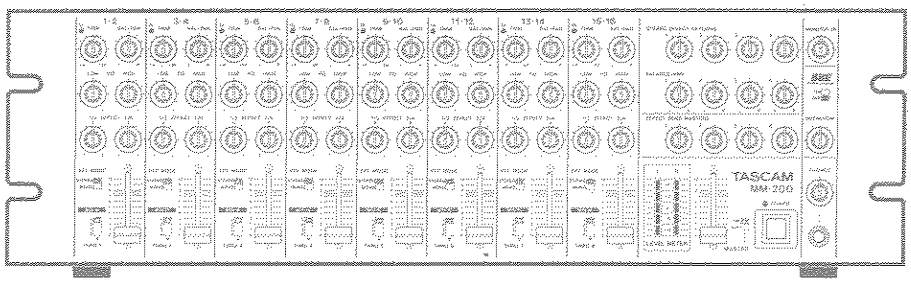
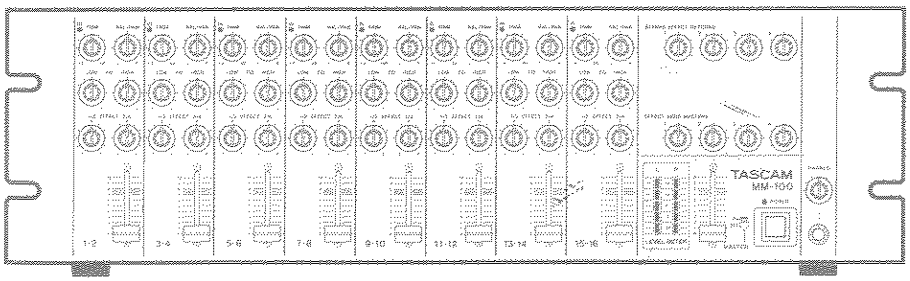
TASCAM

TEAC Professional Division

MM-200/MM-100

Keyboard Mixer





OWNER'S MANUAL

9101392201

Important Safety Precautions

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

VARNING
Explosionsfara vid felaktigt batteribyte.
Anvand samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera anvant batteri enligt fabrikantens instruktion.

THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989
DIRETTIVA CEE/87/308

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

KEYBOARD MIXER TASCAM MM-200/100

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

AMTSBLATT 163/1984, VFG 1045/1984

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

TEAC CORPORATION

Name des Herstellers/Importeurs

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This book may not be reproduced in whole or in part, by mimeograph or any other means, without permission.

SAFETY INSTRUCTIONS

CAUTION:
- **Read all of these instructions.**
- **Save these instructions for later use.**
- **Follow all warnings and instructions marked on the audio equipment.**

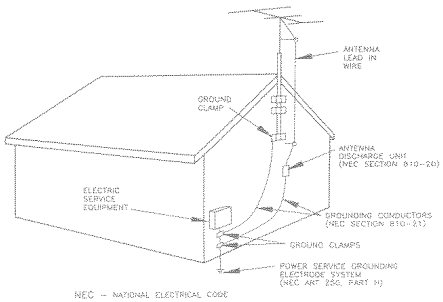
1. **Read Instructions** – All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Water and Moisture** – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. **Carts and Stands** – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.



7. **Wall or Ceiling Mounting** – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning** – The appliance should be cleaned only as recommended by the manufacturer.
14. **Power Lines** – An outdoor antenna should be located away from power lines.
15. **Outdoor Antenna Grounding** – If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70 – 1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure below.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE



16. **Nonuse Periods** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
17. **Object and Liquid Entry** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
18. **Damage Requiring Service** – The appliance should be serviced by qualified service personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
19. **Servicing** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

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Introduction

The TASCAM MM-200/100 is a conveniently sized (19" rack mountable) Keyboard Mixer designed primarily for electronic music applications. It can be used to mix five performances, or as a submixer to a larger recording system. Prominent in today's audio production fields is the innovation of stereo output synthesizers, rhythm machines and other electronic instruments. To meet what this current situation calls for, all inputs on the MM-200/100 are stereo. Each channel has 2 band EQ, and each channel has so wide a range of gain in the preamp and a trim control that low-level sources–even microphones and pickups–can be connected to the MM-200/100.

The MM-200 model : The effects sends can be four monos or two stereos, letting you process left and right signals tied together or kept separate as desired ; and the four stereo returns have their own balance (this acts as Pan for mono returns) and level controls. The MM-200's stereo mix buss has a "BBE Professional" system* which cancels unwanted phase shift and boosts the high frequencies by optimum amount at any given time. The MM-200 model also has a 4-in/8-thru MIDI patch bay allowing you to get your MIDI signals under control and reroute quickly, speeding things up and getting back what you really want to do.

This Manual

To get the most out of your MM-200/100, please take the time to read through this manual. If you're familiar with mixers you could use the unit on your own without a problem, but some time spent now will keep you from overlooking some of the features that make the MM-200/100 a more creative tool. You may discover some new tricks you haven't tried before.

Use of capital letters : In general, we use all upper case type to designate a particular switch, control, jack name or label (like BAL/PAN). All upper case type is also used to clearly distinguish an item from other similar ones (like CHANNEL FADER, as distinct from MASTER FADER).

* Under license from BBE Sound Inc.

Signal Flow in the MM-200/100

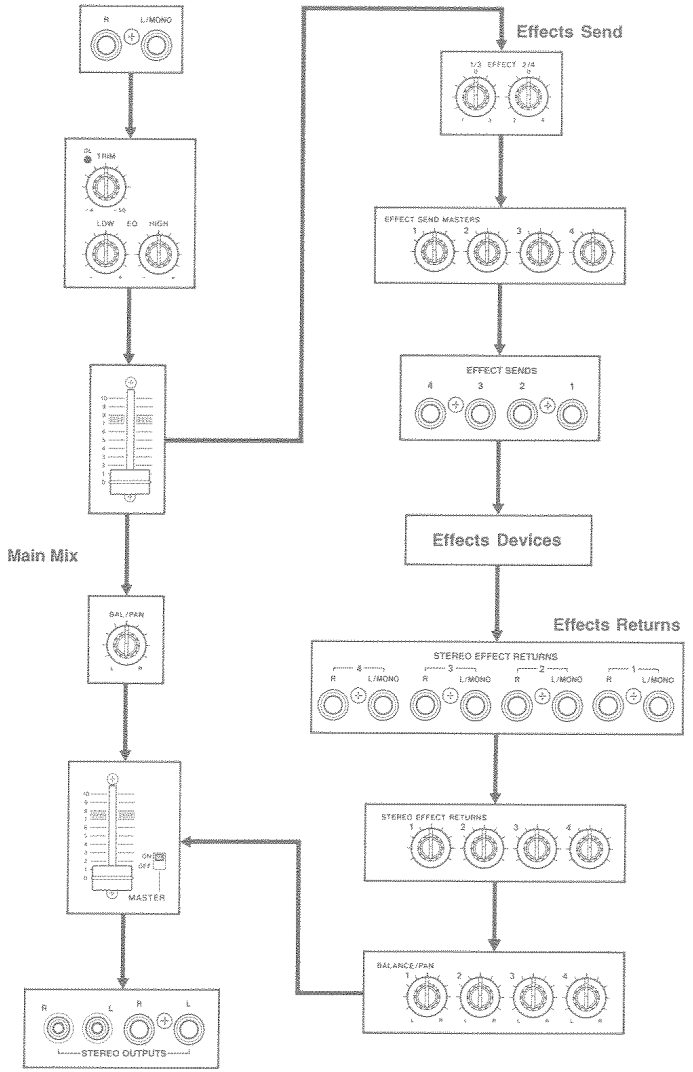


Fig. 1

Hookup Example

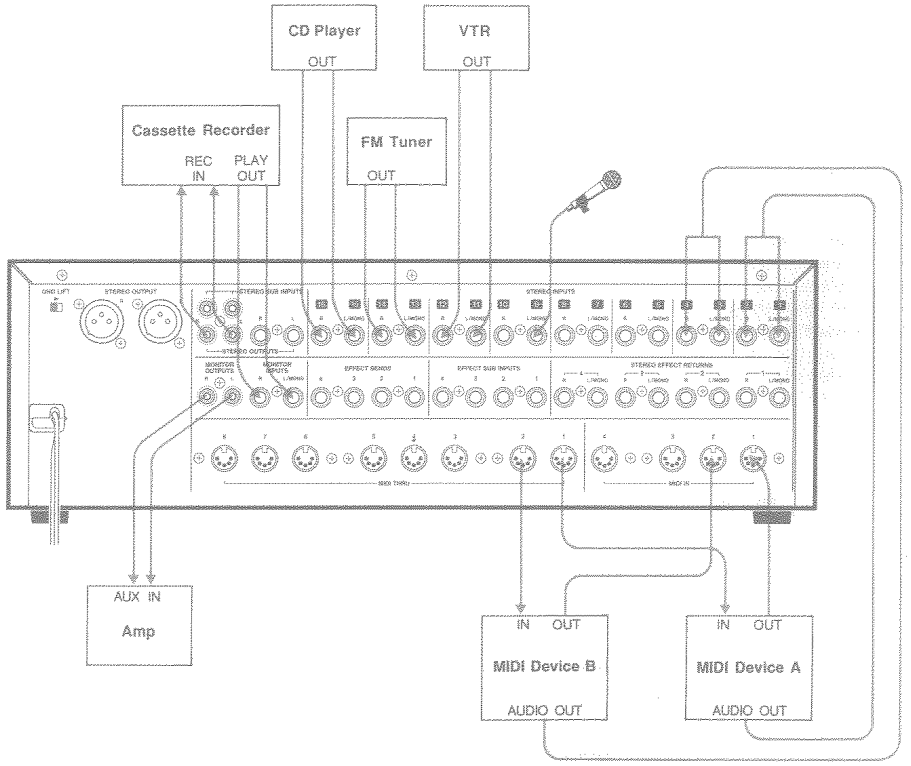


Fig. 2

The BBE System (MM-200 Only)

The BBE system has two functions : the Phase shift compensation and the Amplitude compensation.

Phase shift compensation

The BBE system provides the phase characteristics as shown in Figure 3 and the frequency response as shown in Figure 4, and prevents unwanted phase shift from being produced by speakers, ensuring the best sound to the human ears as proved by hundreds of participants who helped the folks at BBE laboratories to ferret out these curves ; they are a result of years' research at BBE labs.

When playing back tapes recorded with the BBE system switched on, be sure to turn off the BBE switch. If the switch is on, you doubly apply the phase shift compensation to the tapes, which will disturb the original effect, making tape playback sound degenerated.

Amplitude compensation

On general mixing consoles you'll turn up the High EQ control to emphasize the brilliance or brightness of the signal. This has side effects, though :

- It makes "pianissimo" passages noisy.
- It makes the sound harsh if this has a large amount energy in the high frequencies, as in cases where you turn up the EQ High control intending to bring out the snare drum or tom-tom, a cymbal crash is concomitantly amplified.

The BBE system lets you be free from these problems because it automatically moderates the boost when a passage of low sound pressure or a passage rich in energy in the high frequencies comes in — this is what we call "amplitude compensation" in the sense of "amplitude dependent boost compensation".

How the BBE works

Refer to the Block Diagram (Figure 5). Signal fed into the BBE system is sorted through a group of filters into three groups : the high, the middle, and the low frequencies. While passing through the filters the signal is given the phase characteristics described above (Figure 3). Then the high frequency signal goes to the voltage controlled amplifier (VCA), and it is combined together with the middle and low frequency signals before going out the BBE system.

On the other hand, the high and the middle frequency signals are sent to the level detection circuit then to the computing circuit, the heart of the BEE system, where optimum boost amount for the high frequencies is computed relative to the middle frequency content of the signal, so that a proportionally variable control voltage is sent to the VCA. The high boost amount is also dependent on the DEFINITION control. Turning the control full up (all the way to the right) does not, however, necessarily full boost the high frequency region. With a low level signal or a signal whose high frequency content is largely strong with regard to its middle frequency content, the boost amount is automatically reduced regardless of the setting position of the DEFINITION control. Signal bypasses the BBE system when the BBE ON/OFF switch is set to OFF.

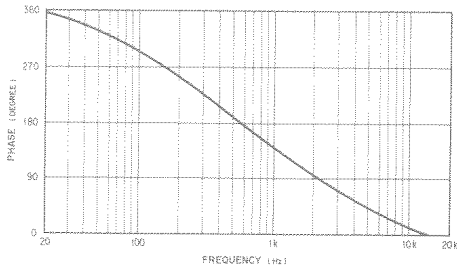


Fig. 3

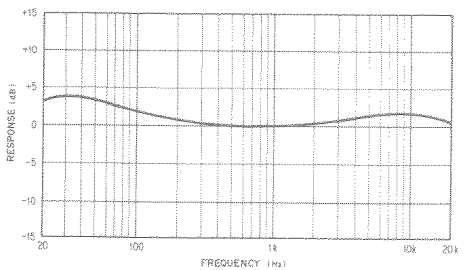


Fig. 4

When all is said and done, the BBE system does not straightforwardly boost the high frequencies like equalizers, but it has a logic or *intelligence* which enables the system to constantly monitor harmonics in the musical program and to compute an ever changing optimum amount of boost to be applied to the high frequencies.

Here are some tips on how to use the BBE system together with the EQ controls :

1. Boosting the low frequencies by EQ

   As the BBE automatically boosts the high frequencies only, if you want a little more in the low frequency range turn up the Low EQ control until you get the desired high-low balance.

2. Applying a tint to the sound

   Turn the High EQ control somewhat down and turn the BBE DEFINITION control up to a relatively high position. Then, in "pianissimo" passages the equalizer will be effective, because the BBE system automatically reduces the boost amount. This will make the "pianissimo" passages sound "mellow". Inversely, in "forte" passages the BBE will override the EQ, making the passages sound brightly.

3. Using the EQ/BBE system as a noise reduction system

   Turn the High EQ control all the way to the left (MIN) and turn the BBE DEFINITION control all the way to the right (MAX). Then, when source device is not sending out signal, the EQ cuts off noise intrinsic to the source ; and, when the source device starts sending out signal, the boost amount by BBE exceeds the cut amount by EQ. Remember, however, both frequency curves (one provided by EQ and the other by BBE) do not completely cancel each other and you cannot necessarily get a "flat response".

"BBE Professional"

A least difference in operation of capacitors between left and right channels would disturb the panorama of sound image. To prevent this we at TASCAM adopted for both the filter and the amplitude detecting circuits capacitors of so small an error that we thought that our BBE system is worth bearing a special name and we named it "BBE Professional" with the permission of BBE Sound Inc.

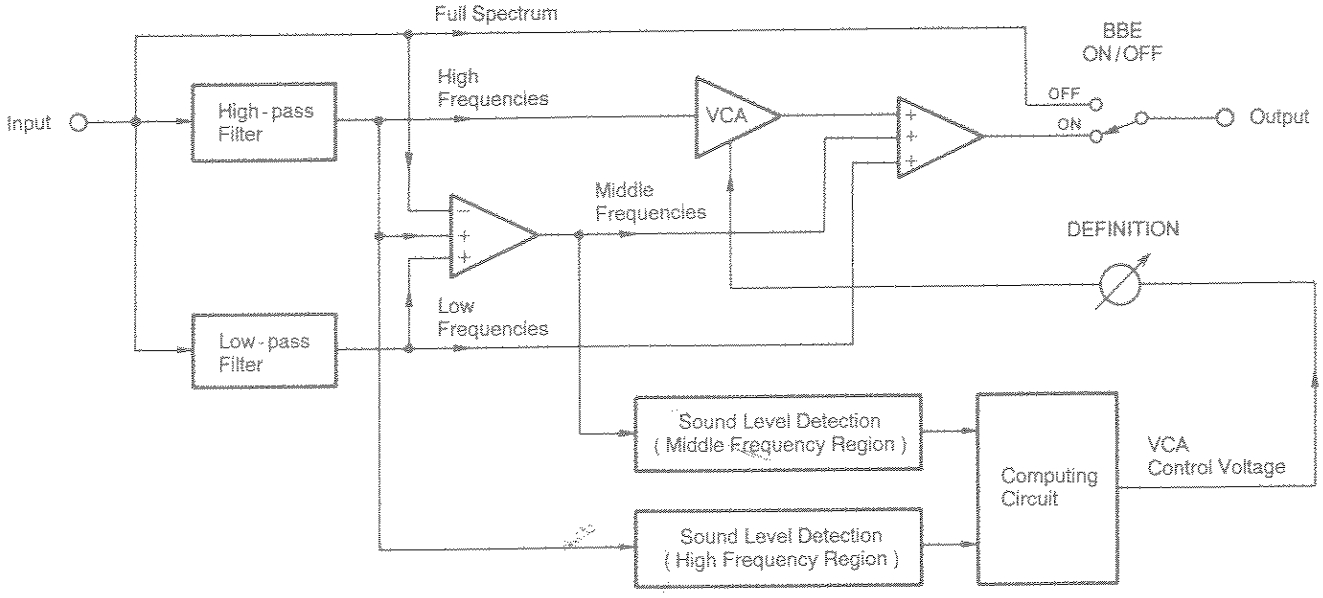


Fig. 5

Brief Guide

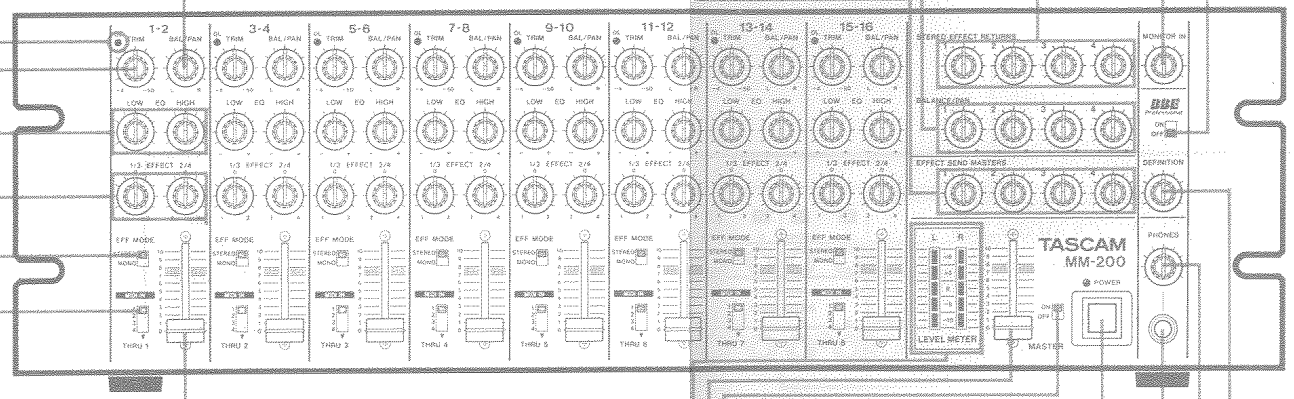
Input Section

EQ HIGH and LOW : HIGH cuts or boosts treble frequencies, and LOW, bass frequencies.

TRIM control : Sets how much preamplification will be added to the input signal. Turn to the right until the OL indicator only occasionally flashes.

OL (OverLoad) indicator : Lights prompting you to turn down the input level.

BAL/PAN control : As BAL(ance) this acts when both L and R inputs are plugged in and as PAN when only L is plugged in.



(Illustration shows the MM-200 model)

Channel fader : Sets the output level of the respective input channel.

MIDI IN switch (MM-200) : Lets any of the four MIDI IN signals "echo" out any of the eight THRU jacks.

EFF MODE switch (MM-200) : In STEREO, left input is sent to EFFECT control 1/3, and right input to EFFECT control 2/4. In MONO, left and right inputs are summed to mono, and the summed signal is sent to both EFFECT controls 1/3 and 2/4.

EFFECT 1/3 and 2/4 send controls : Turn these to the left of center to send signal (post fader) to EFFECT SEND MASTERS 1 and 2, or to the right of center to send signal to EFFECT SEND MASTERS 3 and 4.

Master Section

EFFECT SEND MASTERS 1-4 : These are the overall volume control for the four effects send mixes.

BALANCE/PAN (MM-200): Similar to the BAL/PAN control on the input channels ; Acts as BALANCE when both L and R jacks of STEREO EFFECT RETURNS are plugged in and as PAN when only the L/MONO jack is plugged in.

STEREO EFFECT RETURNS 1-4 : Used to control how much signal from the same labeled jacks on the back panel is sent to the MASTER fader.

MONITOR IN control (MM-200) : Adjusts how much signal from the MONITOR INPUT jacks will go to the PHONES level control.

BBE switch (MM-200) : Switches the BBE system on and off.

BBE DEFINITION (MM-200) : When the BBE switch is ON this control sets how much the BBE system enhances the high frequencies.

PHONES control : Adjusts the listening level in the headphones.

PHONES jack : For connecting to any stereo headphone (with a 1/4" 3-conductor stereo plug).

POWER switch : Turns the power to the mixer on and off.

MASTER ON/OFF switch : Switches the STEREO OUTPUTS on and off.

MASTER fader : Controls the overall output level of the stereo mix.

Level meter : On the MM-200 this shows the MONITOR OUTPUT level and on the MM-100 the STEREO OUTPUT level.

Rear Panel : Input and Output Connectors

MONITOR OUTPUTS (MM-200) : For connecting to your monitor speaker amplifier. The output level is not affected by the PHONES control.

STEREO OUTPUTS : May connect to a power amplifier or a 2-track recorder. All these six outputs are disabled when the MASTER ON/OFF switch is OFF.

GND LIFT (MM-200) : Eliminates noise due to a ground loop created through the XLR-type connector STEREO OUTPUT connections.

STEREO SUB INPUTS : Provides a direct route to the stereo mix buss.

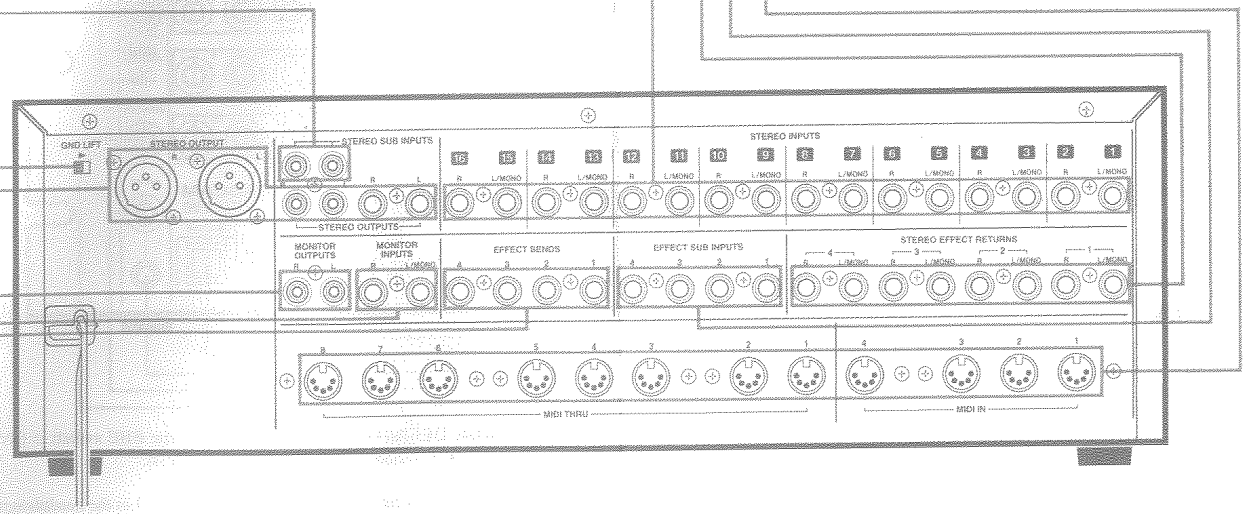
STEREO INPUTS : For use with stereo instruments or other stereo sources. To use with a mono source, plug it into the L/MONO jack.

STEREO EFFECT RETURNS : Typically for connecting to the output of effects devices. They may alternatively be used as additional normal stereo inputs.

EFFECT SUB INPUTS : Provide a direct route to the same-numbered EFFECT SEND MASTER controls.

CAUTION : Do NOT connect effects returns to these jacks.

MIDI patch bay (MM-200) : Connect the MIDI OUT of external MIDI devices to the MIDI IN jacks so MIDI signals may be "echoed" out the THRU jacks.



EFFECT SENDS : For connecting to the input of effects devices. The overall send level depends on the EFFECT SEND MASTERS.

MONITOR INPUTS (MM-200) : Accept the outputs of a 2-track recorder, the monitor outputs of a CD player etc.

Hookup Tips

Unfortunately, we can't cover every possible equipment system. Use the following as a guide when you lay out your system hookup.

CAUTION

All connections should be made with the power off.

Input Connections :

When stereo instruments are plugged into pairs of L and R channels, the left inputs will go to the left side of the stereo mix, and the right inputs to the right side. If you want to position left and right inputs somewhere in the mix separately, connect both left and right signals to different MONO jacks and keep their companion jacks unused (for example, left connects to jack 1 and right to jack 3, leaving jacks 2 and 4 empty), so that the BAL/PAN control on the channels can be used to pan them individually.

Choosing Effect Paths:

Each channel can access only two effects at any given time: if the EFFECT control is turned to the left for Effect Send 1, no signal can go to Effect Send 3 (and the same is true for Effect Sends 2 & 4).

Suppose, drums need to have digital reverb and delay simultaneously at times, and a guitar needs to have chorus and delay simultaneously. Chorus and reverb aren't going to be used at one time on one instrument (see diagram below). So you may connect Effect Send 1 to the reverb, Effect Send 2 to the delay, and Send 3 to the chorus. Then, on the guitar channel, turn EFFECT 1/3 to the right of center, and EFFECT 2/4 to the left of center. When you process the drums, turn both EFFECT 1/3 and EFFECT 2/4 to the left of center as shown.

With the MM-200 model, left and right inputs can be taken into the effect send paths either keeping them separate or summing them to mono as selected by the EFF MODE switch. If in the above example you set the EFF MODE switch on the drum channel to its STEREO position, the kick drum will be sent to the reverb, and the snare to the delay, separately. If you set the EFF MODE switch to its MONO position, both signals from the drum machine will simultaneously be sent to the reverb and delay as shown in diagram below. See also the "Stereo Effects Sends" on the next page.

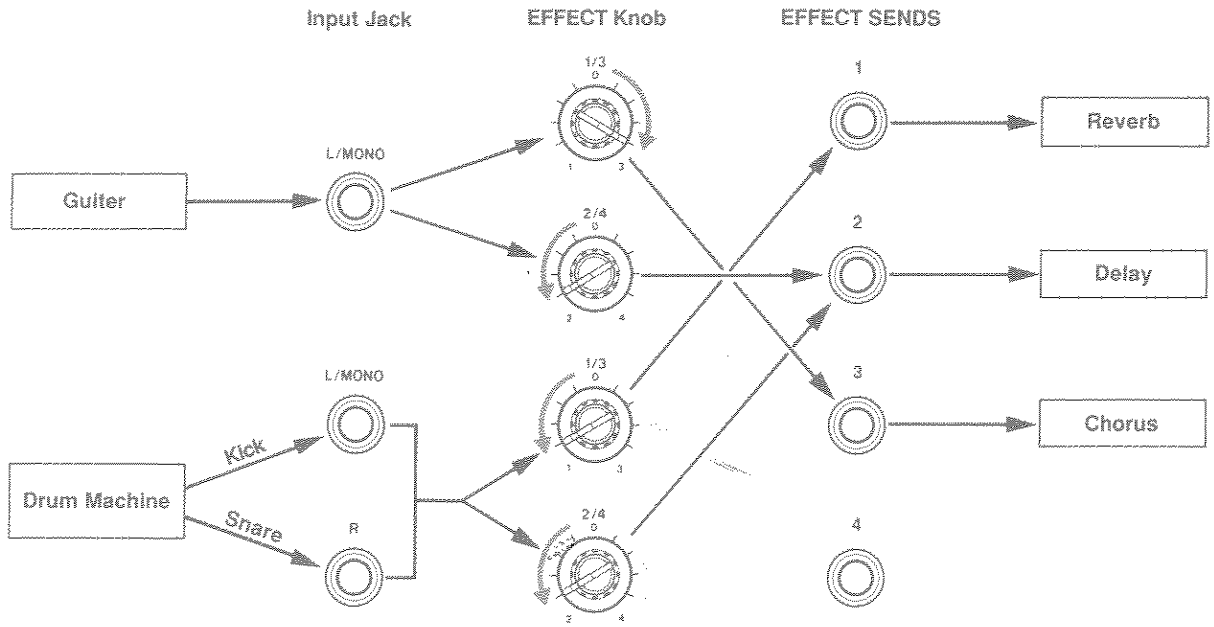


Fig. 6

Choosing Effect Returns:

There's no "rule" about it, but for the sake of clarity most people use the same number for the effect send and return—if Send 1 feeds a reverb, the reverb return is connected to Return 1 and so on.

MM-200 : If your reverb have stereo outputs connect to one of the four stereo effects returns. The BALANCE/PAN control in the return path works as BALANCE, allowing you to set the relative level of both sides. Mono output devices may be connected to Effects Return L/MONO jacks. You can pan them anywhere between the left and right sides if their companion R jacks are not used. If R jacks are also used to connect mono returns you cannot pan them ; left returns go to the left side, and right returns to the right side.

Choosing Stereo Outputs :

Your speaker amplifier may be connected to the 1/4" jacks or to the RCA jacks (or, on the MM-200 model, to the XLR type connectors). You can experiment to see which is quietest and most distortion-free with your equipment. The jacks not used for amp feed may be connected to your 2-track recorder if you want to record the live performance, or may be used to feed an extra monitor amp and speaker on-stage.

As an Expander Mixer to a Recording System :

The stereo outputs of the MM-200/100 connect to "Buss Ins" of your recording mixer. This makes the MM-200/100 part of the busses of the recording mixer. At mixdown time, when the busses into which the outputs of the MM-200/100 are connected feed a two track recorder, you have the inputs of the recording mixer added to the 16-mono (or 8-stereo) inputs of the MM-200/100.

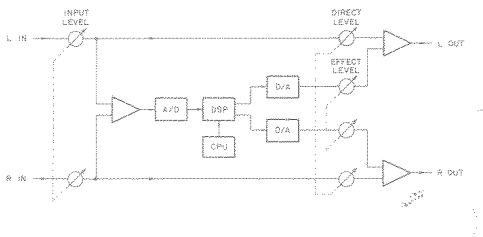


Fig. 7

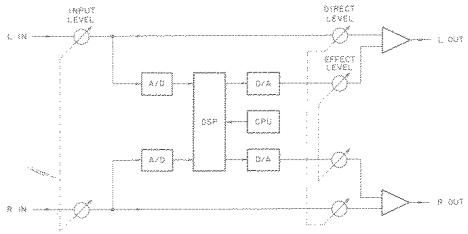


Fig. 8

STEREO EFFECTS SENDS (MM-200 ONLY)

Many of the newly manufactured digital effects devices are a full stereo format. In traditional digital effects devices, even if their inputs and outputs are stereo, left and right signals are blended into mono before being fed into DSP (digital signal processor) as shown in Figure 7. But full stereo format effects devices have two systems of DSP as shown in Figure 8, and you can use them to process left and right signals keeping their *stereoness* ; or, you can use each of them as two mono effects devices.

The MM-200 model supports these full stereo effects devices and its each channel has an EFF MODE STEREO/MONO select switch.

When you are using traditional stereo effects devices, connect them as shown in Figure 9. You can connect up to 4 units.

When you are using full stereo format units, you can connect up to 2 of them as shown in Figure 10. Pan returns 1 and 3 hard left and returns 2 and 4 hard right. To send left and right signals at the same level, set both EFFECT 1/3 and EFFECT 2/4 controls to the same position.

When using one full stereo unit as two mono effects units, you can pan their returns anywhere between the left and right sides of the stereo mix.

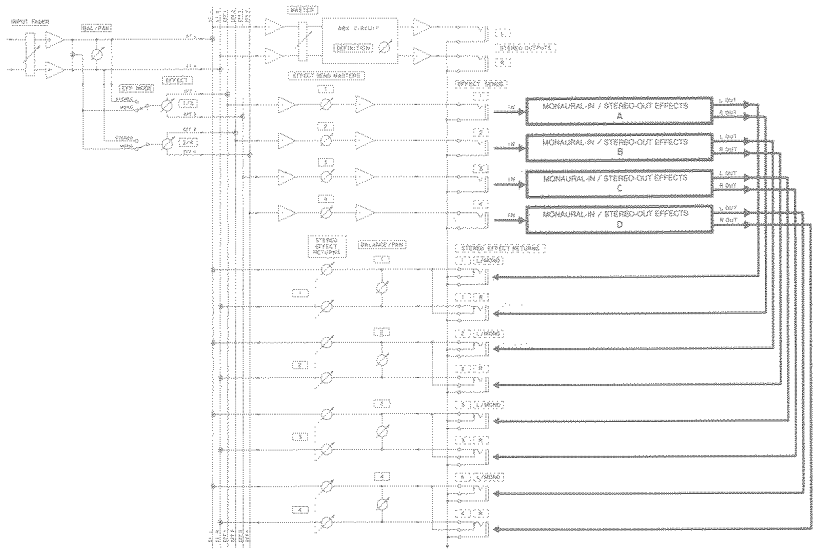


Fig. 9

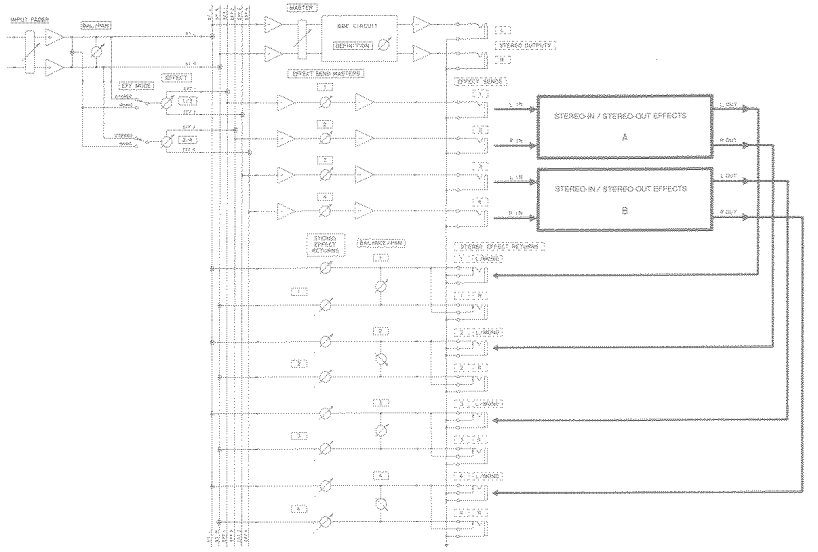


Fig. 10

■ When switching on power to your system, first turn on the MM-200/100, second, instruments, effects devices and others connected to the MM-200/100, and finally the power amplifier.

CAUTION

When switching off power, be sure to turn off the amplifier before any other equipment.

Setting Input Levels:

The goal is to get as "hot" a signal going as possible, without distorting the mixer itself.

1. Turn the level controls on your instrument all the way up.
2. Turn the **INPUT FADER** and **MASTER FADER** controls on the MM- 200/100 all the way down.
3. Set all **BAL(ANCE)/PAN** and **EQ** controls to their center position.
4. Play the instrument and, watching the **OL** indicator for that channel, turn the **TRIM** control so that the **OL** indicator flashes occasionally. You may have to adjust the trims again for different patches, etc., and if you increase the EQ settings.

   Setting the trim of each channel this way will give you the absolute maximum performance. If you want, you may turn down the trims so that you have headroom to make EQ adjustments and patch changes without causing distortion.

Setting Output Levels:

5. Turn the volume control(s) of your power amplifier all the way down.
6. Now, bring all the **CHANNEL FADERS** to their nominal positions (the shaded area between 7 and 8).
7. While playing, slowly bring up the **MASTER FADER** until the level meters read +6 on the loudest peaks, and the average is around 0 dB.
8. While playing, slowly bring up the volume controls on your power amp. Adjust the mix on the **CHANNEL FADERS**, making sure that you increase or decrease the **MASTER FADER** so that the MM-200/100 meters read a strong level. Increase the power amp volume control until you get the level you want.

This is the best way to get the best signal-to-noise ratio from your system. In most cases: keep everything as "hot" as possible until the power amp, and set the power amp controls to low sensitivity to get the overall level you want. If you make the mistake of running the faders of the MM-200/100 at a low level, and leaving the power amp wide open, all you are doing is amplifying the residual noise of the mixer.

Setting Levels: To Effect Devices

Effect devices are typically the noisiest elements of a system, but with proper level setting you won't hear the noise. Again, the principle is to have as loud a signal as possible going into the effect device, and turn down the effect *return level* when you want less effect.

Most effect devices have some kind of input meter — sometimes a single LED that changes color to red when the distortion point is reached. They may or may not have their own input and output level controls; sometimes there is a level switch. You have to set these properly to get the best signal-to-noise ratio from your system.

1. Go through the "Setting Input Levels" and "Setting Output Levels" procedures to set the trim and fader levels of the mixer properly if you haven't already.
2. MM-100 : Set the **EFFECT 1/3** and **EFFECT 2/4** controls on the channels to their maximum settings (full clockwise for Effect 3 and Effect 4, full counterclockwise for Effect 1 and Effect 2).

   MM-200 : If you want to send left and right inputs summed together, set the **EFF MODE** switch to its MONO position on the channels concerned and adjust the **EFFECT 1/3** and **EFFECT 2/4** controls to their maximum settings (full clockwise for Effect 3 and Effect 4, full counterclockwise for Effect 1 and Effect 2). If you want to send left and right inputs separately, set the **EFF MODE** switch to its STEREO position. The function of the **EFFECT 1/3** and **EFFECT 2/4** controls does not change when in STEREO send mode ; set them in the same way that you'll do in MONO send mode.
3. Set the **EFFECT SEND MASTERS** to the "2 o'clock" position.
4. While playing the instruments, slowly increase the input control of the effect unit. Stop when the effect device's meter or clip light warns of distortion.

If the effect unit has an input level switch (for example "+4/-20"), set it to the -20 dB (most sensitive) position. Change it to +4 (least sensitive) only if you can't get a non-clipping level by slightly turning down the EFFECT SEND MASTER of the MM-200/100.

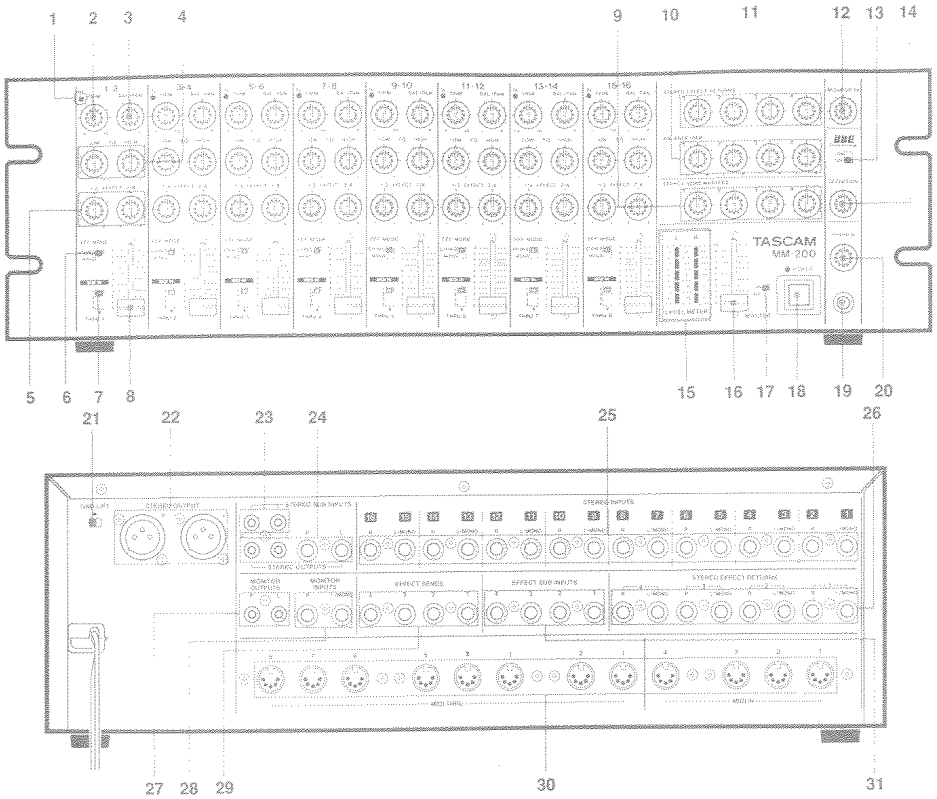
Setting Levels: From Effect Devices

Now that we know your effect device is exercising its full dynamic range--the input signal is not buried in the noise floor, or clipping the device--we can set the output level of the effect device (if it has one). Here, noise is less of a problem: we're aiming for maximum control.

1. Make sure that any "mix" or "balance" controls on the effect unit are set to "full effect" or "wet", so that no "dry" (unprocessed) signal comes to the effect returns.

2. Set the **STEREO EFFECT RETURN** controls of the MM-200/100 to the "2 o'clock" position.

3. While playing the instruments, slowly increase the output control of the effect device until you hear the "wettest" mix you're likely to use. This is a matter of taste.



1. OL (OverLoad) indicator

This indicator goes on about 3 dB before the signal is so loud it will distort or "clip" the electronics of the mixer. If it's on constantly turn down the TRIM or the volume control on your instrument.

2. TRIM control

This sets the level of both left and right inputs. The TRIM should be set high enough to amplify the input above the noise floor of the electronics, but not so high that it distorts the sound of the mixer. When the TRIM is turned all the way to the left, the signal at the STEREO INPUT jack is cut 6 dB. Use this setting for signals that are already preamplified, such as most synthesizers. The signal is amplified 40 dB when the TRIM is turned all the way to the right, allowing you to plug a microphone or other low-level signal into the STEREO INPUTS.

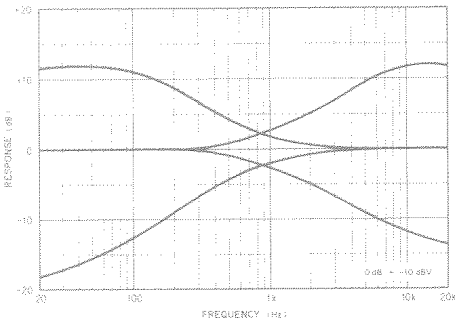
After the level has been set with the TRIM, signal goes to the equalizer.

3. BAL/PAN control

When both L and R inputs are plugged in, this controls the relative level of the left and right signals. One signal (odd numbered input) goes to the left side, and the other (even numbered input) goes to the right at all times (as long as there are two inputs actually plugged in). If only the L/MONO input is plugged in, the stereo feature is defeated and the control works as PAN, sending the one input anywhere to the left or right of the mix.

4. EQ HIGH and LOW controls

The two-band equalizer allows you to adjust the tonality of the signal going through each channel. It gets signal from the TRIM, and sends it to the input fader. At 10 kHz and higher frequencies a boost of 12 dB occurs when HIGH EQ is turned all the way to the right and a cut of 12 dB when turned all the way to the left. LOW EQ cuts or boosts 12 dB at 100 Hz and lower frequencies.



5. EFFECT 1/3 and 2/4 send controls

These each are a combination of "where to" and "how much" control. They typically control how much signal will go to two of four external effects devices, for example, a digital delay on EFFECT 1 and a reverb unit on EFFECT 2. They get signal from a point just after (post) the CHANNEL FADER. Turn the EFFECT 1/3 control to the right of center to route signal to EFFECT SEND MASTER 3, or to the left of center to send signal to EFFECT SEND MASTER 1. The farther you turn it in either way to send more signal. In a similar way the EFFECT 2/4 control routes signal to EFFECT SEND MASTER 2 or 4. At the center (12 o'clock) position they are "Off" and don't send any signal.

When you are first connecting your effects devices into the mixer, you should decide what effects you might want to use simultaneously. For example, if you think you might want to use a flange and a reverb unit on a vocal at the same time, connect EFFECT SEND 1 to the flange and EFFECT SEND 2 to the reverb. You couldn't send a signal to both EFFECT SENDS 1 and 3 or 2 and 4 at the same time.

On the MM-200 model : Left and right inputs may either be summed to mono or be separate before they appear at the EFFECT controls as selected by the EFF MODE switch (#6).

On the MM-100 model : Left and right inputs are always summed to mono before they appear at the EFFECT controls.

6. EFF MODE switch (MM-200)

In MONO position, this switch sums left and right inputs in the channel to mono. Set to MONO if you want to send both left and right inputs to a single effects device. If you want to send left and right inputs separately to different effects devices, set the switch to its STEREO position.

7. MIDI IN ▶ THRU switch (MM-200)

The MM-200 model is equipped with a 4-IN/8-THRU MIDI patch bay fully independent from the mixing section. Any MIDI IN can be assigned to any THRU jack simply by sliding these switches without having to repatch cables.

8. Channel fader

This linear control varies the level feeding the BAL/PAN control and MASTER fader and the EFFECT 1/3 and 2/4 controls.

The nominal setting position is between 7-8 (shaded area in the scale).

MASTER SECTION

9. EFFECT SEND MASTERS 1-4

They get signal from the EFFECT 1/3 and 2/4 controls on the channels. The signal then goes to the EFFECT SEND output jacks on the back panel.

10. BALANCE/PAN (MM-200)

These controls work for the effects returns in the same way that the BAL/PAN controls, item #3, work for the channel inputs.

11. STEREO EFFECT RETURNS 1-4

These controls set how much signal from the four STEREO EFFECT RETURN jacks is mixed onto the L/R stereo buss. When set to their 2 o'clock position, they let the return level go to the BALANCE/PAN controls without increasing or decreasing ("unity gain" : level in=level out).

Mono effects returns

MM-200 : If a signal (for example, the output of a reverb) is plugged into an L/MONO jack and nothing is plugged into its companion R jack, the BALANCE/PAN control in the respective return path works as PAN, so, as you vary the control, the reverb signal will go to anywhere between the left and right sides.

MM-100 : There is no way that you can "pan" them ; they are sent to the "hard left" and "hard right".

12. MONITOR IN level control (MM-200)

This control gets signal from the MONITOR INPUT jacks and adjusts its level directly going to the PHONES level control then on to the PHONES and MONITOR OUTPUT jacks.

This control does not work like PAN nor BALANCE ; it increases or decreases the level of the left and right monitor inputs by the same amount. If only the L/MONO jack of MONITOR INPUTS is plugged in (the R jack left unused), you'll hear the signal in the center of the headphones/monitor speakers.

13. BBE ON/OFF switch (MM-200)

This switch turns the BBE system on and off. If you don't want to boost the high frequencies but want to use the phase shift compensation function of the system, turn the DEFINITION control full down leaving this switch at ON position.

14. BBE DEFINITION (MM-200)

When the BEE ON/OFF switch is ON, turn this control to the right to enhance the high frequency content of the signal. This is similar to a "treble" or "high EQ" control but is not the same–for more information on this point, see pp.7-8.

This control has nothing to do with the phase shift compensation function of the BBE system ; when you turn the DEFINITION control all the way to the left (full down), there will be no boost but the phase shift compensation continues to occur.

15. Level meter

MM-200 : This shows the level feeding the MONITOR OUTPUT jacks. Its gets signal after the MASTER fader and before the PHONES level control.

MM-100 : The meter gets its signal after the MASTER fader and just before the STEREO OUTPUT jacks, showing the output level of the stereo mix.

16. MASTER fader

This adjusts the output level of the stereo mix. It gets signal from the left and right mix busses, which are fed by the channel BAL/PAN controls and by the STEREO EFFECT RETURN controls. It sends signal to the STEREO OUTPUT jacks, to the PHONES level control, and to the level meter.

17. MASTER ON/OFF switch

This turns the signal on or off to the STEREO OUTPUT jacks. The most common use is to silence your main speakers, for example during breaks.

18. POWER switch

This turns power to the MM-200/100 on and off.

19. PHONES jack

Any stereo headphone with a 1/4" stereo 3-conductor (TRS : Tip-Ring-Sleeve) plug may be connected to this jack. Signal comes from the PHONES level control.

> **CAUTION**
>
> DO NOT connect a 2-conductor mono plug to this jack, which will short out one of the internal amplifiers powering your headphones, causing it to burn out.

- The MASTER ON/OFF switch does not cut off the mix feeding the phones.

20. PHONES control

This controls the volume feeding the PHONES jack. The signal comes from the MASTER fader (and also from the MONITOR IN controls on the MM-200 model).

This control does not affect the level feeding the MONITOR OUTPUT jacks.

REAR PANEL

21. GND LIFT (MM-200)

Press this switch if you hear noise and think it might be due to a ground loop created through the XLR type STEREO OUTPUT connections.

> **NOTE**
>
> Noise can have many causes, so it is not always possible to eliminate it by the GND LIFT switch. If you have questions consult a person familiar with studio grounding techniques.

22. STEREO OUTPUTS, XLR type connectors (MM-200)

These carry the same mix as the RCA and 1/4" stereo outputs, but differ from them in two points : the XLR type connectors have a nominal output level of +4 dBV (1.2 V), and have a GND LIFT switch.

The pin assignment is : Pin 1 is shield (ground), Pin 2 is low ("cold") and Pin 3 is high ("hot").

23. STEREO SUB INPUTS L and R
This pair of RCA jacks provide access directly to the stereo buss. The signals are added to the buss before the MASTER fader. This allows stereo outputs from an external mixer to be controlled by the MASTER fader of the MM-200/100, so you can add extra channels to your system when needed.

24. STEREO OUTPUTS, RCA and 1/4 Jacks
Signal comes to these jacks from the MASTER ON/OFF switch. Both the RCA and 1/4" jacks have a nominal output level of - 10 dBV (0.3 V). You may connect one set of jacks to your main power amplifier, and the other to tape recorders, other TASCAM mixers or Portastudios.

25. STEREO INPUTS, 1-2 thru 15-16
These 1/4" phone jacks accept unbalanced signals from almost any type of device with an output of -50 dBV to -10 dBV, including microphones. Signal goes from these jacks to the channels' TRIM controls.

When you connect here stereo instruments such as drum machines, synthesizers, samplers, or even playback devices such as CD players, phono preamps, and FM tuners, the left inputs always go to the stereo Left buss and the right inputs to the stereo Right buss passing through the TRIM, EQ, BAL/PAN controls on the channels. They can also be taken into the effects send busses.

Mono Feature : When the L/MONO jack is plugged in and its companion R jack is left empty, the channel will work like a mono channel. In this mono mode, the BAL/PAN control works as PAN, sending signal anywhere in the left-and-right panorama of the mix.

If you want to use balanced microphones in these inputs, you can use a simple XLR-to-1/4" adapter ; alternatively use an in-line mic transformer if you need more gain or if unbalanced operation is noisy.

26. STEREO EFFECT RETURNS 1-4
These jacks connect to the BALANCE/PAN controls (or, on the MM-100, directly to the STEREO EFFECT RETURN level controls) on the front panel. After the level controls, signal goes to the MASTER FADER.

Typically, you connect the outputs of your effects devices to these jacks, but they can be used for any line level input if desired. The input level expected by these jacks is -10 dBV (0.3 V), but each return path has its own Level control and can accept a wide range of higher or lower levels.

27. MONITOR OUTPUTS (MM-200)
These RCA jacks provide a line level version of the same signal that feeds the PHONES jack and may be connected to your monitor speaker amplifier. Signal comes from a point before the PHONES level control.

28. MONITOR INPUTS (MM-200)
Signal fed into this pair of 1/4" jacks passes only the MONITOR IN level control before appearing at the MONITOR OUTPUT jacks. These jacks may be connected to the -10 dBV unbalanced outputs of a 2-track recorder, or to the monitor outputs of a CD player etc, so playback can be heard in the headphones or through the monitor speakers without disturbing any settings or risking feedback by bringing the 2-track or CD monitor outputs into a channel.

29. EFFECT SENDS 1-4
The signals coming from the EFFECT SEND MASTERS are taken out from these jacks to a signal processor (reverb, delay, phaser, etc.) so that they can be enhanced in some way. After the signals are processed, they return to the STEREO EFFECT RETURN jacks.

30. MIDI patch bay (MM-200)
Any of the four MIDI INputs can be assigned to any of the eight THRU jacks depending on the setting of the MIDI IN switches on the front panel.

The possibilities of a MIDI system is almost endless, and the discussion on how to hook up your MIDI devices using this MIDI patch bay is out of the scope of this manual. Consult the manual for your MIDI devices to know how MIDI signals are to be routed for specific purposes. You'll also find books and magazines that can provide valuable information to help you.

31. EFFECT SUB INPUTS 1-4
These jacks connect directly to the Effects Send busses. Signal fed into jack 1 goes directly to the EFFECT SEND MASTER 1 control, signal fed into jack 2 to the EFFECT SEND MASTER 2 control, and so on. By connecting an external mixer's effects output directly to the effects buss of the MM-200/100, the whole mixing system can share a single effects device.

CAUTION

DO NOT confuse these jacks with the effects returns. If you connect the output of an effects device which is fed on EFFECT SEND 1 to EFFECT SUB IN 1, you will get feedback and possibly damage your equipment.

Specifications

STEREO INPUT (1/4" phone jack, unbalanced)

Input impedance :	50k ohms (25k ohms with only L/MONO connected)
Input level :	-50 dBV to -4 dBV
Trim gain :	-6 dB to +40 dB

STEREO SUB Input (RCA jack, unbalanced)

Input impedance :	10k ohms
Nominal input level :	-10 dBV (0.3 V)

STEREO EFFECT RETURN (1/4" phone jack, unbalanced)

Input impedance :	5k ohms (MM-200) 10k ohms (MM-100)
Nominal input level :	-10 dBV (0.3 V)

EFFECT SUB INPUTS (1/4" phone jack, unbalanced)

Input impedance :	300k ohms
Nominal input level :	-10 dBV (0.3 V)

MONITOR INPUTS (RCA jack, unbalanced)

Input impedance :	65k ohms
Nominal input level :	-10 dBV (0.3 V)

STEREO OUTPUTS

	(XLR type connector, balanced)	(RCA/ 1/4" phone jack, unbalanced)
Output impedance :	75 ohms	100 ohms
Nominal output level :	+4 dBm (1.2 V)	-10 dBV (0.3 V)

EFFECT SENDS (1/4" phone jack, unbalanced)

Output impedance :	100 ohms
Nominal output level :	-10 dBV (0.3 V)

MONITOR OUTPUTS (RCA jack, unbalanced)

Output impedance :	100 ohms
Nominal output level :	-10 dBV (0.3V)

PHONES Output (1/4" stereo jack)

Output impedance :	27 ohms
Maximum output level :	100 mW + 100 mW (8-ohm load)

MIDI Connector (MM-200 only)

MIDI IN :	DIN socket, 5-pin
MIDI THRU :	DIN socket, 5-pin

Equalizer

Type :	2-band, shelving
Frequency :	10 kHz (HIGH) 100 Hz (LOW)
Boost/cut :	+/-12 dB at 10 kHz/100 Hz

Input Clipping Level : +17 dB (Trim at min.)

Overload Indicator Lighting Level : about 3 dB below clipping

Level Meter : 5-dot L and R meters

Power Requirements

USA/CANADA :	120 V AC, 60 Hz
EUROPE :	230 V AC, 50 Hz
U.K./AUSTRALIA :	240 V AC, 50 Hz

Consumption :

MM-200 :	16 Watts
MM-100 :	11 Watts

Dimensions (WxHxD) : 482 x 139 x 244 mm (19" x 5-1/2" x 9-5/8")

Typical Performance

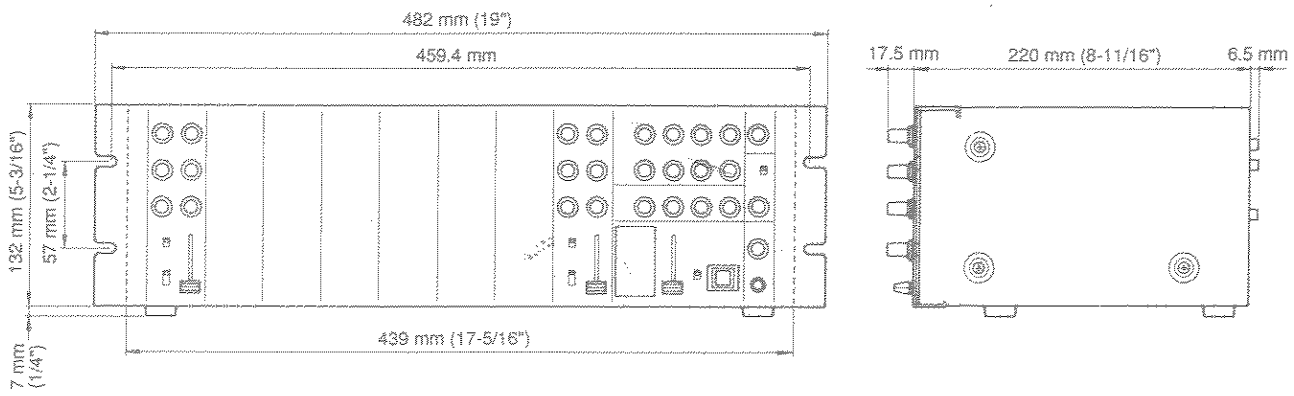
Signal-to-Noise Ratio : (DIN A WTD, Trim Min, without BBE)
Channel Input to Stereo Outputs : 73 dB
All Channel Inputs to Stereo Outputs : 71 dB

Frequency Response : (at Trim Min, -4 dBV input, without BBE)
Channel Input to Stereo Outputs : 10 Hz to 30 kHz +/-1 dB

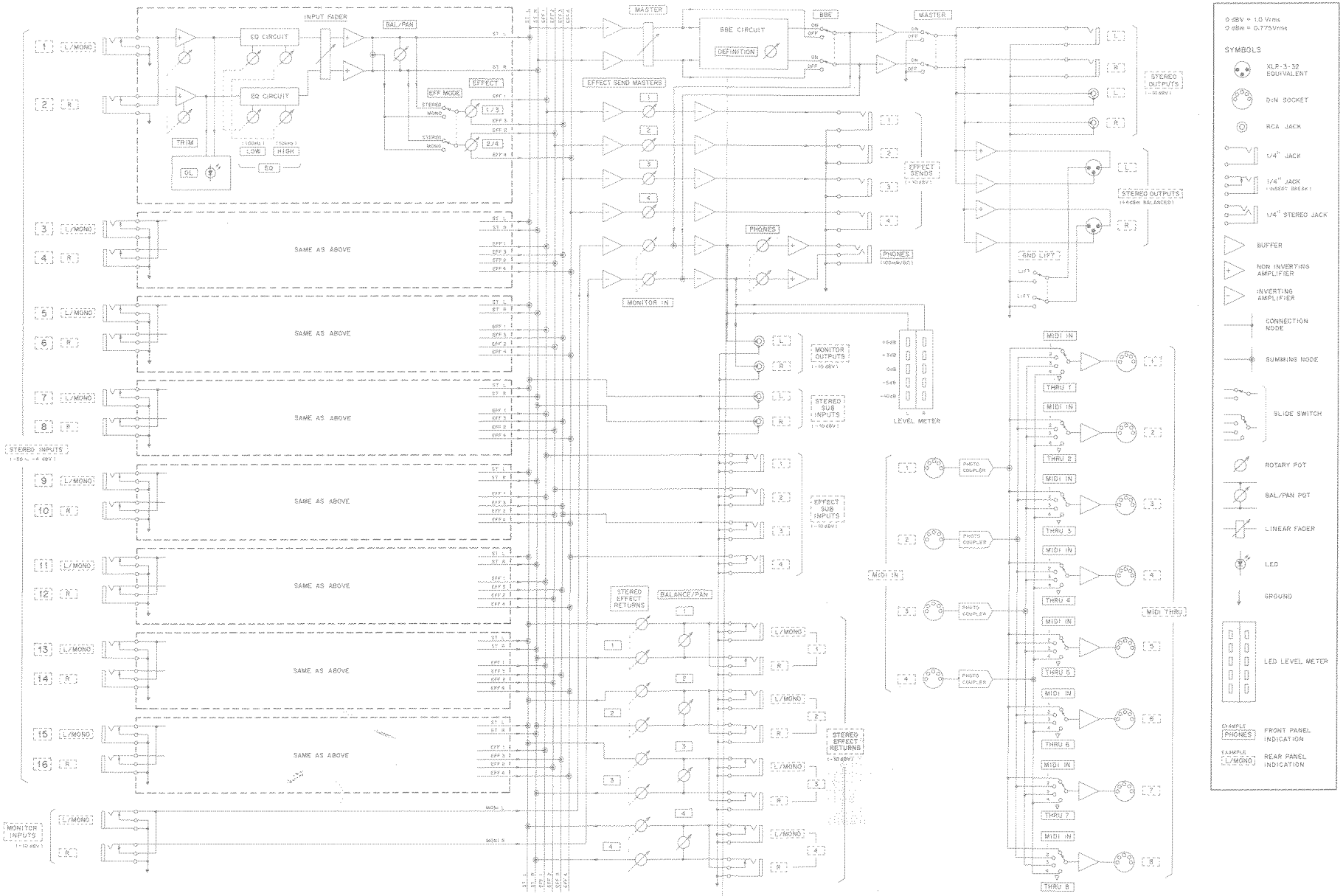
Distortion : (THD, at 1 kHz, -4 dBV input, Trim Min, without BBE)
Channel Input to Stereo Outputs : 0.03%

Crosstalk : (at 1 kHz))
Stereo Outputs, L and R : 60 dB

■ Changes in specifications and features may be made without notice or obligation.

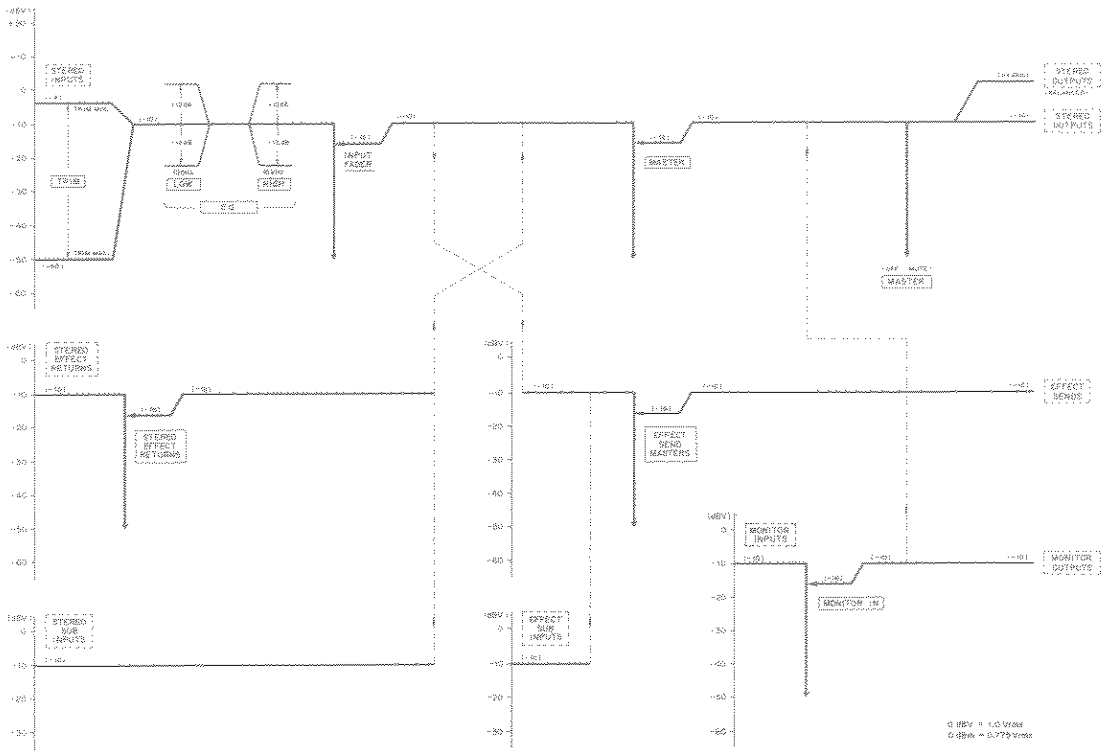


Block Diagram (MM-200)

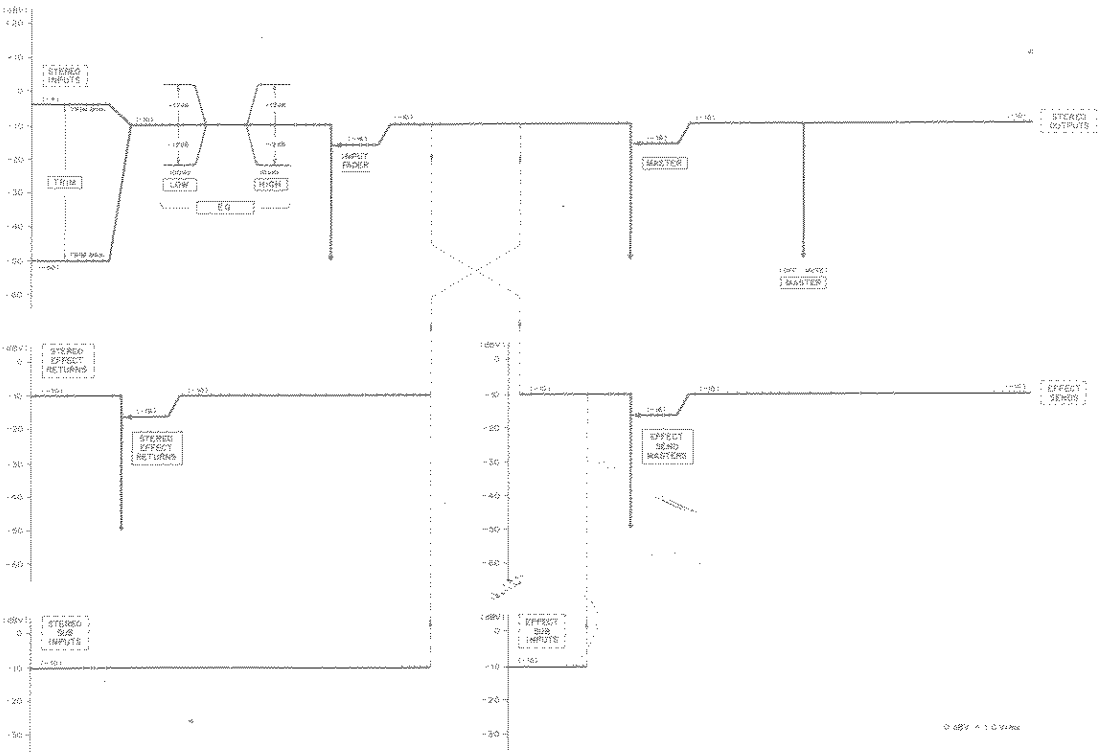


Level Diagrams

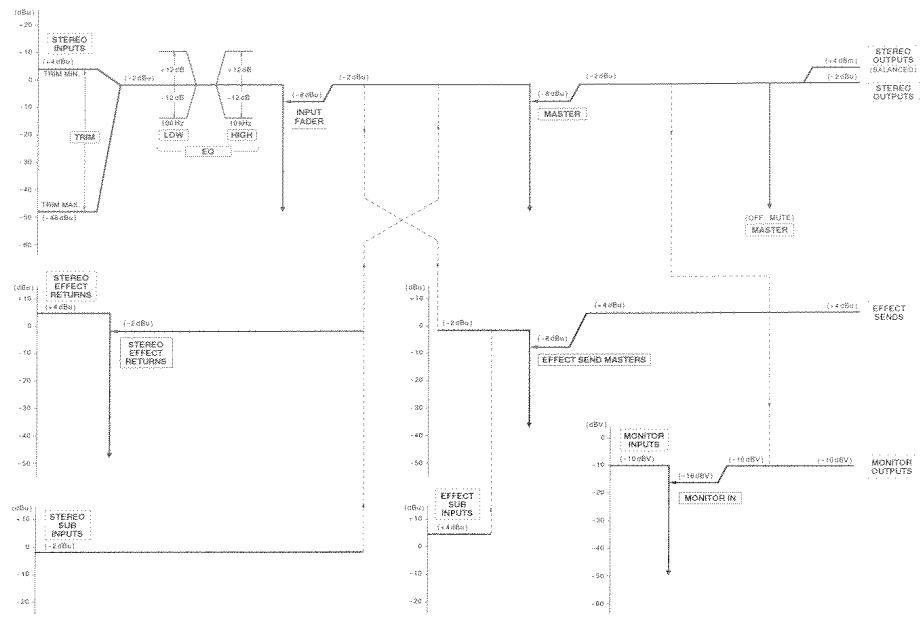
MM-200



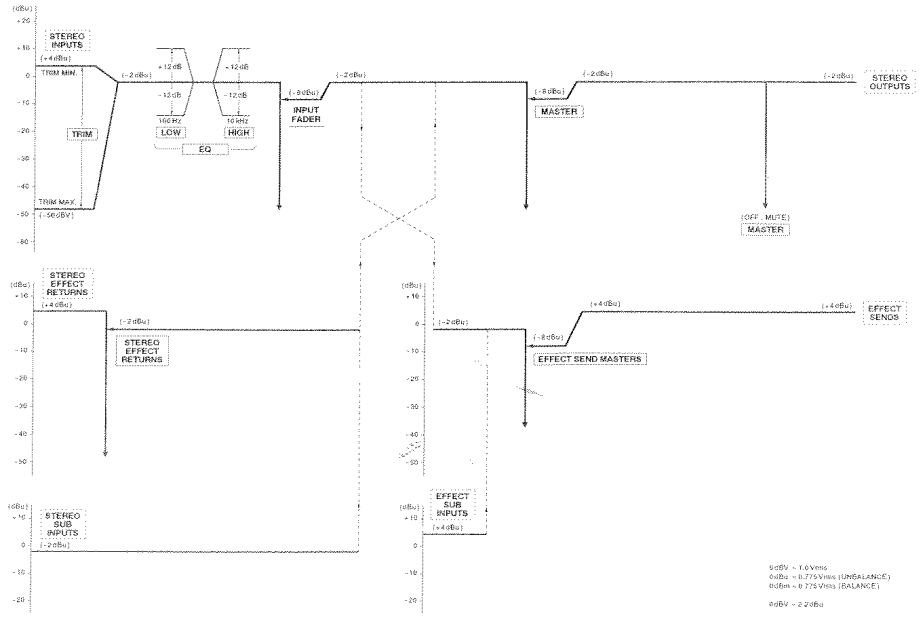
MM-100



MM-200



MM-100



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Specifications

Typical Performance

To improve the S/N ratio, the internal nominal operating level has been changed from −10 dBV to −2 dBu. Here are the updated specifications (remember the changes when reading the block diagrams contained in the current manual):

STEREO INPUT (1/4" phone jack, unbalanced)

Input impedance:	50k ohms (25k ohms with only L/MONO connected)
Input level:	−48dBu ~ +4dBu
Trim gain:	−6dB ~ +46dB

STEREO SUB Input (RCA jack, unbalanced)

Input impedance:	10k ohms
Nominal input level:	−2dBu (0.6V)

STEREO EFFECT RETURN (1/4" phone jack, unbalanced)

Input impedance:	5k ohms (MM-200) 10k ohms (MM-100)
Nominal input level:	+4dBu (1.2V)

EFFECT SUB INPUT (1/4" phone jack, unbalanced)

Input impedance:	300k ohms
Nominal input level:	+4dBu (1.2V)

MONITOR INPUT (RCA jack, unbalanced)

Input impedance:	30k ohms
Nominal input level:	−10dBV(0.3V)

STEREO OUTPUTS (XLR type connector, balanced) (RCA/ 1/4" phone jack, unbalanced)

Output impedance:	75 ohms	100 ohms
Nominal output level:	+4dBm (1.2V)	−2dBu (0.6V)

EFFECT SENDS (1/4" phone jack, unbalanced)

Output impedance:	100 ohms
Nominal output level:	+4dBu (1.2V)

Signal-to-Noise Ratio:(DIN A WTD, Trim Min, Input fader Max, Master fader 75%, without BBE)

Channel Input to Stereo Outputs:	80dB
All Channel Inputs to Stereo Outputs:	79dB

Frequency Response:(at Trim Min, −2dBu input, without BBE)

Channel Input to Stereo Outputs:	20Hz to 20kHz ±1dB

Distortion:(THD, at 1kHz −2dBu input, without BBE)

Channel Input to Stereo Outputs:	0.03%

■ If the minimum and maximum positions of the TRIM controls are marked with numbers on your MM-200/100, please disregard them

TASCAM

TEAC Professional Division

MM-200/MM-100

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