 V 50/60 Hz
- General model: 70 W

**Power Consumption**
- U.S. & Canadian models: 70 W
  - General model: 80 W

**Dimensions (W x H x D)**
- MC1204: 76.2 x 18.5 x 65.4 mm
  - (30" x 7-5/16" x 25-3/4")
- MC1604: 91.9 x 18.5 x 65.4 mm
  - (36-3/16" x 7-5/16" x 25-3/4")
- MC2404: 123.2 x 18.5 x 65.4 mm
  - (48-1/2" x 7-5/16" x 25-3/4")

**Weight**
- MC1204: 22 kg (48 lbs. 6 oz.)
- MC1604: 26 kg (57 lbs. 3 oz.)
- MC2404: 34 kg (74 lbs. 13 oz.)

*Measured with a –6 dB octave LPF @ 12.7 kHz.
**nominal = 6 dB below max.
Specifications subject to change without notice.

0 dB = 0.775 V
### INPUTS

<table>
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<tr>
<th>Input terminals</th>
<th>PAD</th>
<th>GAIN</th>
<th>Input impedance</th>
<th>Source impedance</th>
<th>Sensitivity</th>
<th>Input level</th>
<th>Max. non-clipping level</th>
<th>Connector</th>
</tr>
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<tr>
<td>CH INPUT (MC1204 1-12)</td>
<td>OFF (0 dB)</td>
<td>LO Z 4 kΩ</td>
<td>50 - 250 Ω Microphones or 600 Ω Lines</td>
<td>-70 dB (6.195 mV)</td>
<td>-40 dB (7.75 mV)</td>
<td>-30 dB (24.5 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>CH INPUT (MC1604 1-16)</td>
<td>OFF (0 dB)</td>
<td>LO Z 4 kΩ</td>
<td>50 - 250 Ω Microphones or 600 Ω Lines</td>
<td>-70 dB (6.195 mV)</td>
<td>-40 dB (7.75 mV)</td>
<td>-30 dB (24.5 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>CH INPUT (MC2404 1-24)</td>
<td>OFF (0 dB)</td>
<td>LO Z 4 kΩ</td>
<td>50 - 250 Ω Microphones or 600 Ω Lines</td>
<td>-70 dB (6.195 mV)</td>
<td>-40 dB (7.75 mV)</td>
<td>-30 dB (24.5 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>CH INSERT IN (MC1204 1-12)</td>
<td>10 kΩ</td>
<td>600 Ω Lines</td>
<td>-22 dB (61.6 mV)</td>
<td>-6 dB (245 mV)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (TRS) (Unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP INSERT IN (1-4)</td>
<td>5 kΩ</td>
<td>600 Ω Lines</td>
<td>-16 dB (123 mV)</td>
<td>-6 dB (245 mV)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (TRS) (Unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECHO RETURN (1, 2)</td>
<td>10 kΩ</td>
<td>600 Ω Lines</td>
<td>-8 dB (309 mV)</td>
<td>+4 dB (1.23 V)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (Unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUB IN (GROUP 1-4, ECHO 1, 2)</td>
<td>10 kΩ</td>
<td>600 Ω Lines</td>
<td>-2 dB (61.6 mV)</td>
<td>+4 dB (1.23 V)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (Unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TALKBACK INPUT</td>
<td>10 kΩ</td>
<td>50 - 250 Ω Microphones or 600 Ω Lines</td>
<td>-62 dB (6.16 mV)</td>
<td>-50 dB (245 mV)</td>
<td>-10 dB (245 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OUTPUTS

<table>
<thead>
<tr>
<th>Output terminals</th>
<th>Output impedance</th>
<th>Load impedance</th>
<th>Output level</th>
<th>Max. non-clipping level</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP OUT (1-4)</td>
<td>150 Ω</td>
<td>600 Ω Lines</td>
<td>+4 dB (1.23 V)</td>
<td>+22 dB (9.76 V)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>STEREO OUT (L, R)</td>
<td>150 Ω</td>
<td>600 Ω Lines</td>
<td>+4 dB (1.23 V)</td>
<td>+22 dB (9.76 V)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>FB OUT (1, 2)</td>
<td>150 Ω</td>
<td>600 Ω Lines</td>
<td>+4 dB (1.23 V)</td>
<td>+22 dB (9.76 V)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>ECHO SEND (1, 2)</td>
<td>150 Ω</td>
<td>600 Ω Lines</td>
<td>+4 dB (1.23 V)</td>
<td>+18 dB (6.16 V)</td>
<td>Phone Jack (Unbalanced)</td>
</tr>
<tr>
<td>CH INSERT OUT (MC1204 1-12)</td>
<td>100 Ω</td>
<td>10 kΩ Lines</td>
<td>-10 dB (245 mV)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (TRS) (Unbalanced)</td>
</tr>
<tr>
<td>GROUP INSERT OUT (1-4)</td>
<td>600 Ω</td>
<td>10 kΩ Lines</td>
<td>-10 dB (245 mV)</td>
<td>+20 dB (7.75 V)</td>
<td>Phone Jack (TRS) (Unbalanced)</td>
</tr>
<tr>
<td>PHONES</td>
<td>100 Ω</td>
<td>8 Ω Phones</td>
<td>1 mW</td>
<td>20 mW</td>
<td>Stereo Phone Jack (Unbalanced)</td>
</tr>
</tbody>
</table>

* Input level required to produce +4 dB output level.
* 0 dB = 0.775 V r.m.s.

**Dimension**

![Diagram](image-url)
Grounding on the Road

Many of the above procedures are difficult to use on the road. For example, the telescoping shield concept is nearly impossible to use on a portable cable. Similarly, it is a difficult and time consuming process to search for a water pipe ground every time the system is moved from one performance to another. Yet portable systems can be extremely complex, and may have major grounding problems.

The telescoping shield concept can be extended to portable systems by installing a "ground lift switch" on the output of each device, and on the inputs of devices after the mixer. Since microphones are not grounded except through the mixer, there is no need for an input ground lift switch on most mixers. The diagram below shows a typical ground lift switch installation. By judicious use of these switches, each piece of equipment can be AC grounded for safety without causing ground loops.

Because of leakage currents from equipment in the audio system, and in the house, some noise currents can ride on the AC ground wire and are able to enter the audio system. This problem is usually most noticeable with sensitive equipment such as the mixer. Lifting the AC ground at the mixer can often solve this problem. However, lifting the AC ground on the mixer also lifts the AC ground on the microphone chassis, causing a safety hazard. Try connecting the mixer and any other sensitive equipment to other AC circuits. The only other apparent solution to this problem is to eliminate the noise on the AC ground, which is not an easy task. Since it has its own ground, a portable AC power distribution system connected to the house service entrance may be the most effective way to avoid all AC noises. Such a system can be designed and constructed by a qualified electrician; check local electrical codes before each use.

Use of Ground Lift Switch

Perhaps the best answer to portable system grounding problems, RFI, EMI, and AC noises, is to develop a versatile grounding scheme. Ground lift switches and adapters, and a portable AC power distribution system allow different grounding techniques to be tried easily and quickly when a problem occurs.

Connector and cable configurations

<table>
<thead>
<tr>
<th>REMOTE DEVICE DESCRIPTION</th>
<th>REMOTE SIDE OF CABLE (Connector Type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating or Balanced low impedance, most professional equipment line in and line out, microphones.</td>
<td>A. XLR ** WHT (RED)/HI BLACK/LOW SHIELD/GND (XLR)</td>
</tr>
<tr>
<td>Unbalanced low impedance, some professional equipment and microphones.</td>
<td>B. TRS PHONE WHT (RED)/HI BLACK/LOW SHIELD/GND (XLR)</td>
</tr>
<tr>
<td>Unbalanced high impedance, most professional equipment and microphones.</td>
<td>C. STANDARD PHONE WHT (RED)/HI BLACK/LOW SHIELD/GND (XLR)</td>
</tr>
<tr>
<td>Unbalanced high impedance, most professional equipment and microphones.</td>
<td>D. STANDARD PHONE WHT (RED)/HI BLACK/LOW (10' or less) SHIELD/GND (XLR)</td>
</tr>
<tr>
<td>Unbalanced high impedance, most professional equipment and microphones.</td>
<td>E. RCA-PIN WHT (RED)/HI BLACK/LOW (10' or less) SHIELD/GND (XLR)</td>
</tr>
<tr>
<td>Unbalanced high impedance, most professional equipment and microphones.</td>
<td>F. STANDARD PHONE WHT (BLACK/HI BLACK/LOW SHIELD/GND (STANDARD PHONES)</td>
</tr>
<tr>
<td>Unbalanced high impedance, most professional equipment and microphones.</td>
<td>G. RCA-PIN WHT (BLACK/HI BLACK/LOW SHIELD/GND (STANDARD PHONES)</td>
</tr>
</tbody>
</table>

** This wiring configuration (Pin 2 high, Pin 3 low) matches the MC series wiring and DIN standards. Much of the equipment in the U.S.A. is wired with Pin 3 high and Pin 2 low (shield isPin 1). In most cases involving the MC series, this makes no difference. However, interconnections between other manufacturer's equipment may require that Pins 2 and 3 be reversed: consult the manufacturer’s literature.

* Use this cable at remote equipment, and install matching transformer with high Z side toward remote equipment. Then use cable A to join the low Z side of the transformer to the console. Use of the transformer at the high Z location allows long cable runs to the low Z connection.
The finest in professional mixing consoles, with 12, 16 or 24 inputs.
Complete compatibility with nearly all professional audio equipment.
Light, compact and rugged for mixing on the road as well as in the studio.

FEATURES
- Balanced XLR connectors on all primary input and output channels for complete compatibility with virtually all professional equipment.
- 8 mixing busses - 4 program, 2 echo and 2 foldback - and a stereo master buss.
- Insert patch points on all input channels and program busses offer maximum flexibility.
- Input channel equalizers offer a full 15dB of filtering in three bands with a sweepable midrange control for extra fine EQ control.
- On/Off switches on all input channels greatly simplify channel punch-in/out operation.
- Phantom power supply with 4 input channel selections for ease and convenience when using phantom-powered microphones.
- Sophisticated Cut system allows operator to monitor via head-phones all inputs, buses, and/or effects without altering or interrupting mix.
- Switchable Pops and Gain controls on all channels allow channel sensitivity to be set to accept microphones, electrical instruments or output from nearly any signal processing equipment.
- Illuminated, highly precise VU meters are switchable to provide accurate monitoring of program, foldback, echo, and stereo mixing busses (the MC2404 has independent meters for each buss), built-in peak LED's indicate high level peaks to avoid even momentary distortion.
- Peak LED's on each input channel light whenever post-EQ/pre-fader signal comes within 3 dB of clipping.
- Sophisticated Talkback system permits total communication between operator, crew and performers.
- Pan and Group assignment switches on all inputs allow channel signals to be either independently assigned to one of the program busses or simultaneously panned between groups 1 & 2 and 3 & 4.
- Foldback and Echo master control the signal level sent to respective output channels. Stereo master faders control overall level of corresponding Stereo output channel.
- Echo pan & Stereo assign switches and Group pan controls give exceptional flexibility in signal placement.
- Rugged construction throughout, and lightweight, compact overall dimensions make the MC series ideal for both touring and in-house installation.
GENERAL SPECIFICATIONS

Frequency Response
20Hz to 20kHz (±3dB) (400Hz ±6dB)

THD <0.1% (20Hz to 20kHz @400Hz ±6dB)

Noise Level*
Equivalent Input Noise = 0dBFS (40dB) Residual Noise = 90dB
-86dB GROUP Level Volume Innomal** All Channel assign switches off!
-86dB GROUP Level Volume Innomal** One input fader matched***
STANDBY OUT
-86dB Stereo fader min (All GROUP faders min)
-94dB Stereo fader min (One input fader and One GROUP fader innomal)**
FB OUT
-86dB GROUP Level control innomal*** All input FB volumes set
-86dB GROUP Level control innomal*** One input FB volume Innomal***
ECHO REND
-98dB GROUP Level control innomal*** All input ECHO volumes set
-98dB GROUP Level control innomal*** One input ECHO volume Innomal***

Equalizer Characteristics
Frequency Response MId 1..0
Noise Level'

GENERAL SPECIFICATIONS

INPUT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Input terminals</th>
<th>Input level</th>
<th>Source impedance</th>
<th>Sensitivity</th>
<th>Rated Input level</th>
<th>Max. non clipping level</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH INPUT (1 to 24)</td>
<td>OFF 10dB</td>
<td>20Ω (Balance)</td>
<td>50 to 2000 ohm lines or 600Ω</td>
<td>-32dB (±15 mV)</td>
<td>-20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>CH INSERT IN (1 to 20)</td>
<td>-20dB</td>
<td>20Ω (Balance)</td>
<td>600Ω</td>
<td>+4dB (12dB)</td>
<td>-20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>GROUP INSERT IN (1 to 4)</td>
<td>-20dB</td>
<td>20Ω (Balance)</td>
<td>600Ω</td>
<td>-20dB (±15 mV)</td>
<td>-20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>ECHO RETURN OUT (1 to 2)</td>
<td>+4dB</td>
<td>600Ω</td>
<td>10Ω</td>
<td>-20dB (±15 mV)</td>
<td>-20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
</tr>
<tr>
<td>SUB INSERT OUT 1 to 4 (1 to 2, 1 ECHO 1, 2)</td>
<td>-20dB</td>
<td>600Ω</td>
<td>10Ω</td>
<td>+6dB (23.4mV)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Unbalanced)</td>
</tr>
<tr>
<td>TALKBACK INPUT</td>
<td>-20dB</td>
<td>600Ω</td>
<td>10Ω</td>
<td>+6dB (23.4mV)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Unbalanced)</td>
</tr>
</tbody>
</table>

OUTPUT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Output terminals</th>
<th>Output level</th>
<th>Load impedance</th>
<th>Output level</th>
<th>Rated level</th>
<th>Max. non clipping level</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP OUT (1 to 4)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>STEREO OUT (L, R)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>FB OUT (1 to 2)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>ECHO OUT (1 to 2)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>CH INSERT OUT (1 to 20)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>GROUP INSERT OUT (1 to 4)</td>
<td>100Ω</td>
<td>600Ω (Balance)</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>XLR type (Balanced)</td>
<td></td>
</tr>
<tr>
<td>PHONES</td>
<td>100Ω</td>
<td>4Ω phones</td>
<td>+4dB (12dB)</td>
<td>+20dB (±15 mV)</td>
<td>TRS type (Unbalanced)</td>
<td></td>
</tr>
</tbody>
</table>

* Input level required to produce rated +4 dB output level: 0 dB = 0.775V

LEVEL DIAGRAM