YAMAHA

PM 5000
MIXING CONSOLE

Owner's Manual

CAUTION

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.
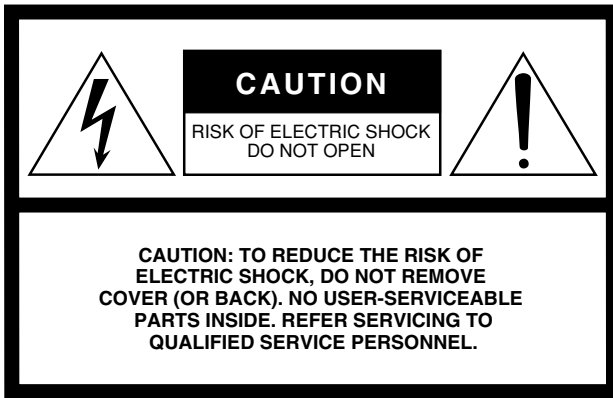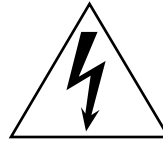
The above warning is located on the rear of the unit.

Explanation of Graphical Symbols

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 product.

IMPORTANT SAFETY INSTRUCTIONS

1 **Read these instructions.**

2 **Keep these instructions.**

3 **Heed all warnings.**

4 **Follow all instructions.**

5 **Do not use this apparatus near water.**

6 **Clean only with dry cloth.**

7 **Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.**

8 **Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.**

9 **Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.**

10 **Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.**

11 **Only use attachments/accessories specified by the manufacturer.**

12 **Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.**

13 **Unplug this apparatus during lightning storms or when unused for long periods of time.**

14 **Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.**

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK,
DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

PRECAUTIONS

PLEASE READ CAREFULLY BEFORE PROCEEDING

* Please keep this manual in a safe place for future reference.

⚠ WARNING

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

Power supply/Power cord

- Only use the voltage specified as correct for the device. The required voltage is printed on the name plate of the PW5000.
- Use only the specified power supply PW5000.
- Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.

Do not open

- Do not open the device or attempt to disassemble the internal parts or modify them in any way. The device contains no user-serviceable parts. If it should appear to be malfunctioning, discontinue use immediately and have it inspected by qualified Yamaha service personnel.

Water warning

- Do not expose the device to rain, use it near water or in damp or wet conditions, or place containers on it containing liquids which might spill into any openings.
- Never insert or remove an electric plug with wet hands.

If you notice any abnormality

- If the power cord or plug becomes frayed or damaged, or if there is a sudden loss of sound during use of the device, or if any unusual smells or smoke should appear to be caused by it, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified Yamaha service personnel.
- If this device or the power supply should be dropped or damaged, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified Yamaha service personnel.

⚠ CAUTION

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the device or other property. These precautions include, but are not limited to, the following:

Power supply/Power cord

- Remove the electric plug from the outlet when the device is not to be used for extended periods of time, or during electrical storms.
- When removing the electric plug from the device or an outlet, always hold the plug itself and not the cord. Pulling by the cord can damage it.
- Turn the unit ON or OFF using only the POWER switch on the power supply PW5000. Turning the unit ON or OFF by plugging or unplugging the power cord, using a switch on a power tap, a breaker switch, or similar external means can result in damage.
- Do not turn the PW5000 POWER switch OFF and ON in rapid succession. Doing so can result in excessive current flow that can cause damage. Wait at least 5 seconds before turning the POWER switch ON after it has been turned OFF.

Location

- When transporting or moving the device, always use six or more people.
- Before moving the device, remove all connected cables.
- Always remove the memory card before moving the console. Accidental impact or shock during transport can damage the memory card and/or the card reader unit.
- Avoid setting all equalizer controls and faders to their maximum. Depending on the condition of the connected devices, doing so may cause feedback and may damage the speakers.
- Do not expose the device to excessive dust or vibrations, or extreme cold or heat (such as in direct sunlight, near a heater, or in a car during the day) to prevent the possibility of panel disfiguration or damage to the internal components.
- Do not place the device in an unstable position where it might accidentally fall over.
- Do not block the vents. This device has ventilation holes at the top/front/rear to prevent the internal temperature from rising too high. In particular, do not place the device on its side or upside down, or place it in any poorly-ventilated location, such as a bookcase or closet.
- Do not use the device in the vicinity of a TV, radio, stereo equipment, mobile phone, or other electric devices. Otherwise, the device, TV, or radio may generate noise.

Connections

- Before connecting the device to other devices, turn off the power for all devices. Before turning the power on or off for all devices, set all volume levels to minimum.

Handling caution

- Do not insert your fingers or hand in any gaps or openings on the device (vents, etc.).

- Avoid inserting or dropping foreign objects (paper, plastic, metal, etc.) into any gaps or openings on the device (vents, etc.) If this happens, turn off the power immediately and unplug the power cord from the AC outlet. Then have the device inspected by qualified Yamaha service personnel.

- Do not use the device or headphones for a long period of time at a high or uncomfortable volume level, since this can cause permanent hearing loss. If you experience any hearing loss or ringing in the ears, consult a physician.

- Do not rest your weight on the device or place heavy objects on it, and avoid use excessive force on the buttons, switches or connectors.

Backup battery

- This device has a built-in backup battery. When you unplug the power cord from the AC outlet, the internal data is retained. However, if the backup battery fully discharges, this data will be lost. When the backup battery is running low, the display indicates "LoBT(Low Battery)." In this case, immediately save the data to a Memory Card (CompactFlash), then have qualified Yamaha service personnel replace the backup battery.

XLR-type connectors are wired as follows (IEC60268 standard): pin 1: ground, pin 2: hot (+), and pin 3: cold (-).

Yamaha cannot be held responsible for damage caused by improper use or modifications to the device, or data that is lost or destroyed.

Always turn the power off when the device is not in use.

The performance of components with moving contacts, such as switches, volume controls, connectors, and fans, deteriorates over time. Consult qualified Yamaha service personnel about replacing defective components.

FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!
This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance

with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA90620

The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.   (class B)

ADVARSEL!
Lithiumbatteri—Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandoren.

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

VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

(lithium caution)

NEDERLAND / THE NETHERLANDS

• Dit apparaat bevat een lithium batterij voor geheugen back-up.
• This apparatus contains a lithium battery for memory back-up.

• Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat ann het einde van de levensduur afdankt of de volgende Yamaha Service Afdeiing:
  Yamaha Music Nederland Service Afdeiing
  Kanaalweg 18-G, 3526 KL UTRECHT
  Tel. 030-2828425

• For the removal of the battery at the moment of the disposal at the end of the service life please consult your retailer or Yamaha Service Center as follows:
  Yamaha Music Nederland Service Center
  Address : Kanaalweg 18-G, 3526 KL UTRECHT
  Tel   : 030-2828425

• Gooi de batterij niet weg, maar lever hem in als KCA.
• Do not throw away the battery. Instead, hand it in as small chemical waste.

(lithium disposal)

Foreword

Thank you for choosing a Yamaha PM5000 Mixing Console. The PM5000 is the proud successor to the highly acclaimed Yamaha PM4000, which became the definitive sound reinforcement console of the preceding decade in terms of both performance and features.

The PM5000 carries on the PM-series pedigree with unprecedented sound and operability, while inheriting new digital control features from Yamaha's top-line PM1D digital console. In an era in which digital consoles are becoming the mainstream, the PM5000 represents the peak of refinement in analog sound technology, with the added benefits of digital control.

Please read this manual carefully before use to ensure that you benefit from the maximum performance and control capabilities that your PM5000 can deliver. Also keep the manual safe but handy so you can refer to later.

About This Manual

General Approach

Most of this manual is devoted to describing the features and functions of the various PM5000 modules. Since the operational design of the PM5000 is based on familiar analog console principles, anyone who is familiar with the PM4000 or similar consoles should be able to begin operating the PM5000 without hesitation. New features and multi-module control operations will be described in column form.

The names of physical controls such as buttons and knobs will be shown in square brackets.

The manual is organized as follows:

■ **PM5000 Overview (page 10)**

The names and functions of the various sections of the console are broadly described in the context of the console as a whole. Please read this section before continuing on to the details. This section explains the console's overall internal signal flow and how it relates to external equipment.

■ **The Sections and Modules (page 15)**

Following the signal flow from input to output, the individual features and functions of each section and module are described individually.

■ **Scene Memory Functions (page 51)**

Operation of the PM5000 scene memory functions, including storage of panel settings and motor fader operations, is described here.

■ **Utility Functions (page 56)**

This section describes operation of the utility functions relating to overall system setup and communication with external equipment.

■ **Appendix (page 84)**

Options, plugs and connectors, and other information for general operation and maintenance.

References, hints, and additional information will be provided throughout the text where appropriate.

The PM5000 Models

The PM5000 series includes three basic models, as described below:

■ **PM5000-52C** (**52 input channels/center master**)

■ **PM5000-36** (**36 input channels/right master**)

■ **PM5000-28** (**28 input channels/right master**)

For each model the number following "PM5000" refers to the total number of mono and stereo input channels. The only actual difference between models is the number of mono input modules. All other modules and configuration are the same. This manual applies to all three models.

Contents

PM5000 Overview

Panel Layout

The layout of the PM5000's functional sections in the basic configuration is shown below. In the PM5000-52C the master output section is located in the center of the console, while in all other models it is located to the right of the console.

> **NOTE**
>
> In this manual the console's main functional groups are referred to as "sections." Each section further contains "blocks" of functions. The basic hardware divisions are "modules." For example, all of the console's input modules make up the "input channel section." Each input channel is made up of an "EQ block," a "fader block," and others. In the PM5000 each input channel is made up of two separate hardware components: an "input channel module" and a "fader module."

Top Panel

PM5000-52C
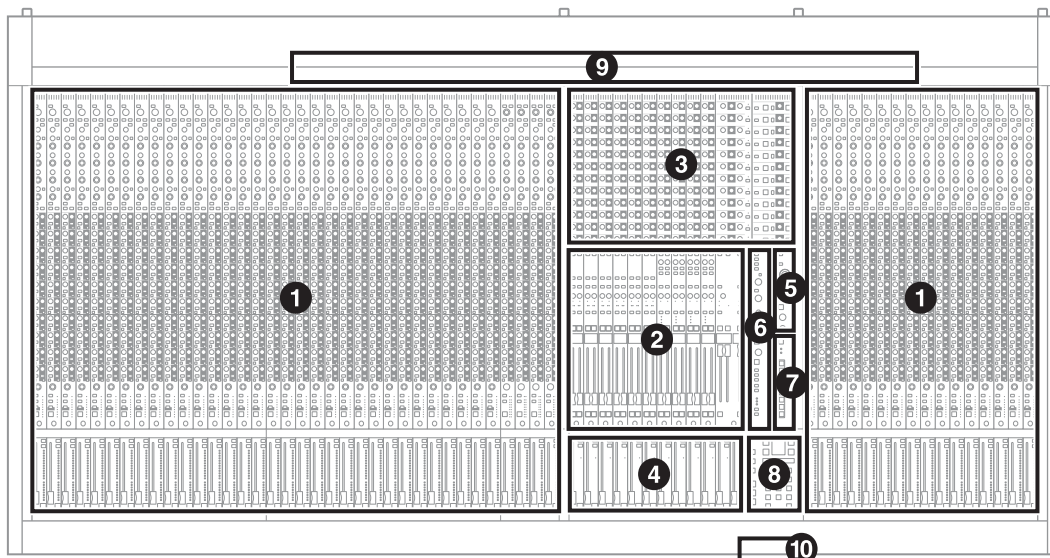
PM5000-28
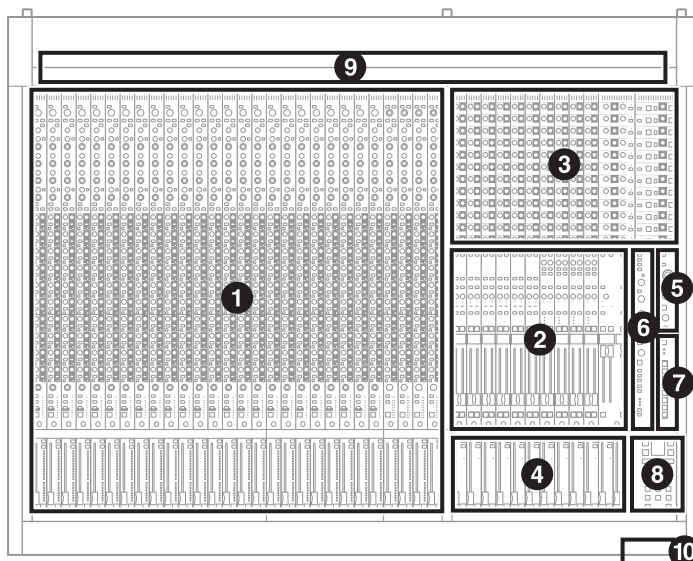
❶ Input Channel Section (page 15)

Two types of input channels are provided – mono and stereo – but the basic block structure of each is the same. After going through phantom power, input gain, phase reversal, and high-pass filter stages, the audio signal passes through a 4-band equalizer before it reaches the channel fader. External processing gear can be inserted into the channel signal path either before or after the EQ block. The post-EQ signal can be sent to any or all of 12 stereo aux buses and 8 G/A (group/aux) buses. The audio signal from the input channel can be assigned to the stereo L&R bus and/or mono bus. On mono input channels the signal can also be assigned to the stereo and mono (center) buses in LCR mode. Up to 12 VCA groups and 8 mute groups can be set for each channel's fader block. Furthermore, the channel on/off status, master bus assign settings, grouping, and fader settings can be stored in the console's scene memory for instant recall whenever required.

❷ Master Output Section (page 26)

The master output section is further subdivided into stereo aux master, G/A (group/aux) master, and stereo/mono master sections. Each stereo aux master module independently controls the signals from two adjacent stereo aux buses (a total of 12 stereo aux buses). Depending on the selected G/A bus mode, each G/A master module can handle the signals from two adjacent group/aux buses as up to 4 stereo pairs or 8 mono feeds. The stereo and mono masters are integrated into a single module, but are independent internally. The stereo and mono masters receive the signals from the stereo and mono buses, respectively, and send these signals to the stereo and mono main outputs. Each master features a SUB IN input and a [SUM GAIN] control for gain adjustment. The on/off status of each master, as well as bus assign and other settings can be stored in the console's scene memory.

❸ Matrix Send and Master Out Section (page 35)

The matrix section is made up of 4 stereo and 8 mono matrix mixes. The sends to the matrix mixes are all derived from the master output section. The matrix input section is located at the top of the master output section. The signal from each master can be sent to a matrix bus by turning the master's [TO MATRIX] switch on and using the matrix level controls to apply the signal to the required matrix bus. The [SUB IN] control located next to the stereo/mono master [SEND LEVEL] control adjusts the level of the [MATRIX SUB IN L&R] signal sent to each matrix bus.

The matrix output section is located to the right of the matrix input section, and it is here that the final matrix bus output levels are set. The stereo matrix buses can be switched to function as mono sends via a utility mode function, in which case the summed L & R mono signal is delivered via the L and R outputs. The on/off status of the matrix outputs can be stored in the console's scene memory.

❹ VCA Master Section (page 21)

The VCA section can be used to independently control up to 12 VCA groups (VCA1 ~ VCA12) set up via the fader blocks of each input channel. The VCA master faders function as master faders for the corresponding VCA groups, while the [VCA MUTE] switches mute or un-mute the corresponding VCA groups. With this versatile system it is possible to assign a channel to multiple VCA groups set up for different purposes.

❺ Oscillator/Talkback Section (page 38)

From this section the oscillator and talkback signals can be sent to any of the console's master and matrix sends. The [TB/OSC] switches in the master and matrix sections assign the oscillator and talkback signals to the corresponding output.

❻ Monitor Control Section (page 40)

With two monitor outputs (MONITOR A & B) and [CUE] switches on each module, any source or combination of sources can be monitored as required. Normally the same monitor signal is delivered via the two main monitor outputs as well as the console's three headphone jacks (one at the top of the monitor module, and two on either side of the front panel). When the [LCR] switch is engaged the MONITOR A and B outputs can be used simultaneously for LCR monitoring. The [SOLO MODE] switches on the meter bridge allow the module [CUE] switches to be used as solo switches independently for the console's input and output sections (CUE/SOLO function).

❼ Mute Master Section (page 21)

The 8 [MUTE MASTER] switches can be used to mute specified input channel groups, or as [DIRECT RECALL] switches for the scene memory. Whether these switches function in the MUTE MASTER or DIRECT RECALL mode is specified via a utility mode function.

❽ Digital Control Section (page 49)

The PM5000's digital control features are concentrated in this section. One of the main functions of this section is storage and recall of console settings to and from the scene memory. In addition to memorizing the on/off status of panel switches, the scene memory can also store fader settings that will be reproduced by the motorized channel and VCA faders when recalled. A fader time function is provided to specify the amount of time it will take for the faders to physically reach the recalled settings. This section also provides access to utility functions that define basic operation of the console and the way it interacts with some types of external equipment. External CF (CompactFlash) memory cards can be initialized and used to store scene memory data.

> **NOTE**
>
> The two screws on the right side of the digital control section can be used to attach a protective cover. The six screws on the sides of the master sections can be used to attach a book rest or a talkback cable. These 8 screws do not affect the mechanical strength of the unit. Use the attached screws or M3-size machine screws 8 millimeters or less in length.

❾ Meter Bridge (page 47)

Used in conjunction with the monitor control section, the meter bridge's LED bar-graph meters provide visual monitoring of final output levels at the console's rear-panel outputs. Indicators are also provided to display the status of the PW5000 Power Supply unit as well as the console's internal fan unit and phantom power supplies. Brightness controls for the console's illuminated controls and gooseneck lamps are also provided. Other controls provided on the meter bridge are scene memory preview on/off and mode selectors for the CUE/SOLO function.

❿ Memory Card Slot

The console's memory card reader is located on the front panel. The PM5000 can use CF (CompactFlash) memory cards (see page 59).

Rear Panel

PM5000-52C
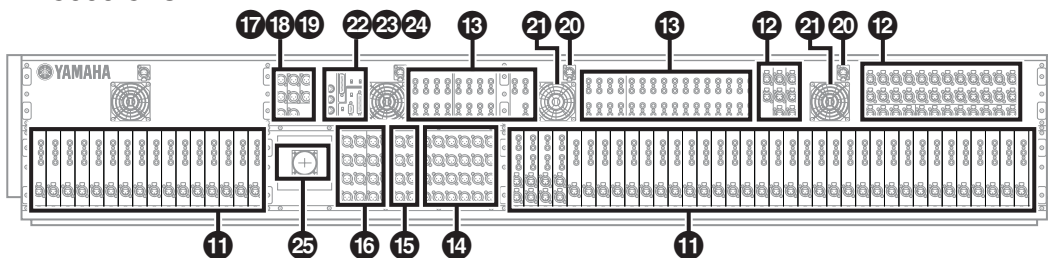
PM5000-28
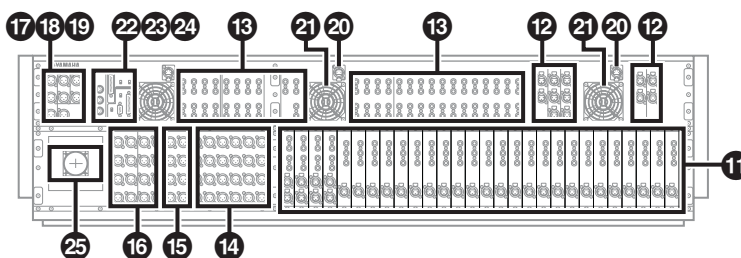
> **NOTE**
>
> All PM5000 inputs and outputs are balanced except for the PHONES outputs and expansion connectors. See the input/output specifications at the end of this manual for details.

⓫ Mono (Stereo) Inputs

XLR-type input connectors, DIRECT OUT connectors, and INSERT IN and OUT connectors are provided on each input channel. Stereo modules feature separate connectors for the L and R channels, but do not have DIRECT OUT connectors.

⓬ Sub Inputs

Each stereo aux master has L and R stereo aux SUB IN connectors, each group/aux master has G/A SUB IN connectors, both monitor outputs feature stereo 2TR IN (1 & 2) and L/C/R CUE SUB IN connectors, and the stereo and mono master outputs have L and R ST SUB IN and MONO(C) SUB IN connectors. L and R MATRIX SUB IN connectors are also provided for all matrix outputs. Please check the supplied block diagram for details.

> **NOTE**
>
> Stereo aux SUB IN and G/A SUB IN connectors are not provided on the PM5000-28.

⓭ Insert Inputs and Outputs

Insert input and output connectors are provided on all 12 stereo aux masters, 8 group/aux masters, the stereo and mono masters, and the 4 stereo matrix and 8 mono matrix outputs.

⓮ Stereo Aux Master Out
**⓯ G/A (Group/Aux) Master Out**
⓰ Matrix Out

The stereo aux master, G/A (group/aux) master, and matrix output connectors are grouped together here.

⓱ Monitor Out

These are the console's two stereo monitor outputs (A & B). You can use outputs A and B as separate stereo monitor outputs, or use A and B simultaneously for LCR monitoring (MONITOR B = Center).

⓲ Talkback/Oscillator Out

The talkback or oscillator signal appears at this output.

⓳ Stereo Output and Mono Output

These are the stereo and mono master outputs (ST OUT, MONO (C)).

⓴ Lamp Connectors

The supplied gooseneck lamps can be connected here (4 connectors on the PM5000-52C, 3 on the PM5000-36 and PM5000-28). Lamp brightness can be adjusted via the [LAMP DIMMER] control on the meter bridge. Engage the [LAMP OFF] switch to turn the lamps off.

㉑ Fan Vents

These are the air vents for the console's internal cooling fans (4 locations on the PM5000-52C, 3 on the PM5000-36 and PM5000-28). Be sure that the vents aren't blocked when installing the console.

㉒ Fan Switch

Sets the speed of the console's internal cooling fans to match prevailing operating conditions. Normally the [LOW] setting can be used. When the ambient temperature is high, however, such as in some outdoor applications when the console is exposed to direct sunlight, the [HIGH] setting should be used. Also switch to the [HIGH] setting if the top-panel temperature feels higher than normal.

㉓ +48V Master Switch

This is the master switch for the 48-volt phantom power supply to all input channels. When using phantom power use the individual input channel [+48V] switches to turn phantom power on or off as required.

㉔ External Expansion Connectors

Type A and B CASCADE connectors, a D-sub 25-pin GPI connector, and MIDI IN/OUT/THRU connectors for connection to compatible external equipment.

㉕ Power Supply Connector

The dedicated external PW5000 power supply unit must be connected to this connector using the power supply cable supplied with the PM5000 console.

Expansion:Connecting to External Equipment

The PM5000 is entirely self-contained and can be used effectively on its own, but it does provide some versatile expansion capabilities. In this section we'll describe how the PM5000 can be synchronized with external gear and cascaded with other Yamaha mixing consoles.
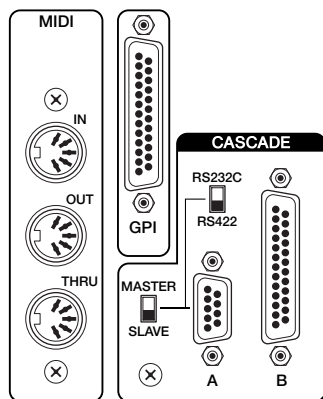
NOTE

See the detailed descriptions of the related utility functions in the Utility Functions section beginning on page 56.

Cascade

Two types of cascade connectors are provided on the PM5000 rear panel: TYPE [A] for connection to a second PM5000, and TYPE [B] for connection to Yamaha PM4000/3500 series mixing consoles. In either case the extra console will be added to increase the total number of available input channels.

Type A

When the TYPE [A] connectors of two PM5000 consoles are connected via a cross cable the functions listed below become linked between the master and slave consoles. The slave console's utility mode can be used to specify reception of individual parameters.

• VCA master section (mute & fade, fade time link).
• Mute master.
• The cue/solo setting (sync of all cue groups).
• Scene memory (synchronized storage and recall of the same scene number).

The TYPE [A] port can also be connected to the serial RS-422 or RS-232C port of a personal computer for offline console parameter editing. PM5000 setup data can be transferred to and from the console in standard CSV file format and edited in any spreadsheet application that can import and export CSV data. The edited data can then be directly read back into the PM5000.

Type B

The TYPE [B] cascade connector can be used to connect the PM5000 to a Yamaha PM4000 or PM3500 series console for linkage of the functions listed below. In this case the PM5000 will function as the master console, there is no need to use the utility mode to set the receive parameters. Cue/solo settings can, however, be transmitted from the PM4000/3500.

• VCA master section (mute & fade, fade time link).
• Mute master (except for the PM3500).
• The cue/solo setting (sync of input cue only).

MIDI

The PM5000 MIDI connectors allow connection to other MIDI equipment to provide the following capabilities:

• Program change message reception from an external MIDI device for scene memory selection.
• Transmission of appropriate program change messages to external MIDI gear when a scene memory is recalled on the PM5000.
• Control change reception from an external MIDI device for control of PM5000 panel control values.
• Transmission of appropriate control change messages to external MIDI gear when a panel control is operated on the PM5000.

In order to select the PM5000's 1000 internal scene memories using MIDI program change messages 1~128 it is necessary to use program change bank select messages or create an program change table for the PM5000. The program change table will also determine which program change number is transmitted by the PM5000 when a scene memory is recalled. MIDI settings can be accessed via the console's utility functions. Also refer to the MIDI data list at the end of this manual.

NOTE

Appropriate MIDI cables must be connected from the OUT connector of the transmitting device to the IN connector of the receiving device. The THRU connector on the receiving devices re-transmits the data received at the IN connector. On the PM5000 an "echo" function can be used to retransmit data received at the IN connector via the OUT connector.

GPI (General Purpose Interface)

The GPI port allows pulse-signal interfacing with compatible external equipment for bi-directional control of several functions. Receive functions include incrementing or decrementing of the PM5000 scene memory and talkback on/off switching. GPI data can be transmitted when a fader is operated (manually or automatically), or when a specified scene memory is recalled. All of these functions are accessible via the PM5000 utility functions. Refer to the GPI Pin Assignments chart at the end of this manual for more information.

Input Channel Section

Mono Input
Module

Stereo Input
Module
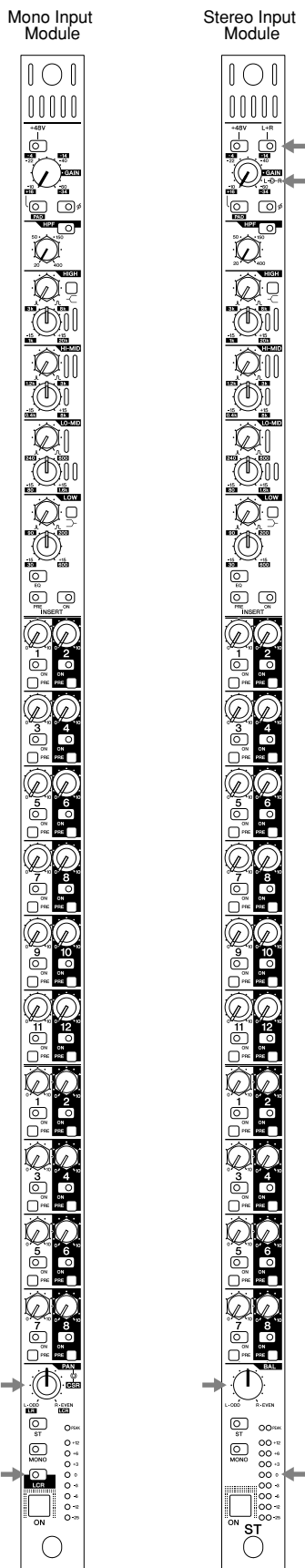
The arrows indicate controls and indicators that differ
between the mono and stereo input modules.

Mono and Stereo Input Modules

Mono and stereo input modules make up the console's
input channel section. In essence each stereo module
contains two parallel mono signal paths, and the panel
controls control both channels simultaneously.

Head Amp Block

Initial adjustment of the input audio signal level and
other parameters can be carried out here.

Mono Input
Module

Stereo Input
Module
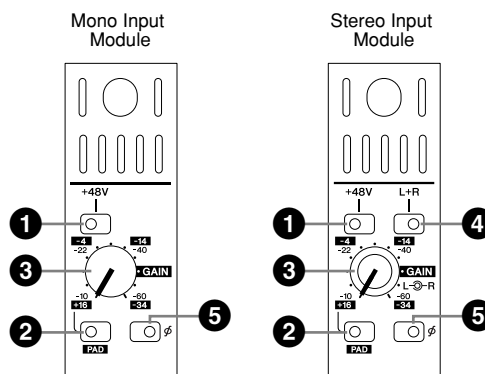
❶ [+48V] Switch

Engage this switch to supply +40-volt phantom power to
the corresponding input.

NOTE

In order to use phantom power, the rear-panel [+48V MASTER]
switch must be turned on. The [+48V MASTER ON] indicator on
the left side of the meter bridge will light when the master
phantom power switch is on.

❷ [PAD] Switch

When this switch is engaged a 26-db pad is inserted at
the channel's input to compensate for high-level source
signals.

❸ [GAIN] Control

Adjusts the input level. When the [PAD] switch is off the input level can be adjusted from –10 dB through –60 dB. When the [PAD] switch is engaged the range is from +16 dB through –34 dB.

> **NOTE**
>
> Stereo modules feature concentric gain controls: the inner control adjusts the gain of the left channel and the outer control adjusts the gain of the right channel.

❹ [L+R] Switch (stereo modules only)

When this switch is engaged the stereo input signal is summed to a mono mix, allowing the stereo input modules to be used as mono input modules, as required.

> **NOTE**
>
> To maintain the proper subjective signal level the left and right channels are attenuated by 3 dB.

❺ [ø] (Phase) Switch

Engaging this switch reverses the phase (also referred to as the "polarity") of the input signal.

HPF Block

The high-pass filter can be used to attenuate unwanted low-frequency noise that can adversely affect the overall sound.
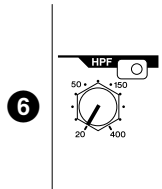
❻ [HPF] Switch and Control

The filter is activated when the switch engaged, and the control can be used to adjust the high-pass filter cutoff frequency from 20 Hz through 400 Hz. The filter has a 12-dB/oct. cutoff slope.

EQ Block

This 4-band equalizer features individually-adjustable HIGH, HI-MID, LO-MID, and LOW bands for versatile shaping of the channel signal. The HIGH and LOW bands are switchable between shelving and peaking operation, while the HI-MID and LO-MID bands are peaking types.
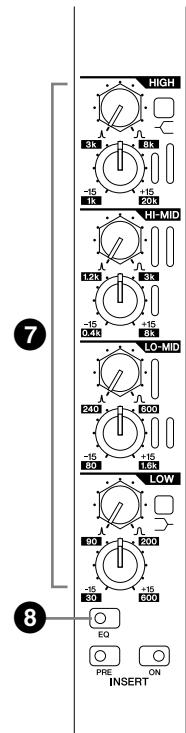
❼ EQ Controls

Two controls are provided for each EQ band: the upper "Q" control adjusts bandwidth, while the lower concentric control adjusts frequency (outer control) and gain (inner control). The HIGH and LOW bands additionally have a peaking/shelving switch that determines the band's mode of operation: engaging the switch selects the shelving mode.

HIGH	1 kHz ~ 20 kHz, -15 dB ~ +15 dB (peaking and shelving modes)
HI-MID	400 Hz ~ 8 kHz, -15 dB ~ +15 dB
LO-MID	80 Hz ~ 1.6 kHz, -15 dB ~ +15 dB
LOW	30 Hz ~ 600 Hz, -15 dB ~ +15 dB (peaking and shelving modes)

* For all bands Q (bandwidth) can be adjusted from 0.5 ~ 3.0.

❽ [EQ] Switch

Turns the 4-band EQ block on or off. When the [EQ] switch indicator is off the EQ circuitry is bypassed. EQ is active when the indicator is lit.

Insert Block

These switches are used to determine whether and where external processing gear connected to the rear-panel INSERT IN and OUT connectors will be inserted into the channel signal path.
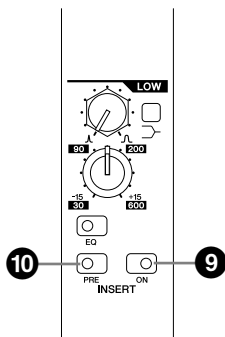
❾ Insert [ON] Switch

Turns channel insert on or off. When the [ON] switch is engaged an external equipment connected to the rear-panel INSERT IN connectors is inserted into the channel's signal path. The [PRE] switch (below) determines whether the insert is pre- or post-EQ.

❿ [PRE] Switch

Determines whether the channel's INSERT IN and OUT connectors insert the externally connected gear before or after the channel EQ stage. When the switch is off the insert is post-EQ. When on (when the indicator is lit) the insert is pre-EQ.

> **NOTE**
>
> The channel signal appears at the rear-panel INSERT OUT connector whether the INSERT [ON] switch is engaged or not.

Stereo Aux Send 1~12 Block

The controls in this block determine the levels at which the channel signal is sent to the console's 12 stereo aux buses.

⓫ Send Level and Pan Controls (mono modules)

Send Level and Balance Controls (stereo modules)

The inner controls adjust send level (0 dB at approximately 2 o'clock), and the outer controls adjust pan for mono modules or balance for stereo modules.

⓬ [ON] Switch

When an [ON] switch is engaged the send to the corresponding aux bus is active.

⓭ [PRE] Switch

When this switch is engaged the pre-fader signal is sent to the corresponding aux bus. When off, the post-fader signal is sent to the aux bus.
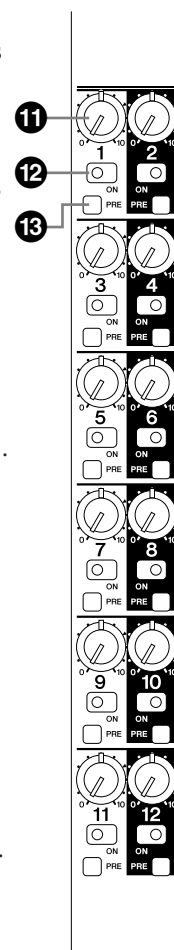
G/A (Group/Aux) Send 1~8 Block

These controls determine how the channel signal is sent to the console's 8 group/aux buses.
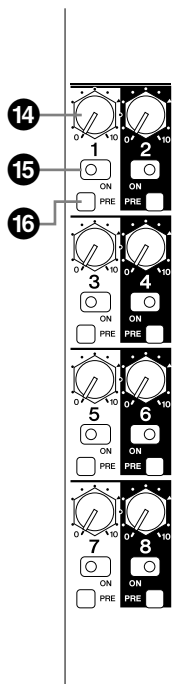
⑭ Send Level Controls

Adjust send level to the corresponding group/aux bus (0 dB at approximately 2 o'clock).

⑮ [ON] Switch

When an [ON] switch is engaged the send to the corresponding group/aux bus is active.

⑯ [PRE] Switch

When this switch is engaged the pre-fader signal is sent to the corresponding group/aux bus. When off, the post-fader signal is sent to the group/aux bus.

NOTE

The above descriptions apply when the group/aux buses are used as 8 mono aux buses (the default mode). The functions of the controls will vary depending on the G/A bus mode selected via the group/aux master section – refer to "Group/Aux Switching" on page 32 for details.

Main Out Block

This block determines how the channel signal is assigned to the console's main stereo and mono (center) buses. The stereo and mono outputs can be used independently, or combined for LCR output.
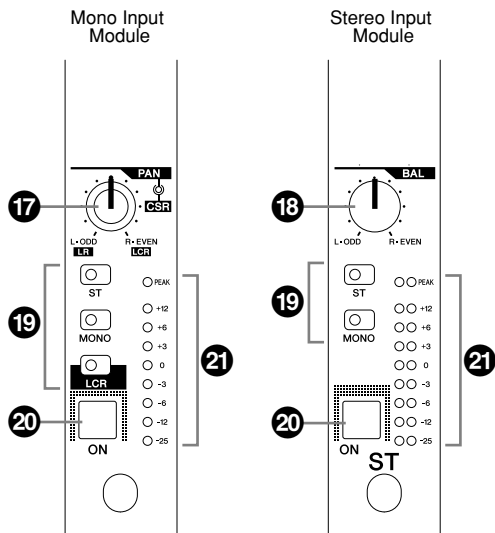
⑰ [PAN]/[CSR] Control (mono modules only)

Adjusts panning of the signal sent to the bus(es) to which the channel signal is assigned via the main out switches ⑲. When the [ST] switch is engaged, assigning the channel signal to the stereo bus, stereo panning is adjusted via the inner control. When the [LCR] switch is engaged and the channel signal is assigned to both the stereo and mono buses in LCR mode, the outer [CSR] (Center-Side Ratio) control can be used – refer to the column below.

⑱ [BAL] Control (stereo modules only)

Determines the stereo balance when the stereo-module [ST] main out switch is engaged to send the channel signal to the stereo bus.

⑲ Main Out Switches

Determine where the post-fader channel signal will be sent. To assign the channel signal to the stereo bus engage the [ST] switch and use the [PAN] ⑰ or [BAL] ⑱ control to adjust the stereo image. To send the signal to the mono bus engage the [MONO] switch. In all cases the channel fader determines the signal level.

On mono modules it is also possible to send the channel signal to the stereo and mono buses in LCR mode, using the mono bus as the center signal. To do this engage the [LCR] switch and use the [CSR] control ⑰ to adjusts the Center-Side Ratio to achieve the desired LCR balance.

⑳ Channel [ON] Switch

Turns the input channel on or off. When off the channel signal is not sent to the STEREO AUX, GROUP AUX, STEREO or MONO buses.

㉑ Level Meter

Displays the channels post-EQ pre-fader signal level. The [PEAK] indicator will light when the signal level exceeds 17 dB above nominal (0 dB) level.

NOTE

The [PEAK] indicator responds to the pre-EQ and pre-insert signal level as well as to the post-EQ pre-fader level.

LCR vs. Stereo + Mono Operation

When the [LCR] switch is engaged the stereo and mono (center) buses become linked for LCR operation and the [ST] and [MONO] switches cannot be engaged. On the other hand, when the [LCR] switch is not engaged the [ST] and [MONO] switches can be engaged simultaneously. In either case the channel signal is sent to both the stereo and mono buses. The difference between these two setups is described below.

- - - - L Bus Level
—— R Bus Level
—— MONO(C) Bus Level

Outer: CSR
Inner: PAN

CSR Control: LR   CSR Control: Center   CSR Control: CSR
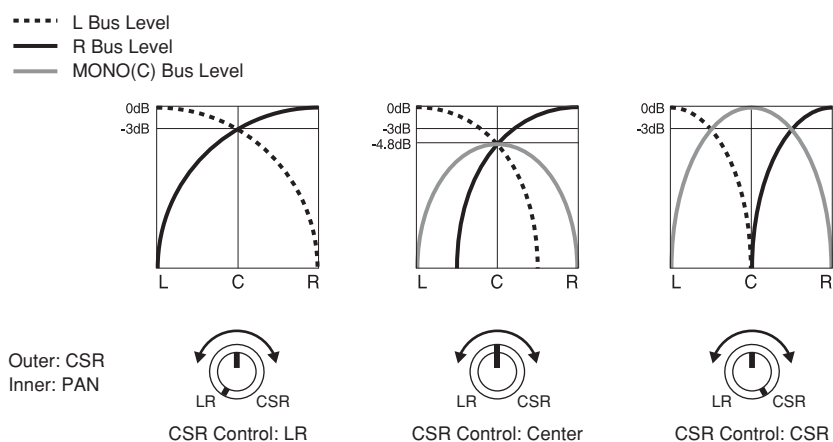
For example, mono sources are normally positioned in the stereo sound field or swept from one side to the other by adjusting the panning to the stereo bus. This works fine when the distance between the left and right speakers is relatively small, but problems arise in venues where the speakers are further apart. In fact, in even modest venues if a channel is panned fully left, for example, audience members sitting on the right side of the house will hear very little of that signal, if any. In such cases it is useful to provide a center channel, the output level of which will be adjusted to reinforce the stereo image and provide more effective coverage. Manually adjusting the levels and panning of the stereo and mono buses to achieve this effect can be extremely difficult, and that's where the LCR output mode with CSR (Center-Side Ratio) control comes in handy. With this system and an LCR speaker setup it is possible to produce natural stereo positioning and smooth panning in large venues with a single control. The [PAN] control adjusts panning as always, while the [CSR] control determines how the center channel responds to [PAN] control operation as shown in the diagrams above. The more the [CSR] control is rotated clockwise, the higher the center channel level as the [PAN] control approaches center position.

Channel Fader Block

The channel faders determine the level of the channel signal sent to the console's master buses, and are of primary importance in setting up the balance between the various channels in the mix. The channel faders can also be assigned to specific VCA and mute groups for group level and mute control.
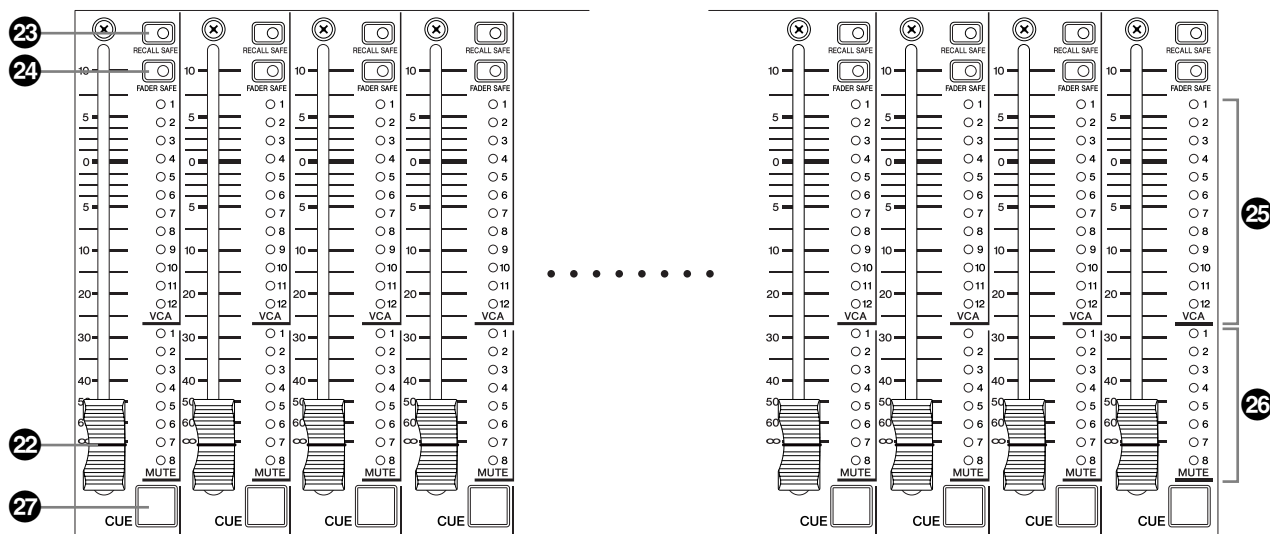
㉒ Channel Fader

Adjusts the out signal level from the corresponding channel. The channel faders also affect the signal level sent to the stereo aux and group/aux buses when the [PRE] switches associated with the corresponding sends are off (i.e. they are sending the post-fader signal).

NOTE

The channel faders are motor-drive types that will physically move to the memorized settings when a scene memory is recalled – after the specified "fade time," if one has been programmed. Refer to "Scene Memory Functions" on page 51 for details.

㉓ [RECALL SAFE] Switch
㉔ [FADER SAFE] Switch

Either of these switches can be engaged to prevent the corresponding data from changing the channel settings when a scene memory is recalled. Use the [RECALL SAFE] switch to maintain the master bus assign switch settings, or [FADER SAFE] switch to maintain the level of the channel fader.

㉕ VCA Indicators 1~12

Indicate the VCA groups to which the corresponding channel fader is assigned. If a VCA group master to which the channel is assigned is muted via its [VCA MUTE] switch, the corresponding VCA indicator will flash rather than light continuously. More details are provided in the "Channel Grouping" section on page 21.

㉖ MUTE Indicators 1~8

Indicate the mute groups to which the corresponding channel is assigned. More details are provided in the "Channel Grouping" section.

㉗ [CUE] Switch

When this switch is engaged the pre-fader channel signal is sent to the console's CUE L&R buses regardless of the channel's on/off status. The cue signal can be monitored via the rear-panel MONITOR OUT connectors or any of the console's PHONES jacks.

NOTE

Using the VCA CUE function, the post-fader channel signal can be monitored.

NOTE

The [CUE] switches are also used to assign channels to VCA and mute groups (page 21), as well as to specify target channels when setting fade time parameters (page 52). Normal [CUE] switch function is suspended while any of these operations are in progress.

Channel Grouping

This section will describe how channels can be assigned to VCA and mute groups.
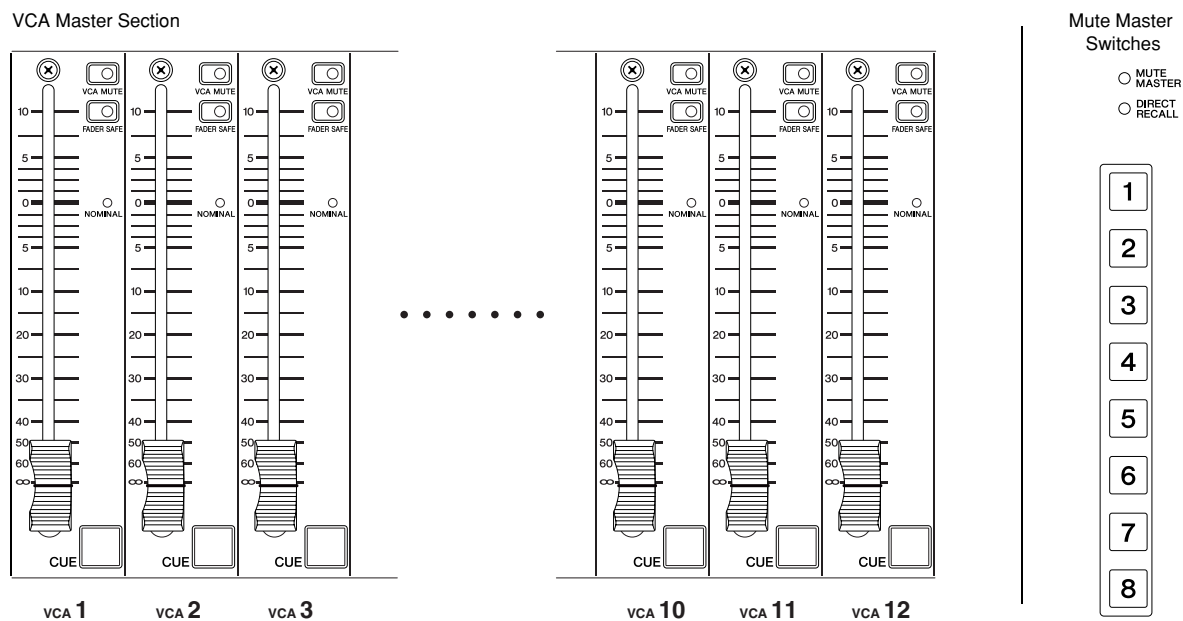
VCA Grouping

The PM5000 provides two methods of "grouping" input channels so that they can be controlled via a single master fader while maintaining the level relationship between the individual channels in the group. The traditional method is to send the channel signals to any of the console's 12 stereo aux or 8 mono group/aux buses and use the bus master fader for group control.

The second method, pioneered by Yamaha's introduction of VCA-controlled groups in the PM3000 console, is to directly control the levels and muting of the channels assigned to a group via voltage control. The main advantage of this system is that a number of different group configurations – for different scenes in a show, for example – can be set up beforehand and then recalled instantaneously as needed. This type of speed and flexibility is simply not possible using the traditional group bus assignment method.

Assigning VCA and Mute Groups

Each input channel can be freely assigned to any of 12 VCA groups and 8 mute groups for group level control via the VCA master faders or group muting via the mute master switches. VCA or mute group assignment is initiated by using the ASSIGN MODE keys in the PM5000's digital control section.
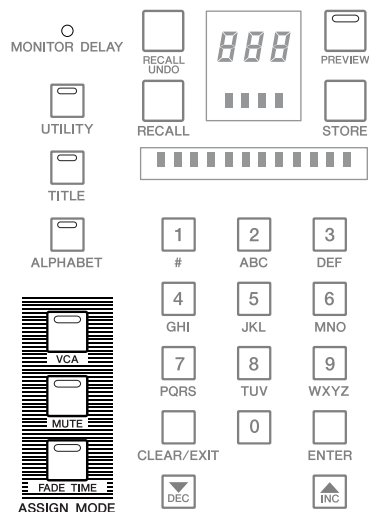
NOTE

The ASSIGN MODE keys include a [FADE TIME] key which will not be discussed here. Fade time assignment specifies the amount of time it will take the motor faders to reach the recalled fader levels when a scene memory is recalled. Refer to the "Scene Memory Functions" section on page 51 for details concerning the fade time function.

VCA Group Assignment Procedure

1 Press the ASSIGN MODE [VCA] key to initiate the assignment procedure (the indicator will flash).

2 Engage a VCA master [CUE] switch to specify the VCA master to which a channel or multiple channels are to be assigned. The [CUE] switch will flash. If any input channels are already assigned to the selected VCA master, their corresponding VCA indicators will flash.

3 Engage the [CUE] switches of the input channels to be assigned to the selected VCA master (the corresponding VCA indicators will flash). To undo an assignment simply press the channel [CUE] switch a second time (the VCA indicator will go out).
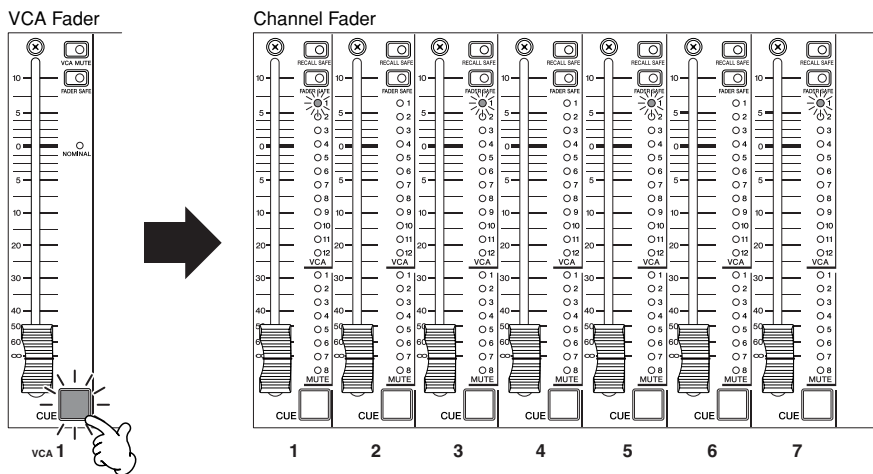
4 Repeat step 3 for all input channels to be assigned to the selected VCA master.

5 If a different VCA master [CUE] switch is pressed at this point the target VCA master will change accordingly and new channel assignments can be made. All channel assignments to the previously-selected VCA master will be confirmed and their corresponding VCA indicators will light.

6 Channel assignments can now be made to the newly-selected VCA master.
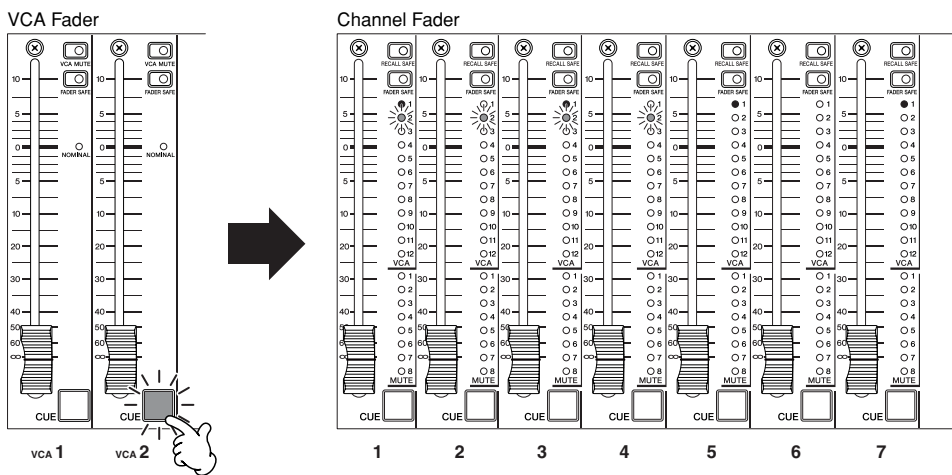
7 Press the ASSIGN MODE [VCA] key to end the assignment procedure (its indicator will go out). Pressing any other ASSIGN MODE key will also end the VCA assignment procedure – assignment will switch to the newly-selected ASSIGN MODE.

NOTE

Normal [CUE] switch operation is suspended during the assignment procedure but the current cue settings are retained.

Mute Group Assignment Procedure

1 Press the ASSIGN MODE [MUTE] key to initiate the assignment procedure (the indicator will flash).

2 Engage a mute master ([1] ~ [8]) switch to specify the muter master to which a channel or multiple channels are to be assigned. The mute master switch will flash. If any input channels are already assigned to the selected mute master, their corresponding MUTE indicators will flash.

3 Engage the [CUE] switches of the input channels to be assigned to the selected mute group (the corresponding MUTE indicators will flash). To undo an assignment simply press the channel [CUE] switch a second time (the MUTE indicator will go out).

4 Repeat step 3 for all input channels to be assigned to the selected mute group.

5 If a different mute master switch is pressed at this point the target mute group will change accordingly and new channel assignments can be made. All channel assignments to the previously-selected mute group will be confirmed and their corresponding MUTE indicators will light.

6 Channel assignments can now be made to the newly-selected mute group.

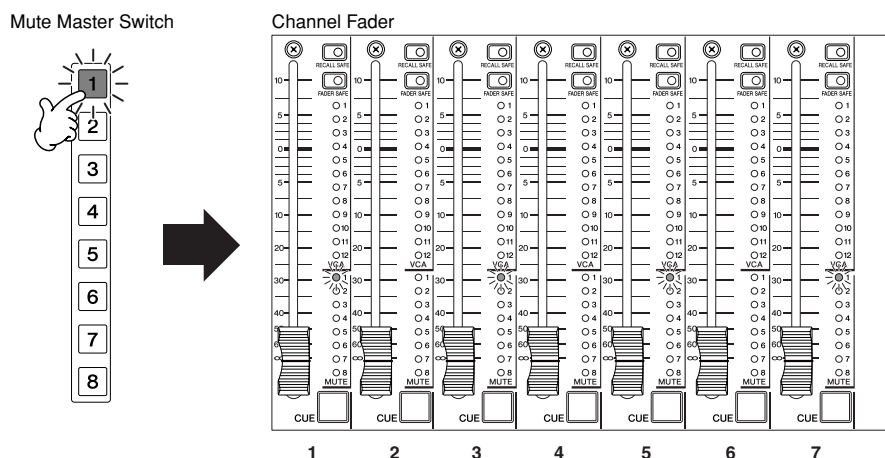**7** Press the ASSIGN MODE [MUTE] key to end the assignment procedure (its indicator will go out). Pressing any other ASSIGN MODE key will also end the mute group assignment procedure – assignment will switch to the newly-selected ASSIGN MODE.
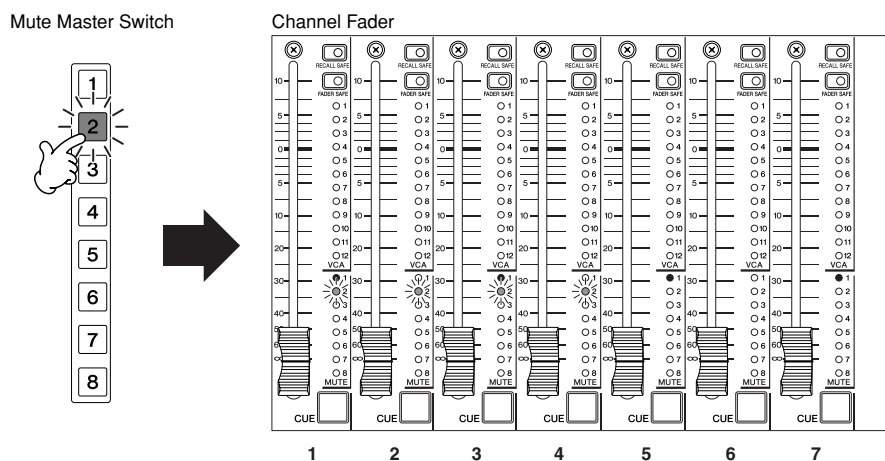
NOTE

Normal [CUE] switch operation is suspended during the assignment procedure but the current cue settings are retained.

VCA Master and Master Mute Switch Group Control

If a number of input channels are assigned to VCA masters or mute master switches as described in the preceding section, those channels can be controlled as a group from a single fader or mute switch.

VCA Section

VCA master faders 1 ~ 12 function as group faders for the assigned input channels, adjusting the output level of all assigned channels while maintaining the level relationships between them. The final fader level of each channel will be the sum of the channel fader and VCA fader settings. In the example below input channels 1, 3, 5, and 7 are assigned to VCA group 1 while input channels 1 through 4 are assigned to the VCA 2 group.

VCA Faders   Channel Faders
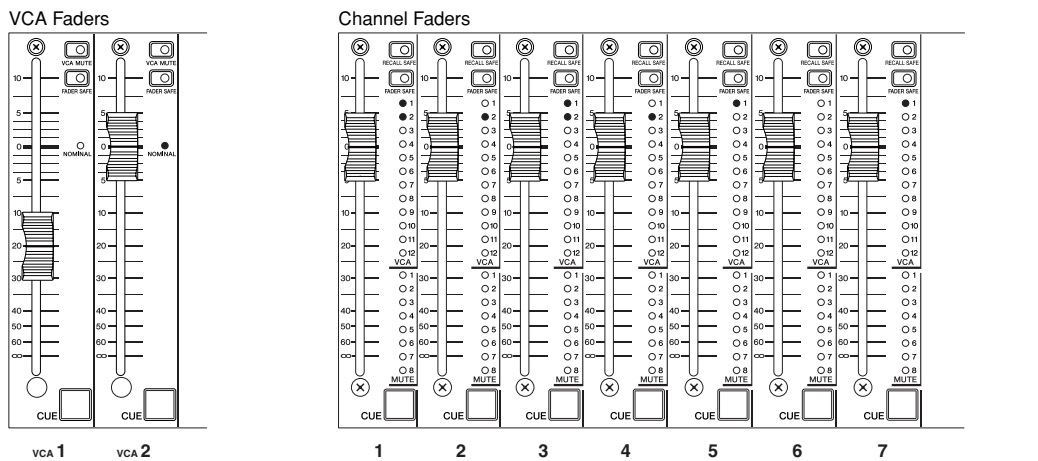
Since the VCA 1 fader is set to –20 dB and the VCA 2 fader is set to 0 dB, the final fader levels of channels 1 and 3, which are assigned to both VCA 1 and VCA 2, will 20-dB lower than the input channel fader settings.

Since the VCA 2 fader is set to 0 dB (nominal), the final fader levels of input channels 2 and 4 will correspond exactly to their respective channel fader settings.

In the same way, the [VCA MUTE] switches on the VCA master modules function as group mute switches for the assigned input channels.

VCA Faders   Channel Faders
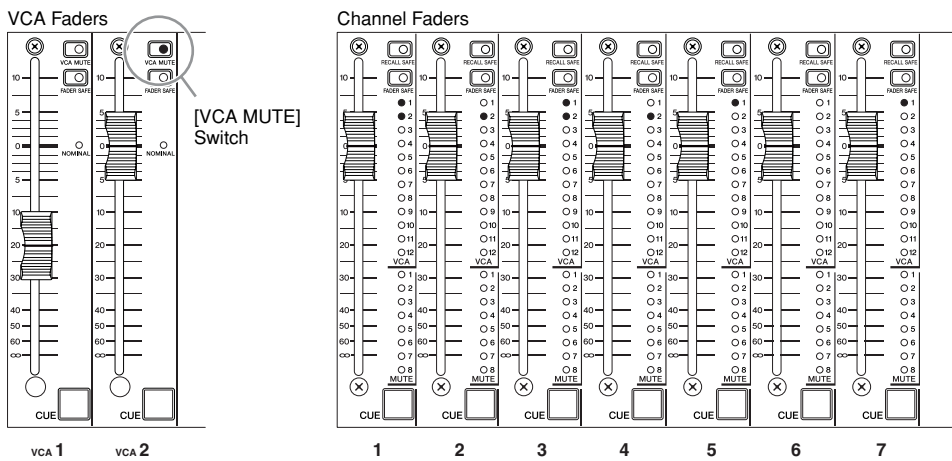
[VCA MUTE] Switch

Since the VCA 2 [VCA MUTE] switch is engaged the final fader level of input channels 1 ~ 4 will be -∞.

NOTE

The [VCA MUTE] switches function in a slightly different way than the mute master switches. When a [VCA MUTE] switch is engaged the effect is the same as turning that VCA fader all the way down to -∞. The mute master switches, on the other hand, disengage the channel [ON] switches of the assigned channels.

The VCA 1 ~ VCA 12 [CUE] switches function as group cue switches for all assigned input channels. When a VCA master [CUE] switch is engaged it will light, while the [CUE] switches of all assigned channels will flash, and the signals from those channels will be routed to the console's cue (L&R, C) buses for monitoring.
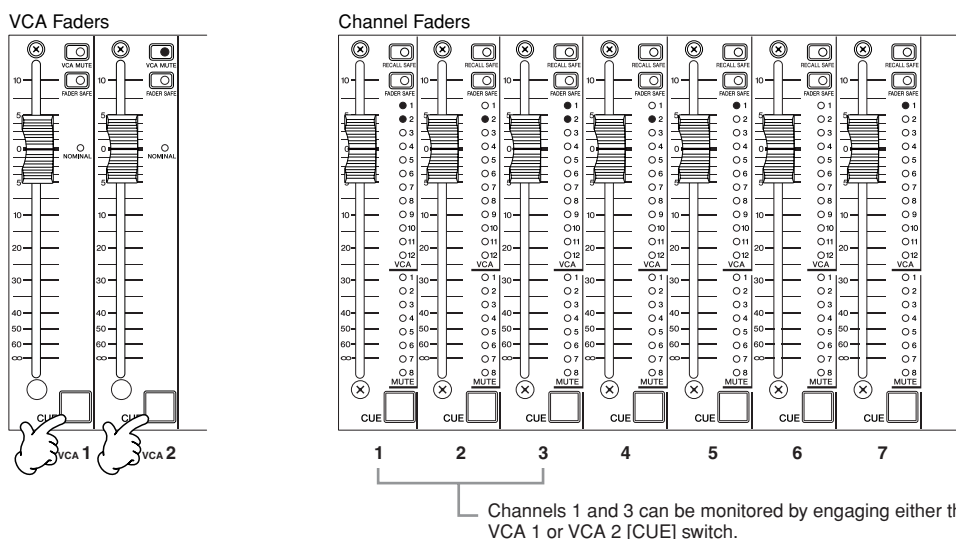
Channels 1 and 3 can be monitored by engaging either the VCA 1 or VCA 2 [CUE] switch.

The Mute Master Switches

Mute master switches [1] ~ [8] function as group mute switches for the assigned input channels.

Press any of the MUTE MASTER switches, [1] ~ [8], to mute the assigned channels. You can configure the channel [ON] switches to either flash or go out entirely when muted, as described on page 25-1.
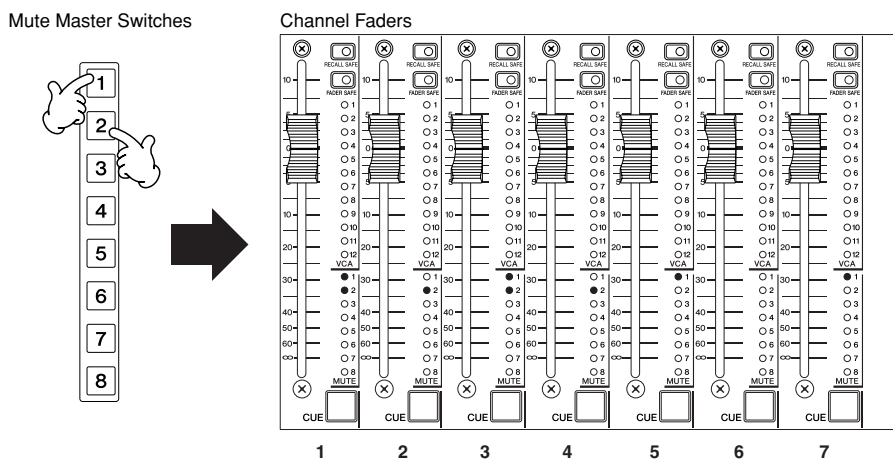
In this setup channels 1 and 3 can be muted by engaging either the mute master [1] or [2] switch.

Group Mute Channel [ON] Switch Indication Mode

When the channels assigned to a MUTE MASTER ([1] ~ [8]) switch are muted, the [ON] switches of the muted channels can be set to either flash or go out entirely. Flashing is the initial default setting.

1 Enter the Group Mute Display Setup Mode by turning the power off, and then back on while holding the ASSIGN MODE [MUTE] switch. Please note, however, that the console will automatically restart in the normal mode if no operations are performed for 5 seconds.
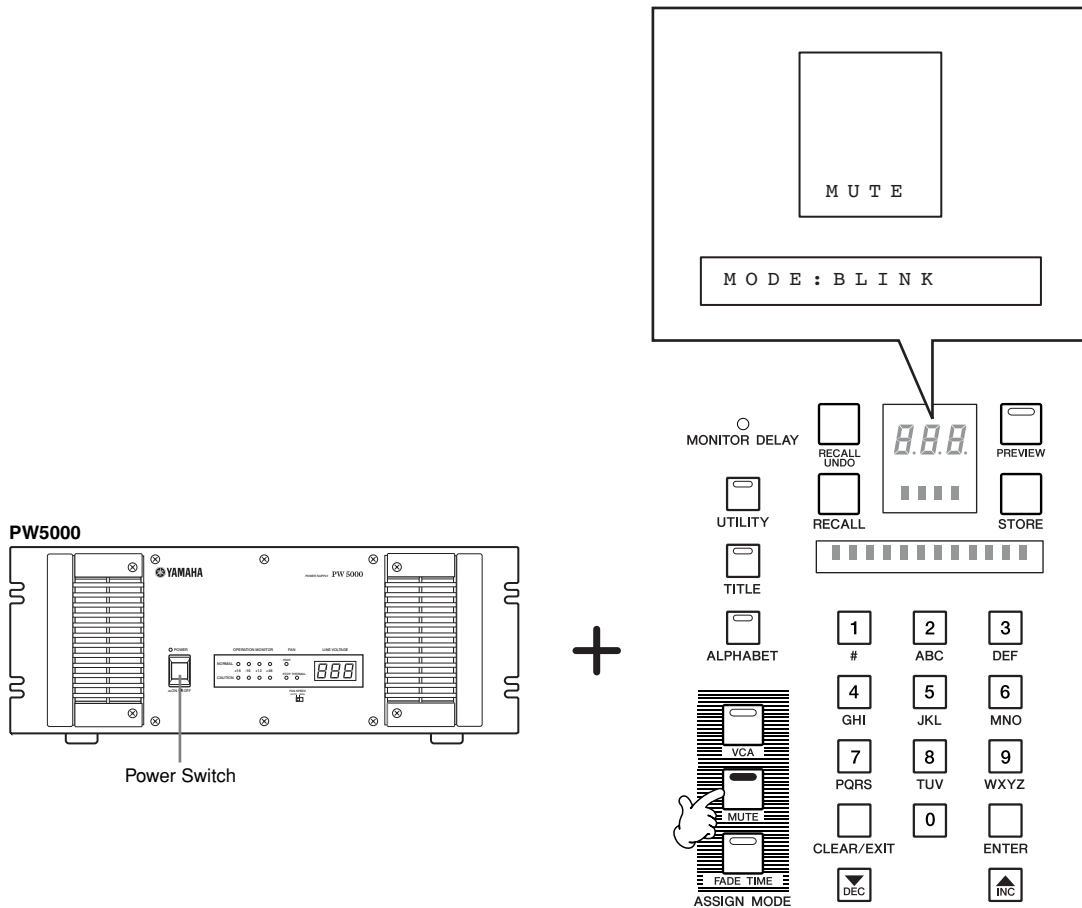
2 While the Group Mute Display Setup Mode display is showing use the [INC]/[DEC] keys to select either "BLINK" (the muted channel [ON] switches will flash) or "STATIC" (the muted channel [ON] switches will go out).

BLINK Mode

STATIC Mode

Flashing

Going out
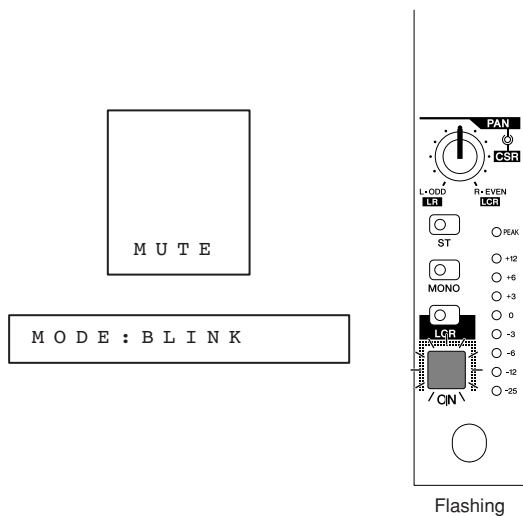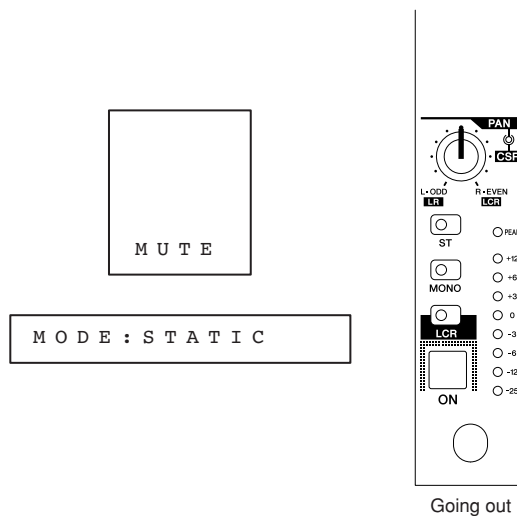
3 Press the [ENTER] key to confirm the selection and restart in the normal mode. Press the [CLEAR/EXIT] key if you want to restart in the normal mode without altering the previous setting.

NOTE

• This setting is retained when the console power is turned off, but is not included in the setup memory and therefore can not be saved to a CF memory card.
• When the STATIC mode is selected the [ON] switches will still flash when PREVIEW is engaged.
• When the STATIC mode is selected pressing the group-muted channel [ON] switches will be ignored.

Master Out Section

Stereo Aux
Master Module

G/A Master
Module

Stereo/Mono Master
Module
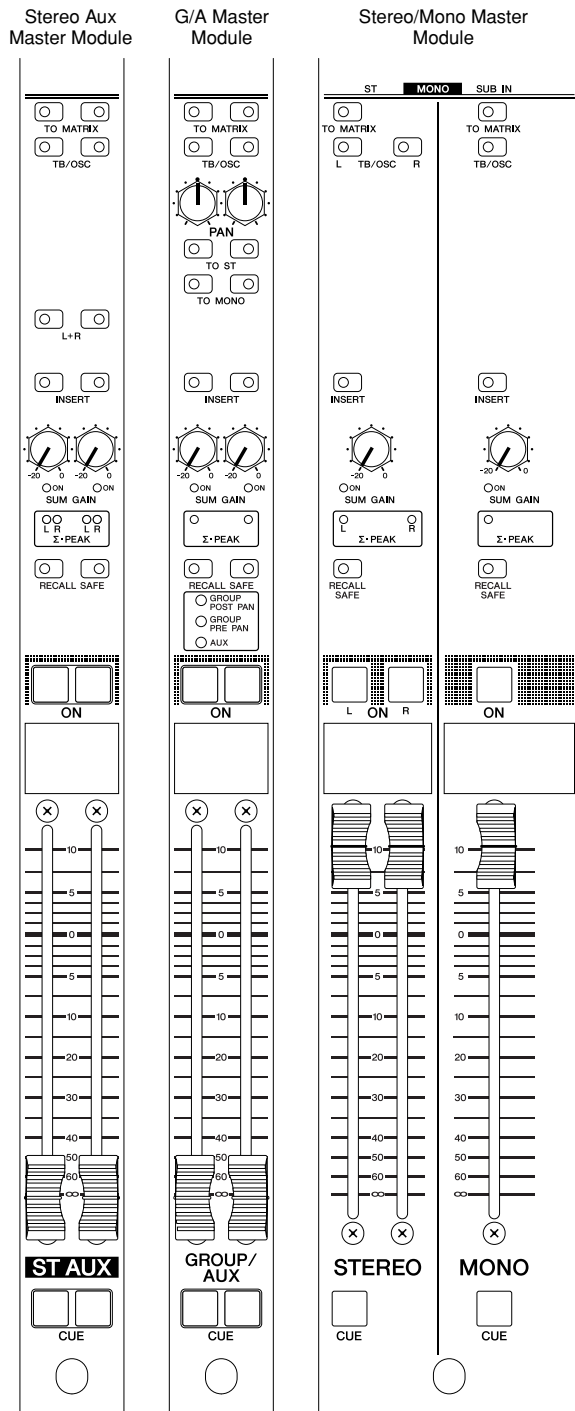
Multiple Masters In Single Modules

The master output section is made up of modules housing the masters for 12 stereo aux buses, 8 G/A (group/aux) buses, a stereo bus, and a mono bus. Both the stereo aux and G/A master modules combine pairs of adjacent masters – odd and even numbers – in each module.

While the stereo aux master modules each handle two stereo signal pairs, each G/A master module can be used to handle two independent mono signals, a linked pair of mono signals, or a stereo pair.

Similarly, the stereo/mono master module combines the console's main stereo and mono bus masters.

Basic Signal Routing

In the same was as the input channel modules, the only real difference between the stereo aux, G/A, stereo, and mono masters is whether they are mono or stereo. The basic routing is the same for all signals, as summarized in the diagrams below.

ST AUX

```
ST AUX L ─────────┐
                  ├──⊕──┐
ST AUX R ──────┐  │     │   ┌──────┐          ┌──────────┐
               │  │     ├──▶│ SUM  │──┬──●────▶│  ST AUX  │────▶ MASTER OUT
TB/OSC ────────┼──┤     │   │ GAIN │  │  │     └──────────┘
               │  │     │   └──────┘  │  │          ┊
ST AUX SUB IN L┼──┼──⊕──┘             │  │     ┌──────────┐
               │  │                   ▼  ▼     │TO MATRIX │────▶ MATRIX
ST AUX SUB IN R┘  │                  INSERT    └──────────┘
```

G/A

```
G/A IN ──────────┐
                 ├──▶┌──────┐       ┌──────────┐
TB/OSC ──────⊕───┤   │ SUM  │──●────▶│ G/A OUT  │────▶ MASTER OUT
             │   │   │ GAIN │  │     └──────────┘
             │   │   └──────┘  │          ┊
G/A SUB IN ──┘   │             ▼     ┌──────────┐
                 │           INSERT  │TO MATRIX │────▶ MATRIX
                 │                   └──────────┘
```

STEREO

```
STEREO BUS IN L ──────┐
                      ├──⊕──┐
STEREO BUS IN R ───┐  │     │   ┌──────┐          ┌──────────┐
                   │  │     ├──▶│ SUM  │──┬──●────▶│  STEREO  │────▶ MASTER OUT
TB/OSC ────────────┼──┤     │   │ GAIN │  │  │     │   OUT    │
                   │  │     │   └──────┘  │  │     └──────────┘
STEREO SUB IN L ───┼──┼──⊕──┘            │  │          ┊
                   │  │                   ▼  ▼     ┌──────────┐
STEREO SUB IN R ───┘  │                  INSERT   │TO MATRIX │────▶ MATRIX
                                                  └──────────┘
```

MONO

```
MONO (C) ────────┐
                 ├──▶┌──────┐       ┌──────────┐
TB/OSC ──────⊕───┤   │ SUM  │──●────▶│ MONO (C) │────▶ MASTER OUT
             │   │   │ GAIN │  │     │   OUT    │
             │   │   └──────┘  │     └──────────┘
MONO (C) SUB IN─┘   │          │          ┊
                    │          ▼     ┌──────────┐
                    │        INSERT  │TO MATRIX │────▶ MATRIX
                    │                └──────────┘
```

* ▭ Shaded blocks correspond to switches on the modules.

Each master receives the signal from the assigned input channels via the corresponding bus, and that signal is summed with the signal from the related SUB IN connector and the talkback and oscillator signal (in stereo in the stereo masters). [SUM GAIN] controls are provided at this point to allow excessively hot signals to be reduced as necessary to prevent overload. The next step in the signal path is the master insert, allowing external processing gear to be applied at this point. From there the signal goes to the corresponding rear-panel master output, and/or to the corresponding stereo or mono matrix.

Controls Common To All Masters

Since the basic signal routing is common to the various master modules, all modules also feature many of the same controls. It is the differences that, in a sense, define the character of each module type. The stereo and mono masters have completely independent sets of controls, while the stereo aux and G/A masters each combine two pairs of channels with two identical sets of controls. In all cases the controls on the left side of the paired modules apply to an odd-numbered master while those on the right apply to the adjacent even-numbered master. In the illustrations below the black bullets with white numbers refer to controls common to all master modules.
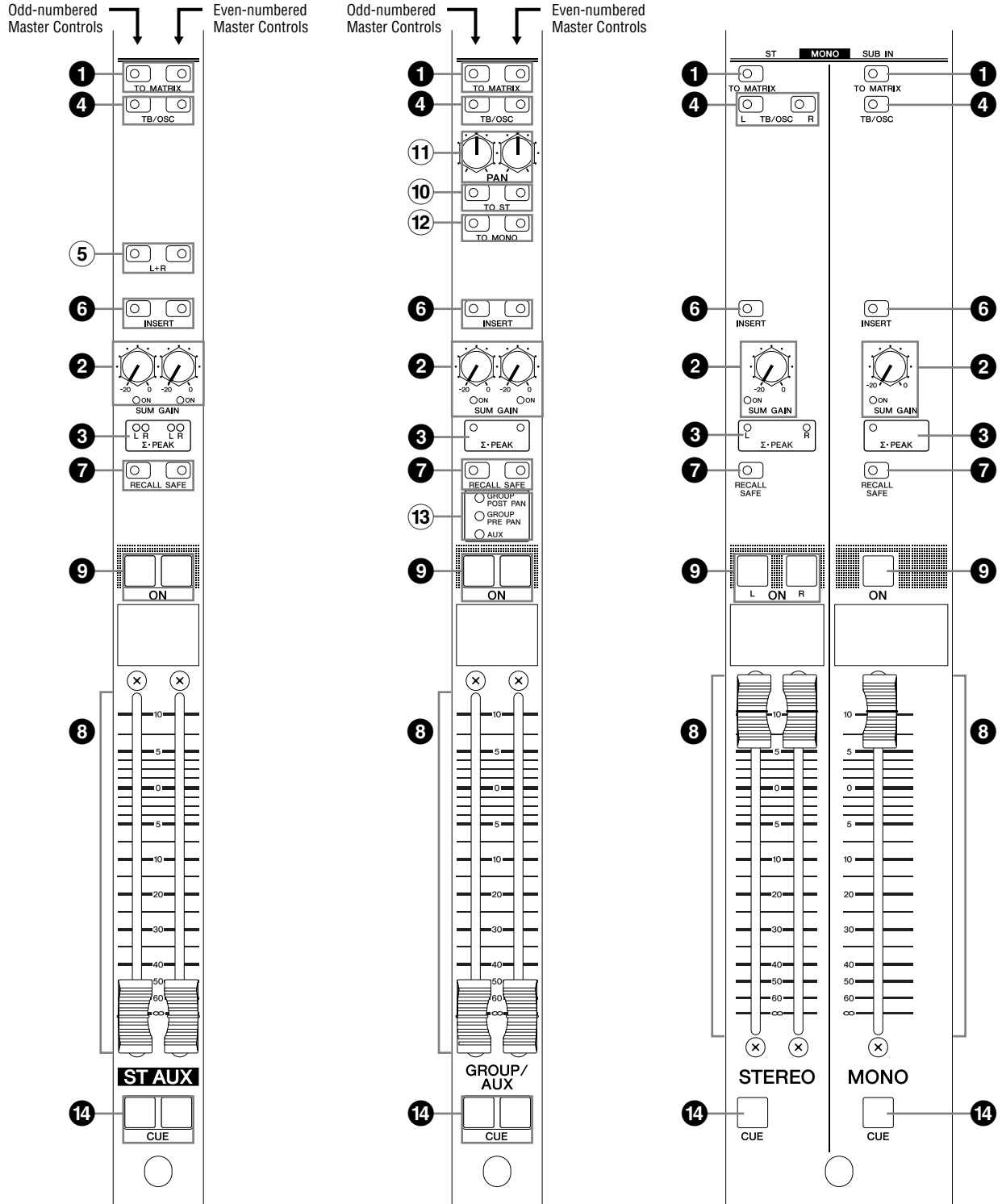
NOTE

After the common controls have been described below, the independent controls (white bullets with black numbers) will be described for each type of master module.

❶ [TO MATRIX] Switch

When this switch is engaged the signal from the corresponding master is sent to the stereo and mono matrix. The matrix send is derived after the master fader and master [ON] switch. Because of this the master [ON] switch must be engaged in order to send the master signal to the matrix via the [TO MATRIX] switch.

❷ [SUM GAIN] Control and Indicator

❸ ∑·PEAK Indicators

The ∑·PEAK indicators indicate the state of the signal after summing in each master. The indicators light when the mixed signal reaches 3-dB below clipping. When a ∑·PEAK indicator lights it is advisable to rotate the corresponding [SUM GAIN] control counterclockwise to reduce the sum gain to prevent possible overloading (a maximum reduction of 20 dB is possible). The SUM GAIN [ON] indicator will light to notify the operator that sum gain reduction is in effect.

❹ [TB/OSC] Switch

When the [TB/OSC] switch is engaged the oscillator and/or talkback signal can be sent to any or all of the console's master outputs as well as the matrix. The signal to be sent is determined by the talkback section controls (page 38).

❻ [INSERT] Switch

When this switch is engaged external equipment connected to the corresponding INSERT IN and OUT connectors is inserted into the master signal.

❼ [RECALL SAFE] Switch

Engaging this switch prevents the corresponding master's settings from being changed by a scene recall operation. The parameters to be protected can be specified via a utility function (page 65).

❽ Master Fader

Determines the output level presented at the corresponding master output connector.

> **NOTE**
>
> The stereo aux master modules are dual configurations, each including two stereo master faders.

❾ Master [ON] Switch

Turns output of the corresponding master on or off. When a master [ON] switch is engaged and lit, the master signal is available at the corresponding master output.

⓮ [CUE] Switch

The [CUE] switches are used to monitor the corresponding master signals via the console's cue bus. PFL (pre-fader listen) or AFL (after-fader listen) can be selected as required. When the monitor control section [MASTER PFL] switch is engaged, the [CUE] switches send the master's pre-fader signal to the cue bus. If the [MASTER PFL] switch is disengaged the post-fader master signal is sent to the cue bus.

> **NOTE**
>
> With the initial default setup the AFL signal cannot be monitored unless the master [ON] switch is engaged. This can be changed to allow AFL monitoring even when the master [ON] switch is disengaged via a utility function (PRE ON, see page 69).

Stereo Aux Master Module

Refer to the preceding "Controls Common To All Masters" section for descriptions of the stereo aux master controls not included in this section.
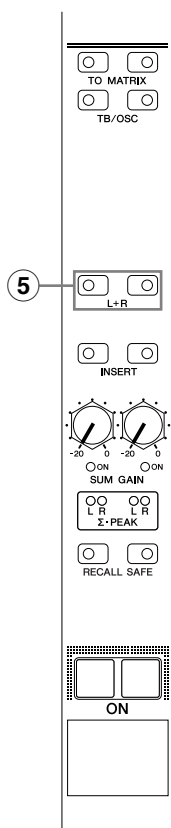
⑤ **[L+R] Switch**

Engaging this switch sums the corresponding premixed stereo signal to a mono signal which is then delivered via both the L and R master channel.

NOTE

To maintain the proper subjective signal level the left and right channels are attenuated by 3 dB.

NOTE

The [L+R] switches allow the stereo aux masters to be used as mono masters. In this case a signal applied to either the L or R SUB IN connector will be send to both the L and R master channels. Since the L and R insert patch points are independent, it is possible to separately process the left and right outputs even though the source for both channels is the same mono mix.
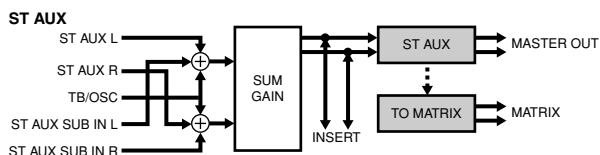
G/A (Group/Aux) Master Module

Refer to the preceding "Controls Common To All Masters" section for descriptions of the G/A master controls not included in this section.
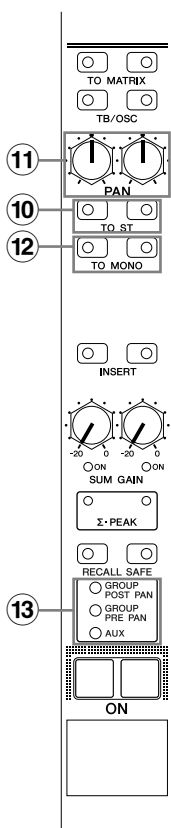
⑩ **[TO ST] Switch**

⑪ **[PAN] Control**

⑫ **[TO MONO] Switch**

When the [TO ST] switch is engaged the post-fader is sent to the stereo bus via the [PAN] control for left/right positioning. When the [TO MONO] switch is engaged the same signal is sent to the mono bus.

NOTE

The signal sent from the G/A master modules to the stereo and mono buses is the same as the post-fader AFL signal that can be monitored by using the [CUE] switches. For this reason with the initial default setup the signal cannot be monitored unless the master [ON] switch is engaged. However, similar to the way that this can be changed to allow AFL monitoring even when the master [ON] switch is disengaged via a utility function (MASTER CUE AFL POSITION = PRE ON), an internal switch setting can be changed to allow the G/A master signal to be sent to the stereo and/or mono bus whether the master [ON] switch is engaged or not.

⑬ **G/A Bus Mode Indicators**

Indicate the current mode of the G/A master module. When the GROUP POST PAN indicator is lit the module is functioning as a group stereo master. When the GROUP PRE PAN indicator is lit the module is functioning as dual group mono masters. And when the AUX indicator is lit the module is functioning as a dual mono aux master.
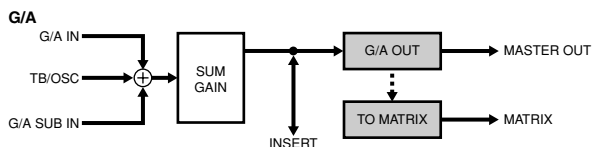
Group/Aux Switching

The G/A modules are all dual types that can be set for GROUP POST PAN (stereo master), GROUP PRE PAN (dual mono master), or AUX (dual mono master) operation. The current mode of each G/A module is shown by the G/A bus mode indicators.

Mono AUX mode (default)
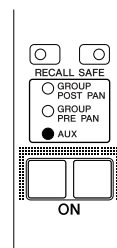
NOTE

The G/A master module mode can be switched via a utility function (page 63).

When the G/A bus mode is switched, the actual change occurs not in the G/A module, but in the way the mono or stereo input channel signal is sent to the group/aux buses (please refer to the block diagram). The operational differences between the three G/A bus modes are organized in the following chart. Be sure to select the mode that best suits your application.

| G/A Bus Mode	From Mono Input Modules	From Stereo Input Modules
GROUP POST PAN (L = odd, R = even)	The G/A send block [PRE FADER] switch and [SEND LEVEL] control have no effect. The post-fader mono signal is L/R assigned via the [PAN] control and sent to the odd and even-numbered G/A buses (L = odd, R = even).	The G/A send block [PRE FADER] switch and [SEND LEVEL] control have no effect. The post-fader stereo signal is L/R balanced via the [BAL] control and sent to the odd and even-numbered G/A buses (L = odd, R = even).
GROUP PRE PAN	The G/A send block [PRE FADER] switch and [SEND LEVEL] control have no effect. The post-fader mono signal is sent to the odd and even-numbered G/A buses in parallel.	The G/A send block [PRE FADER] switch and [SEND LEVEL] control have no effect. The post-fader stereo signal is sent directly to the odd and even-numbered G/A buses (L = odd, R = even).
AUX x 2 (default)	The G/A send block [PRE FADER] switch and [SEND LEVEL] control function normally. The post-fader mono signal is sent to the odd and even-numbered G/A buses in parallel.	The G/A send block [PRE FADER] switch and [SEND LEVEL] control function normally. A mono mix of the post-fader stereo signal is sent to the odd and even-numbered G/A buses in parallel.

NOTE

When the G/A bus mode is set to GROUP POST PAN or GROUP PRE PAN or when the mode is set to AUX and the input channel [PRE FADER] switch is off the channel fader level affects the G/A bus send level. In such a case the send from channels assigned to a VCA or mute group will also be affected by VCA fader, [VCA MUTE] switch, and mute master switch operation.

Cue Operation Differences In the G/A Bus Modes

The way the G/A master signal is sent to the cue buses varies according to the selected G/A bus mode. When the GROUP PRE PAN or AUX mode is selected adjacent G/A master channels function independently and the same signal is sent to both the L and R cue buses when cue is engaged. When the GROUP POST PAN mode is selected, however, adjacent G/A master channels function as a stereo pair and the odd-numbered master feeds the L cue bus while the even-numbered master feeds the R cue bus.

In the GROUP POST PAN mode the two [CUE] switches on a module function in tandem so that engaging either one will automatically engage the other at the same time.
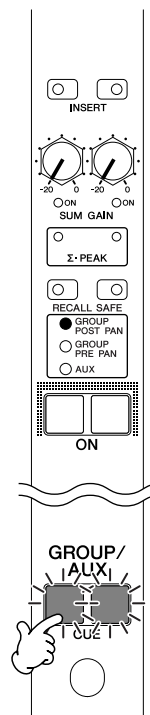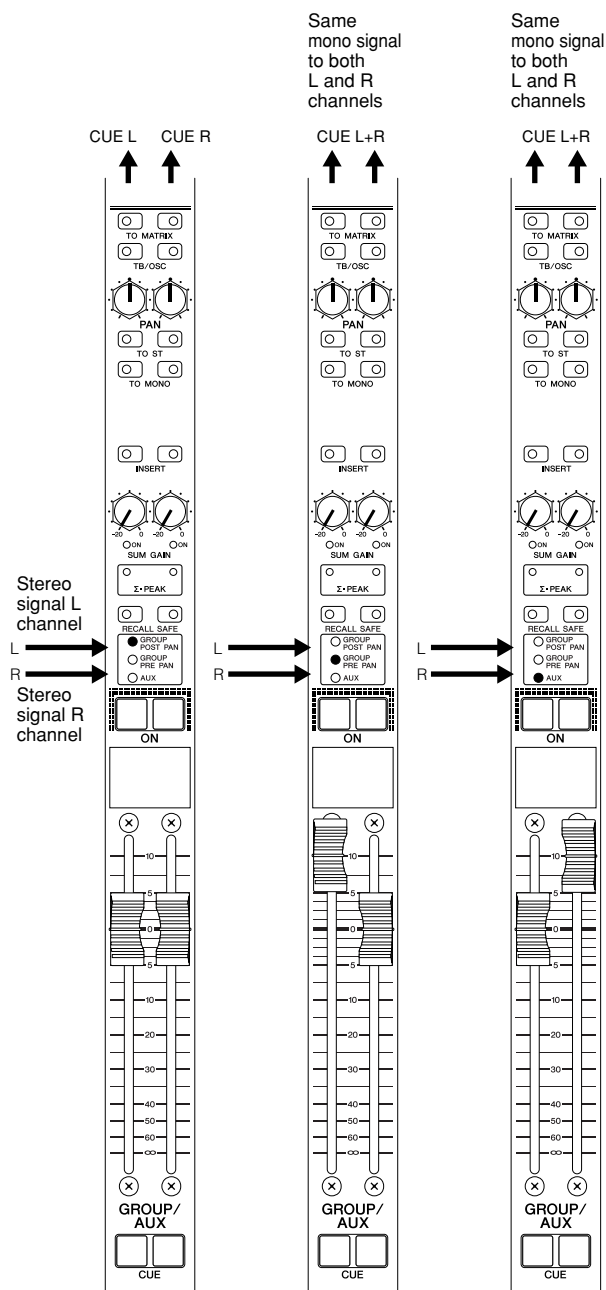
Stereo and Mono Master Modules

Refer to the preceding "Controls Common To All Masters" section for descriptions of the stereo and mono master controls not included in this section.
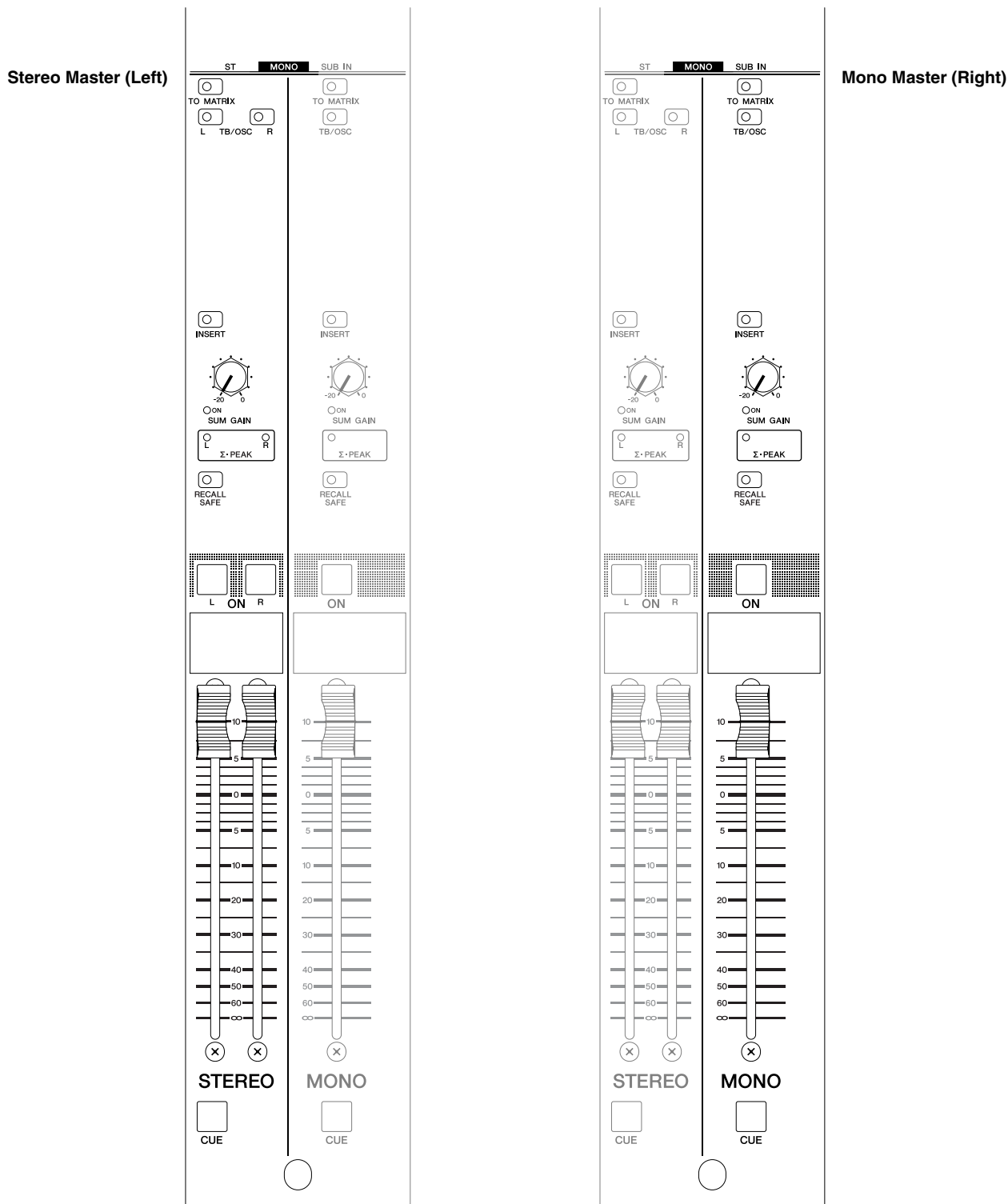
Compared to the stereo aux and G/A master modules just described, the stereo and mono masters are relatively simple. The stereo master controls on the left side of the module correspond approximately to one half of the controls on a stereo aux module (i.e. the controls for one stereo pair). For maximum convenience in practical applications, however, independent [TB/OSC] switches are provided for the left and right channels so that the talkback or oscillator signal can be applied independently to one channel or the other, or to both if required. Similarly, the mono master controls correspond approximately to one half of the controls on a G/A master module. Since the stereo and mono masters feed the console's master stereo and mono outputs there is no need for mono mix or send-to-stereo assignment switches.

Matrix Send and Master Out Section

Matrix Send Section

The matrix send section is located at the top of the console's master out section. From the hardware standpoint it is a "matrix send block" fed by the outputs of the various master modules, but from an operational perspective it is a separate section to which the signals from the master modules are assigned via their respective [TO MATRIX] switches.

The master signals flow vertically.
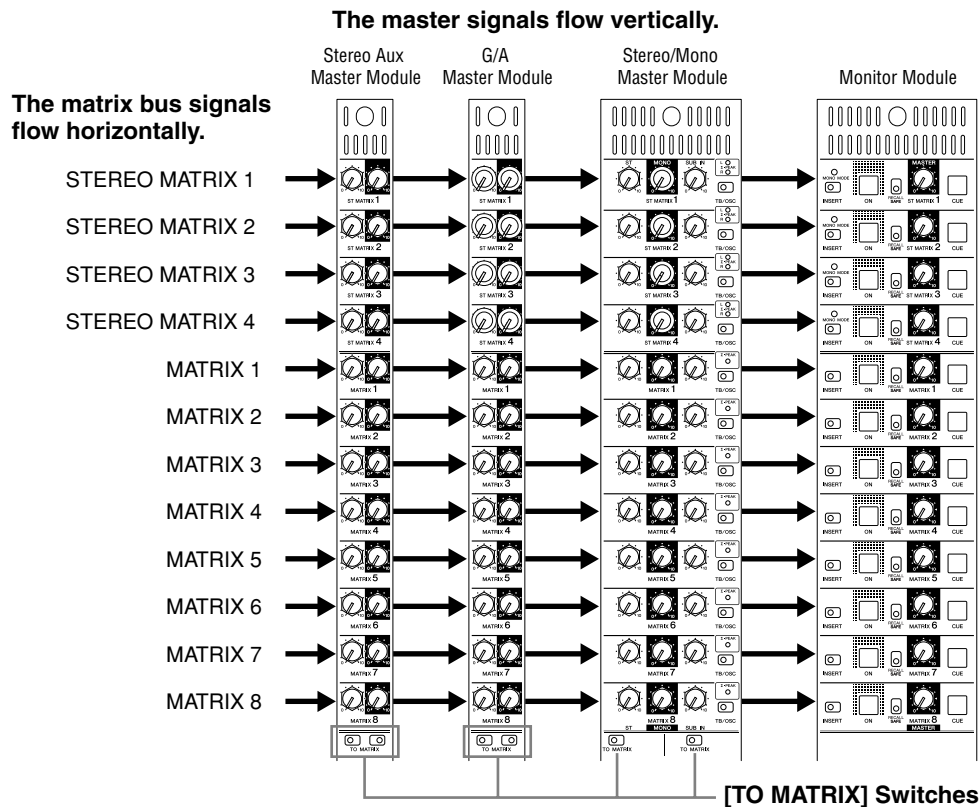
The matrix send configuration for each master is basically the same. From the top down there are four stereo matrices (ST MATRIX 1 ~ 4) and eight mono matrices (MATRIX 1 ~ 8). The outputs from the master modules can be assigned to the matrix inputs and the matrix send levels individually adjusted as required.

Stereo Aux Master Module   Stereo/Mono Master Module

ST MATRIX

(MONO) MATRIX

Stereo channel sends to the stereo matrices are sent directly with the L/R balance determined by the source channel.

Mono channel sends to the stereo matrices are internally mixed to mono.

G/A Master Module   Stereo/Mono Master Module

ST MATRIX

(MONO) MATRIX

Mono master signals sent to the stereo matrices can be adjusted for level (inner control) and L/R balance (outer control).

Mono channel sends to the mono matrices are sent with the L/R balance determined by the source channel.

The level and balance of signals sent from the mono masters (group/aux, mono) a stereo matrix can be adjusted via the inner and outer controls, respectively. Stereo signals from stereo masters (stereo aux, stereo) sent to a mono matrix are internally mixed to mono at the matrix input and then routed to the appropriate mono matrix bus.

The stereo and mono master matrix input blocks also feature [SUB IN] controls that allow signals from the MATRIX SUB IN inputs to be sent to the matrix buses.

The console's talkback and oscillator signals can be fed to any matrix bus by engaging the [TB/OSC] switch located to the right of each [SUB IN] control (the talkback/oscillator signal is simultaneously assigned to the L and R channels of stereo matrix buses). The $\sum\cdot$PEAK indicators light when the matrix bus signal reaches 3-dB below clipping. When a $\sum\cdot$PEAK indicator lights it is advisable to reduce the send level from the corresponding masters until the indicator goes out.

Matrix Master Out Section

The matrix master out section is located to the right of the matrix send section. The matrix master out section determines where the signals received at the matrix send section will finally be output, with a comprehensive complement of [INSERT], [RECALL SAFE], and other functions.

Matrix Send Section

Matrix Master Out Section
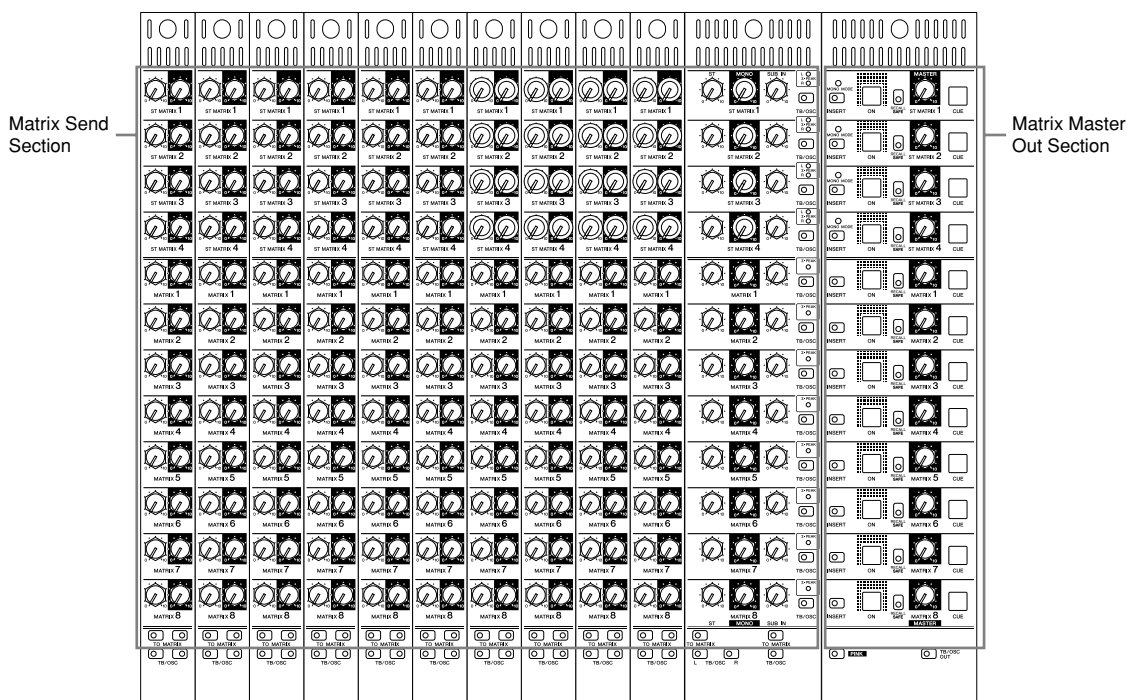
Easiest to conceive of as an extension of the matrix send section, the matrix master out section has corresponding independent stereo matrices (ST MATRIX 1 ~ 4) and mono matrices (MATRIX 1 ~ 8). Since the only function of this section is to control output of the signals from each matrix bus its control complement is quite simple, with no visible difference between the stereo and mono matrices (the L and R channels of stereo matrices are controlled simultaneously). The only difference is the MONO MODE indicator provided on the stereo matrices (ST MATRIX 1 ~ 4). The MONO MODE indicator lights when the corresponding stereo matrix is being used as a mono matrix.

MONO MODE Indicator
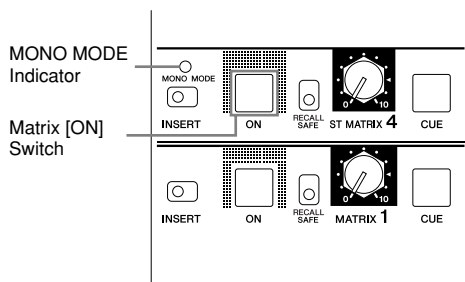
Matrix [ON] Switch

Engaging the matrix [ON] switch activates the corresponding matrix output (output from that matrix is disable when the [ON] switch is disengaged). For active matrix outputs the [MASTER] control determines the level of the signal that will appear at the corresponding rear-panel MATRIX OUT connector. External processing gear connected to the MATRIX INSERT (MONO/ST) connectors is inserted into the matrix signal when the [INSERT] switch is engaged. The [RECALL SAFE] and [CUE] switches function in exactly the same way as those on the master out section (page 29).

Oscillator and Talkback Section

The oscillator and talkback sections, located to the right of the master section, are independent. The oscillator section is capable of generating pink noise or sine-wave signals for testing and system setup via the TB bus, while the talkback section can be used to send the audio signal from the talkback mic via the TB bus. The [TB/OSC] switches provided on each master and matrix bus allow the talback/oscillator signal to be routed as required.
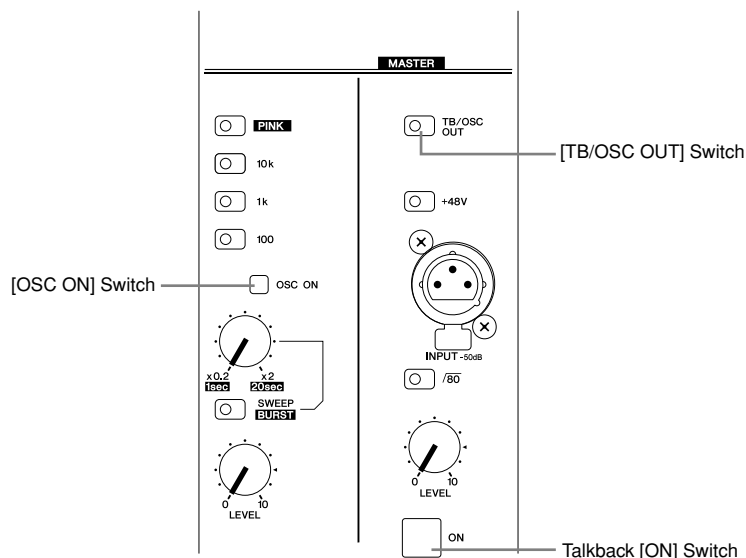
The oscillator and talkback signals are applied to the TB bus by engaging the [OSC ON] or talkback [ON] switch, respectively. Since the oscillator and talkback sections share the same TB bus, however, only one can be engaged at a time. If both the [OSC ON] and talkback [ON] switches are engaged simultaneously, the talkback section takes priority. The talkback and oscillator signals can be sent to the rear-panel TB/OSC OUT connector by engaging the [TB/OSC OUT] switch.

Oscillator/Talkback Signal Output

The oscillator is capable of producing continuous or burst-output pink noise, or sine wave signals from 20 Hz through 20 kHz.

Engage the oscillator section [PINK] switch to generate pink noise. If the [SWEEP/BURST] switch is off the pink noise produced will be continuous. When the [SWEEP/BURST] switch is engaged the control immediately above it can be used to set the burst-output interval from 1 second through 20 seconds. The length of each pink noise burst is fixed at 200 milliseconds.

To generate sine-wave signals disengage the [PINK] switch. To select the sine-wave frequency, use the [10k], [1k], or [100] frequency selector. If the [SWEEP/ BURST] switch is engaged the control immediately above it can be used to vary the selected frequency from 0.2x through 2x (in 120 steps), thus making the entire audible spectrum from 20 Hz through 20 kHz available.

When the [OSC ON] switch is engaged the oscillator signal is output at the level determined by the oscillator [LEVEL] control (make sure the talkback section [ON] switch is disengaged).

NOTE

The current oscillator setting – sine wave frequency or burst interval – can also be visually confirmed via the digital control section message display when no other message is being displayed.

To deliver a talkback signal via the TB bus an appropriate microphone must be plugged into the INPUT connector (input level = –50 dB). When using a phantom-powered microphone engage the [+48V] switch to supply +48-volt phantom power to the INPUT connector. The [/80] switch engages an 80-Hz high-pass filter for the microphone connected to the INPUT connector to cut out unwanted low-frequency noise.

When the talkback [ON] switch is engaged the talkback signal is output at the level determined by the talkback [LEVEL] control.

NOTE

In order to supply phantom power to the talkback INPUT connector the rear-panel [+48V MASTER] switch must be turned on. When the [+48V MASTER] switch is on the +48V MASTER ON indicator on the left side of the meter bridge will light.

Monitor Control Section

Monitor Source

The monitor out section controls output to the consoles two monitor outputs (MONITOR A & B OUT) as well as to the headphone jacks.

NOTE

A monitor delay function is provided to allow a delay to be applied to the monitor and headphone outputs for time alignment between the sound from the main house and monitor speakers.
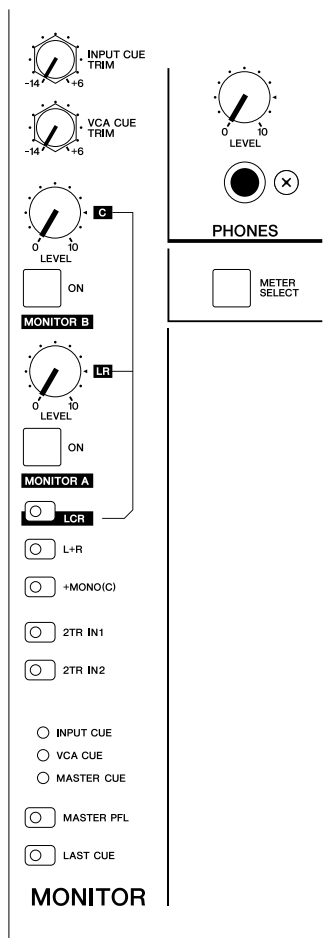
Three sources can be selected for monitoring: the stereo master signal, input from the 2-track inputs (2TR IN 1 & 2), and CUE. The stereo master signal can be monitored via the MONITOR A or MONITOR B output simply by engaging the corresponding [ON] switch and adjusting the [LEVEL] control as required. If the [2TR IN 1] or [2TR IN 2] switch is then engaged the monitor source will be switched to the corresponding 2-track input. Cue monitoring occurs when any channel or master [CUE] switch is engaged (cue monitoring takes priority over 2-track input monitoring).

	Normal Operation	**[2TR IN 1/2] Engaged**	**[CUE] Engaged**
Monitor Signal	Stereo master.	2-track input.	Cue

NOTE

If the console is set up so that the stereo master signal is not normally output (see page 67), only the cue signals will appear at the MONITOR outputs.

The Monitor Outputs

The two monitor outputs can be used independently or simultaneously. When using MONITOR A and B at the same time, the [LCR] switch can be engaged to allow the MONITOR B L channel to function as the C (center) channel for LCR monitoring in conjunction with the L and R channels from MONITOR A. Engage the [L+R] switch to sum the L and R channels to form a mono mix which will be delivered via both the L and R outputs. If you engage the [+MONO (C)] switch the mono master signal will be output via L and R in addition to the center channel.

Normal Operation	L R
[LCR] Engaged	L C R
[L+R] Engaged	L+R (C) R+L
[+MONO (C)] □ Engaged	L+C (C) R+C
[L+R] and □ [+MONO (C)] □ Engaged	L+R+C (C) R+L+C

NOTE

The [LCR] switch has no effect on headphone output. When the [+MONO (C)] switch is engaged, however, the cue C signal is delivered to the L and R channels at the same level, producing a similar effect.

Cue Signal Monitoring

If an input channel, VCA master, master out, or matrix out [CUE] switched is engaged while the stereo master or 2-track input signal is being monitored by the system's monitor speakers or headphones, the corresponding cue signal can be monitored.

One will light during cue monitoring.

○ INPUT CUE
○ VCA CUE
○ MASTER CUE
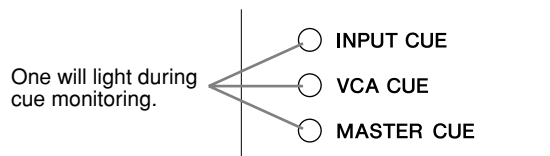
The cue signals from the input channel section, VCA section, or master out section (including the matrix out section) can be monitored one section at a time. When a [CUE] switch is engaged in any section the corresponding cue indicator will light: INPUT CUE, VCA CUE, or MASTER CUE. The cue signal is derived from different points in different sections, as described in the chart below.

Section	To MONITOR OUT When [CUE] Engaged	Cue Point
Input Channel	Channel (mono/stereo)	PFL (fixed)
VCA	Channels assigned to VCA groups (mono/stereo)	AFL (after [PAN/BAL] control)
Master Out	Stereo aux, G/A (group/aux), stereo, mono, matrix	[MASTER PFL] switch ON: PFL OFF: AFL

When a channel [CUE] switch is operated directly the channel's pre-fader signal will be sent to the MONITOR OUTs regardless of whether the channel [ON] switch is engaged or disengaged. In contrast to this situation, cue monitoring of input channels via the VCA section is always AFL (post fader and post [PAN/BAL] control). For example, If a VCA master [CUE] switch is engaged, the [CUE] switches of all channels assigned to that group will flash and only the signals from channels on which the channel [ON] switch is engaged will be sent to the MONITOR outputs. It is therefore possible to switch individual channels in a VCA group on or off while monitoring.
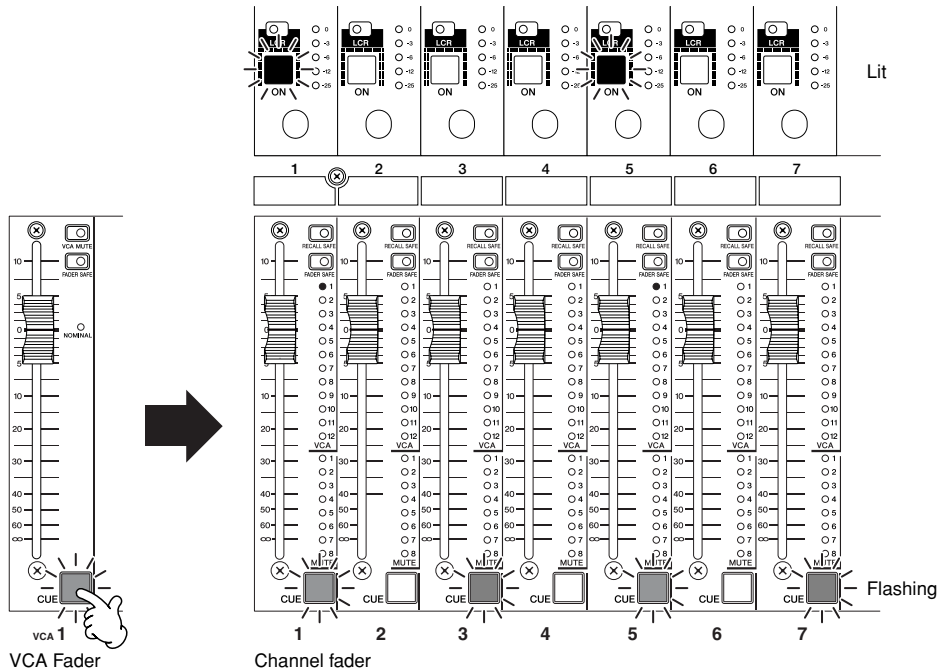
Only channels 1 and 5 can be sent to the MONITOR outputs

It is thus possible to monitor the PFL or AFL signal from each input channel, but a considerable shift in level may occur when switching from one to the other. Cue trim controls are provided to compensate for this: the [INPUT CUE TRIM] adjusts the PFL cue signal level while the [VCA CUE TRIM] control adjusts the AFL cue signal level.
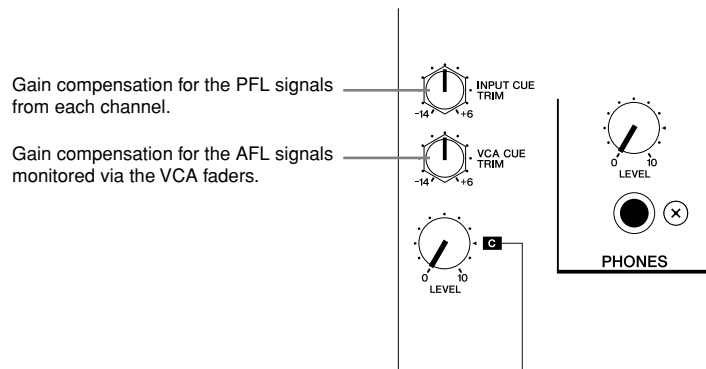
The cue points for all masters can be switched at once. To monitor the pre-master-fader signals engage the [MASTER PFL] switch, or disengage it to monitor the post-monitor-fader signals. In the latter case if the "PRE ON" cue point is selected (before the master [ON] switches – page 69) monitoring is possible even when output to the house speakers is off.
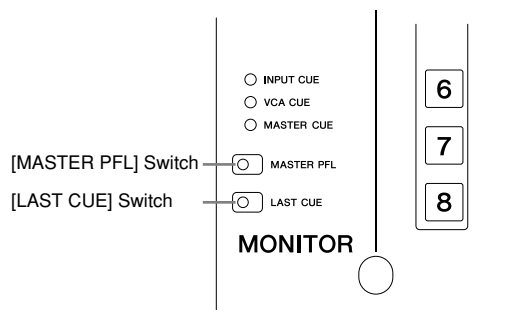
As described above cue monitoring can be active for one section at a time. Normally when multiple [CUE] switches in a section are engaged the corresponding signals are all sent to the monitor outputs (MIX CUE mode). When the [LAST CUE] switch is engaged, however, only the last [CUE] switch engaged in any one section will be active (LAST CUE mode).

NOTE

All active [CUE] switches will be disengaged when switching between the MIX CUE and LAST CUE modes. A neat "trick" to disengage all cues at once, therefore, is to engage and then immediately disengage the [LAST CUE] switch.

The Cue Stack Function

All current [CUE] switch settings are normally disengaged if a [CUE] switch in a different section is engaged. When all panel [CUE] switches are turned off monitor output reverts to the main stereo program or 2-track input signal. In some situations, however, the PM5000 "cue stack" function applies. If, for example, cue monitoring is engaged for the master out section, then the VCA section, and then the input channel section (master out → VCA → input channel), and then all of the [CUE] switches in one of the latter sections are disengaged, the cue status of the preceding section will be restored.
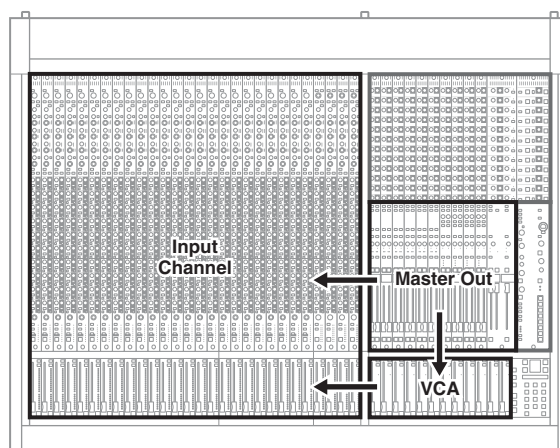
Cue Stack Flow
• Master Out → VCA → Input Channel
• Master Out → VCA

If all VCA [CUE] switches are disengaged the preceding master out section cue status is restored.

• VCA → Input Channel

If all input channel [CUE] switches are disengaged the preceding VCA section cue status is restored.

• Master Out → Input Channel

If all input channel [CUE] switches are disengaged the preceding master out section cue status is restored.

The cue stack function will not work if the above order is reversed (input channel → VCA → master out), or if a [CUE] switch in any other section is engaged.

Solo Mode

Cue and Solo

The terms "solo" and "cue" monitoring are often used interchangeably, and in some cases they are actually the same thing. In the PM5000 and most other sound-reinforcement consoles, however, "CUE" is a signal sent to the operator's monitor speakers while "SOLO" is a signal sent to the speakers fed by the console's master or matrix outs. Since solo monitoring in the PM5000 is handled in essentially the same way as cue monitoring, the term "cue/solo function" can be used in cases in which no clear distinction is necessary.

CUE

House Speaker   House Speaker

Guitar   Guitar
Bass   Bass
Vocal   Vocal
Keyboard   Keyboard

Console Monitor   Console Monitor

Guitar   Guitar

PM5000 (Cue Engaged)

Guitar
Bass
Vocal
Keyboard

SOLO

House Speaker   House Speaker

Guitar   Guitar

Console Monitor   Console Monitor

Guitar   Guitar

PM5000 (Solo Engaged)

Guitar
Bass
Vocal
Keyboard
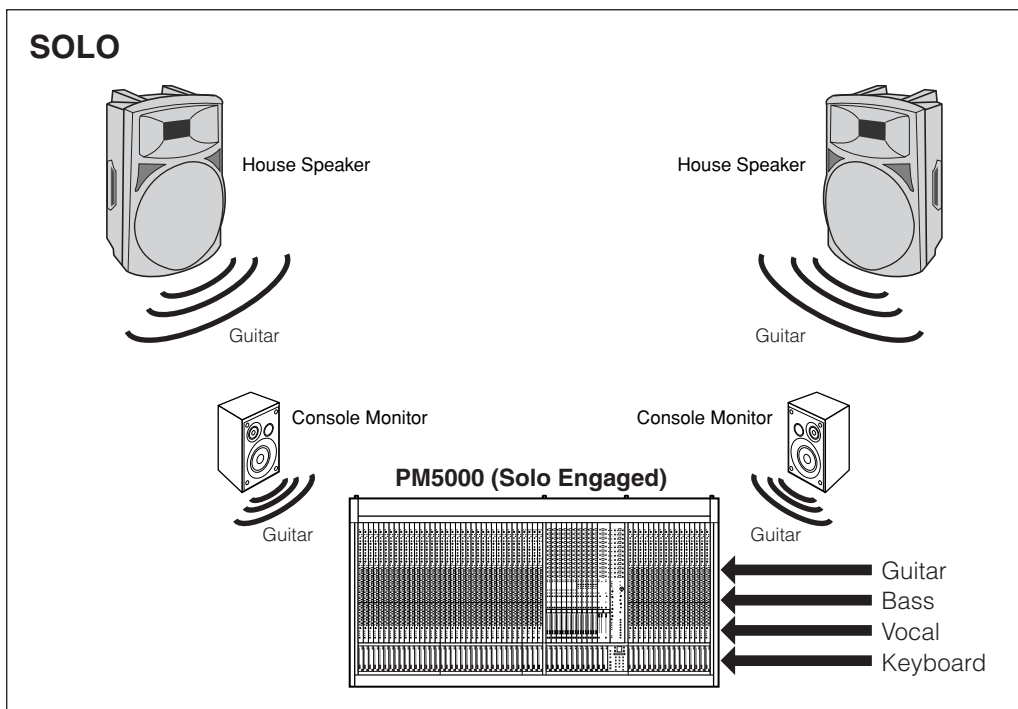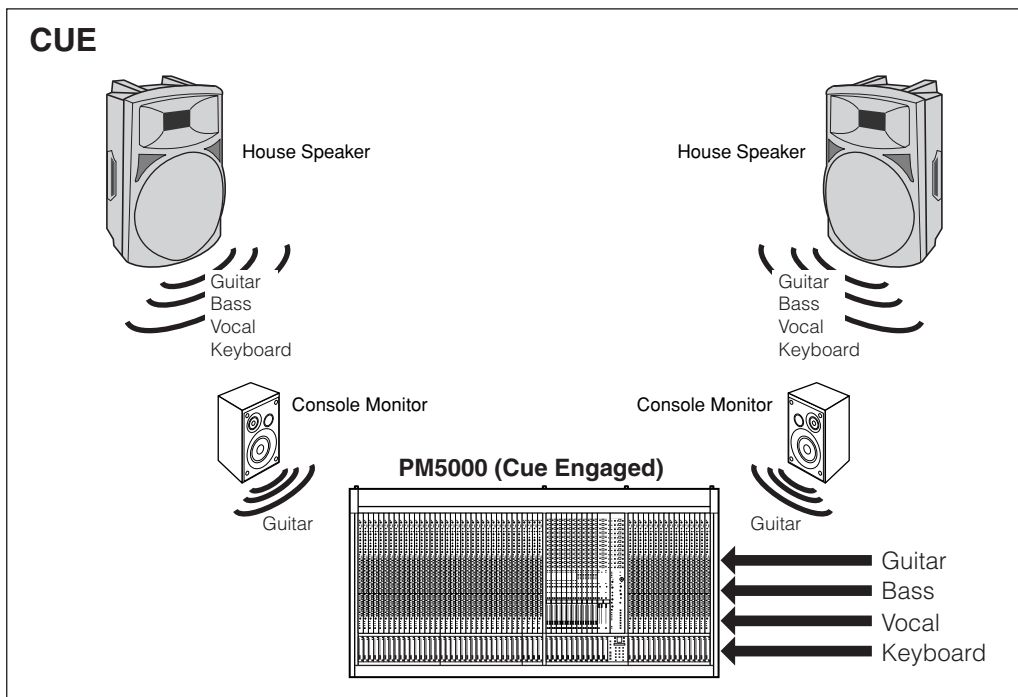
Basic Operation

The solo mode can be activated by holding the [SOLO MODE] switch on the meter bridge for more than two seconds – the [SOLO MODE] switch will flash.

For reasons why you might not be able to switch to the solo mode, see page 66.
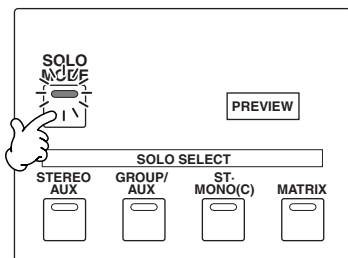
NOTE

The [PREVIEW] indicator is used for scene memory confirmation editing (page 55).

NOTE

If you engage the solo mode during cue monitoring, all [CUE] switches will be disengaged.

No change in the output signal will occur when the solo mode is first engaged (you won't suddenly have only one channel blasting from your house speakers). Once the solo mode has been engaged the [CUE] switches are used to select the channel or channels to be soloed via the master or matrix outs. The channel [ON] switches of all other channels will flash and their output will be muted.

Let's take a look at what happens if solo monitoring is engaged when channel 1 is feeding stereo aux 1 (L & R), group/aux 1, and the stereo and mono masters. Additionally stereo aux 1 is routed to stereo matrix 1 and group/aux 1 is routed to matrix 1.
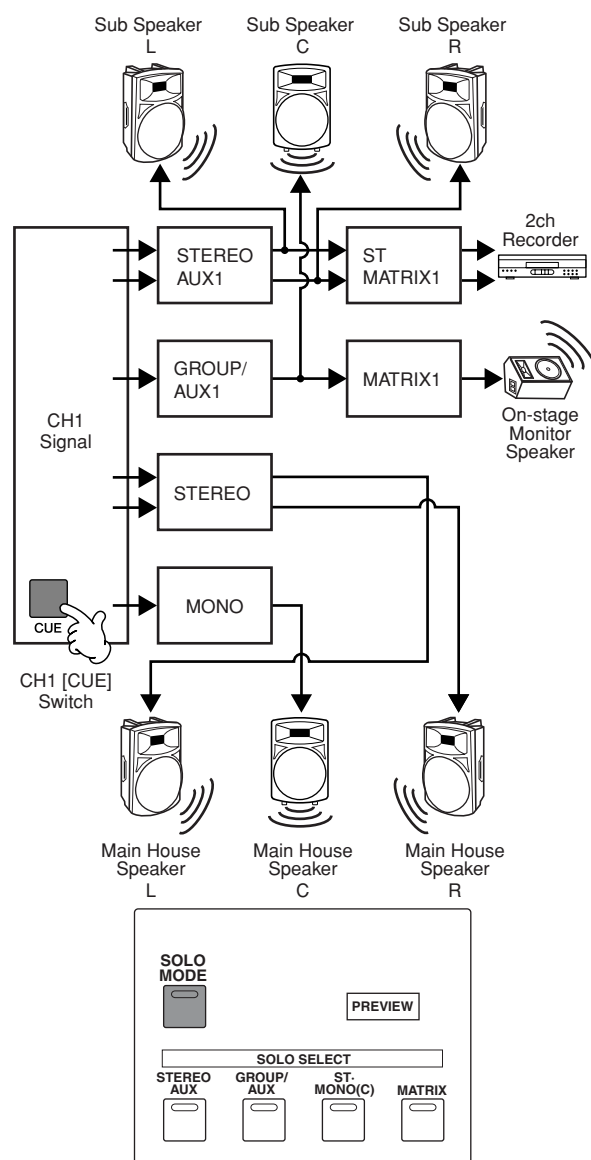
NOTE

Solo monitoring can be activated for one section at a time: input channel, VCA, or master out. The [LAST CUE] switch can be used to switch between the LAST CUE and MIX CUE modes. Also, the cue stack function will operate as described on page 43.

When the solo mode is active and the channel 1 [CUE] switch is engaged, only the channel 1 signal will appear at all master and matrix outputs to which it is routed (the stereo aux 1 and group/aux 1 master [TO MATRIX] switches must be engaged).

Master Solo Select

With complex, large-scale setups, the basic method of using individual [CUE] switches to check the sends to the main house speakers, sub-speakers, on-stage monitors, recording equipment and other gear can be confusing and tedious. The Master Solo function comes in handy in this type of situation.

The four SOLO SELECT switches located below the [SOLO MODE] switch can only be used while the solo mode is active. These switches determine which section will be muted when a solo channel is engaged. For example, if the SOLO SELECT [STEREO AUX], [GROUP/AUX], and [ST. MONO (C)] switches are all engaged. No major change is immediately apparent, but when the stereo aux 1 master [CUE] switch is engaged the sub L & R speakers will automatically be soloed. In the same way, if the stereo master [CUE] switch is engaged the main L & R speakers will be soloed.

If the stereo master [CUE] switch is also engaged the main L & R speakers will also be soloed. All this time the channel 1 signal is being sent to the recording gear via stereo aux 1. The signal does not appear at the on-stage monitors, however, because group/aux 1 is muted (an internal switch allows this setting to be changed so that the on-stage monitors do receive the channel 1 signal).
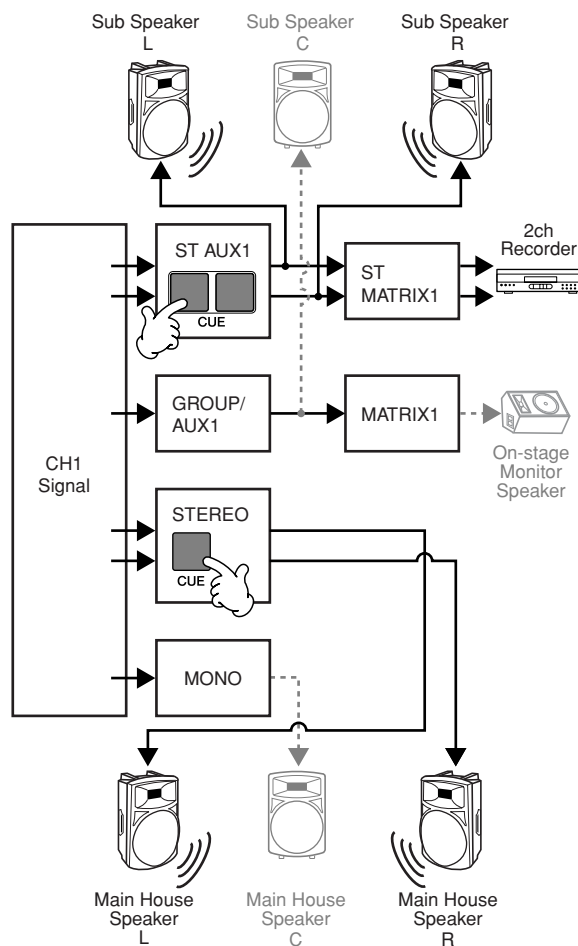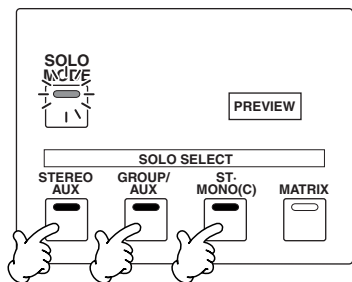
With this setup it is possible to solo-monitor the stereo or stereo aux 1 master outputs by simply operating a single [CUE] switch, making comparison of the main and sub L & R speakers a simple operation. The SOLO SELECT switches are idea for this type of operation, letting you specify which groups of outputs are to be muted when a solo channel is engaged.

NOTE

The solo mode directly affects the signal at the console's master outputs. In addition to the SOLO SELECT switches described above, the PM5000 has input solo safe and solo enable functions that can be used to prevent specified channels from being affected by solo operations. These functions are accessible via the utility mode (page 66).

Meter Bridge

The PM5000 meter bridge features precise bar-graph meters that display the signal levels at the master outs (stereo aux, group/aux, stereo, mono), matrix outs (stereo, mono), cue (L/C/R), and the talkback/oscillator bus, from –39 dB to PEAK level in 3-dB increments.
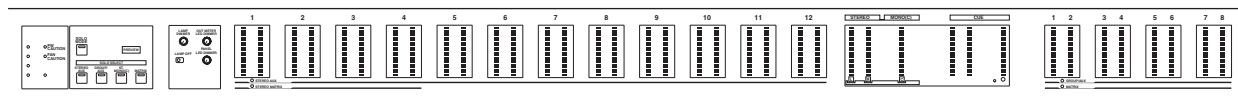
The meters are switched to display the stereo aux or stereo matrix signals, or the group/aux or mono matrix signals. The [METER SELECT] switch in the console's monitor control section alternately selects aux or matrix monitoring for both of these meters at once. The CUE C meter is automatically switched to display the talkback/oscillator signal level when either the [OSC ON] or talkback [ON] switch is engaged (the TB/OSC LED at the bottom of the meter will light).
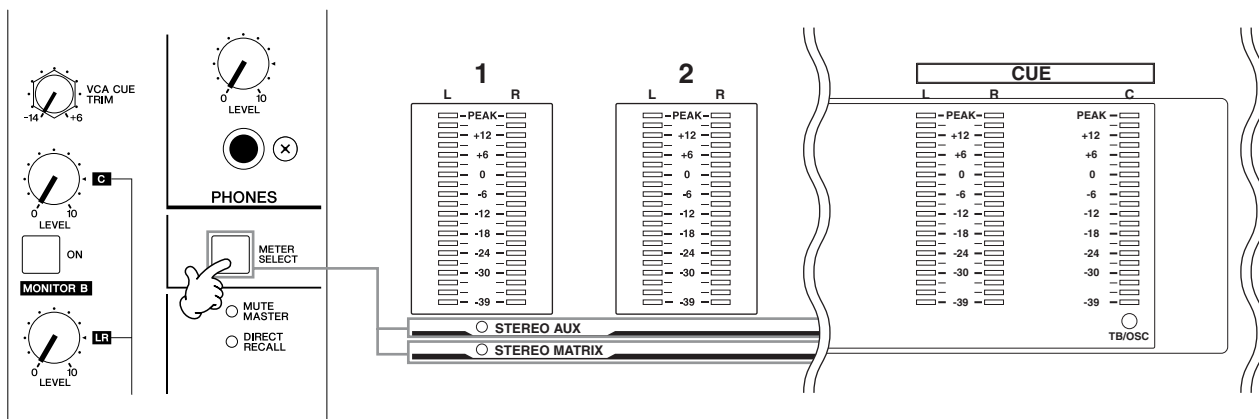
NOTE

Since there are only four stereo matrices, meters 5 ~ 12 are not active when the meters are switched to stereo matrix level display.

The meter bridge also features independent dimmer controls for the meters, panel switch illumination, and gooseneck lamps, as well as a [LAMP OFF] switch for the gooseneck lamps.

Gooseneck lamp dimmer.

Gooseneck lamp off switch.

LAMP DIMMER

LAMP OFF

OUT METER LED DIMMER

PANEL LED DIMMER

Bar-graph meter dimmer.

Panel switch dimmer.
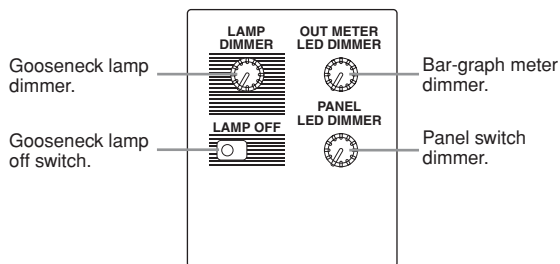
Confirmation LEDs are also provided for the phantom power supply and other power-supply voltages, as well as operation of the console and external power supply cooling fans.

Phantom power supply and other voltage supplies.

+48V

+12V

+16V

-16V

○ **PW CAUTION**

○ **FAN CAUTION**

○ **+48V MASTER ON**

External power supply (lights when a problem is detected).

Cooling fans (lights when a problem is detected).

Master phantom power supply switch on.
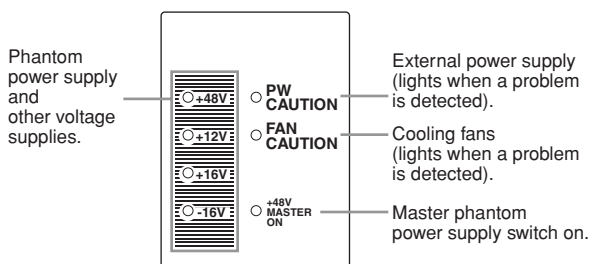
NOTE

If excessive temperature or abnormal voltages are detected in the dedicated external PW5000 power supply unit the PW CAUTION indicator will light as long as continued operation is possible, but if operation becomes impossible the power supply will automatically shut down. The FAN CAUTION indicator if one or more of the PM5000's internal cooling fans ceases to operate. In either case have the unit(s) checked by qualified service personnel as soon as possible.

Digital Control Section

Control Functions

The digital control section includes the majority of functions used for digital control of the PM5000 scene memory and utility features.
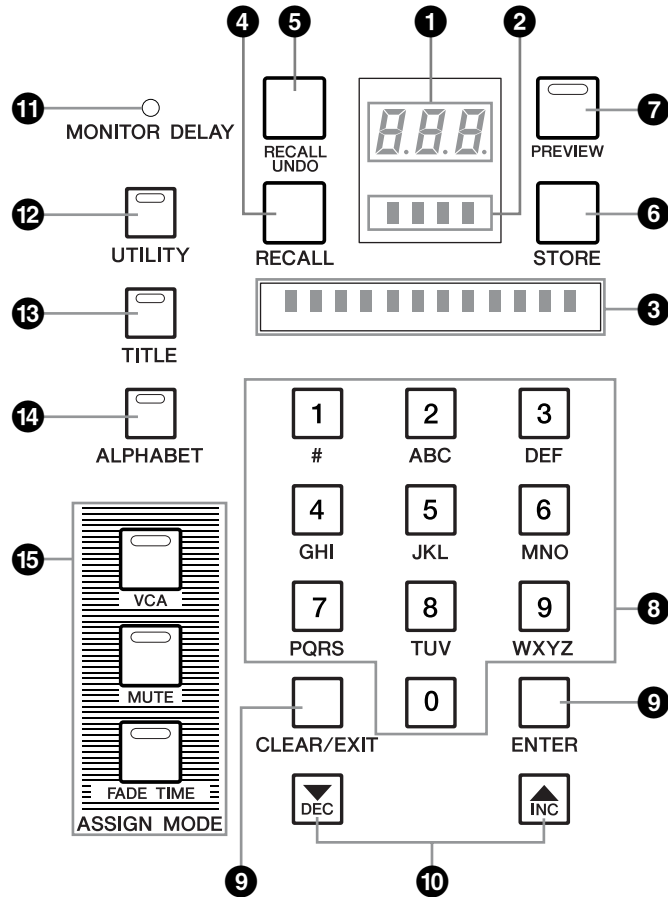
❶ Scene Display (3 Digits + 3 Dots)

When the PM5000 scene memory function is active the current (last recalled) scene memory number – 000 ~ 999 – is shown on this display. The three display dots indicate the status of the current scene as follows:

Left dot: The scene contains no data.
Center dot: A MIDI message has been received.
Right dot: The panel settings are different from the recalled scene.

> **NOTE**
>
> When the PM5000 power is turned on the last panel setup before it was turned off is automatically recalled (scene memory "000" will be recalled the first time the power is turned on after the console is initially shipped).

❷ Message Display (4 Characters)

Messages relating to certain operations and functions are displayed here. Error messages are also shown on the display when problems occur (page 94).

❸ Parameter Display (12 Characters)

Normally the name of the current scene is displayed here, but when a utility function is being used the name of the parameter being edited and its value is displayed.

❹ [RECALL] Switch
❺ [RECALL UNDO] Switch
❻ [STORE] Switch

The [RECALL] switch actually recalls the settings for a specified scene memory, the [RECALL UNDO] switch undoes the last recall operation, and the [STORE] switch is used to store new scene data in the selected scene memory.

❼ [PREVIEW] Switch

When the [PREVIEW] switch is engaged the parameters of the selected scene are called to the console's controls without affecting the current audio setup, allowing the settings to be previewed and edited as required.

❽ Alpha-numeric Keypad
❾ [CLEAR/EXIT] & [ENTER] Keys
❿ [INC] & [DEC] Keys

The alpha-numeric keypad is used to enter scene numbers and titles, the [CLEAR/EXIT] key cancels scene number entry or deletes title characters, and the [ENTER] key confirms an entered scene number or other operation. The [INC] and [DEC] keys are used to increment or decrement scene numbers or parameter values. Either key can be held for continuous scrolling in the corresponding direction.

⓫ MONITOR DELAY Indicator

This indicator will light when the PM5000's digital delay has been applied to the monitor outputs via the corresponding utility function (page 68).

⓬ [UTILITY] Switch

Accesses the console's utility functions. Editing and confirmation of the various utility functions is carried out via the alpha-numeric keypad ❽, [CLEAR/EXIT] and [ENTER] keys ❾, and [INC] and [DEC] keys ❿.

⓭ [TITLE] Switch
⓮ [ALPHABET] Switch

Engage the [TITLE] switch when you want to edit the title of a scene memory. To enter characters rather than numbers via the alpha-numeric keypad ❸, engage the [ALPHABET] switch.

⓯ [ASSIGN MODE] Switches

The three assign mode switches are used for VCA and mute group setup (page 21) as well as setting the scene fade times (page 52).

Scene Memory Functions

Overview

A "scene" is a set of panel settings stored in one of the PM5000's 1,000 internal scene memories (000 ~ 999). Any stored scene can be instantly recalled at any time for fast efficient changes. The first 10 scene memories (000 ~ 009) contain preset data for common basic setups. The presets cannot be overwritten, but the remaining 990 scenes (010 ~ 999) are available to store original setups. The parameters that can be store in each scene are listed in the chart below.

Section		Stored Parameters (Panel Controls)	Protect Capability (■: Panel Control. ■: Utility Function)
Input		Level (channel fader)	Fader Safe
		Channel on/off	Recall Safe
		Stereo bus send on/off	
		Mono bus send on/off	
		LCR send on/off	
		Stereo aux bus send on/off	
		Group/aux bus send on/off	
		VCA group assign	
		Mute group assign	
		Fade time assign on/off	n/a
Output	STEREO AUX	Master out on/off	Recall Safe
	GROUP/AUX	Master out on/off	
		Stereo bus send on/off	
		Mono bus send on/off	
	STEREO	Master out on/off	
	MONO (C)	Master out on/off	
	STEREO MATRIX	Master out on/off	
	MATRIX	Master out on/off	
VCA		Level (VCA fader)	Fader Safe
		Mute on/off (VCA mute)	
		Fade time assign on/off	n/a
Other		Scene title (entered after scene storage)	n/a
		Fade time (common to input channels & VCAs)	

Since the parameters stored in the scene memory are the normal panel settings used in setting up signal routing and mixes, you can easily take "snapshots" of various setups you might need to recall later. The preview function can be used to check and edit the stored settings as necessary. Stored scenes can then be recalled instantaneously at any time.

Fade time settings can be individually stored with each scene, so that when a scene is restored the faders settings will, rather than jump to the recalled values immediately, gradually fade to the recalled settings over the specified fade time.

It is also possible to protect certain parameters so that the specified parameters will not change when a scene is recalled. The [RECALL SAFE] switches provided on

the input channels, master outputs and matrix outputs, and the [FADER SAFE] switches provided on the input channel and VCA master faders are used to specify which parameters are to be protected for the corresponding input or master channel, as listed in the chart above. When a [RECALL SAFE] or [FADER SAFE] switch is engaged the corresponding settings will not be affected by scene recall operations, regardless of the settings contained in the recalled scene.

NOTE

If you don't intend to use the PM5000 scene memory function, the "AUTOMODE OFF" mode can be selected (page 70) to prevent potential problems caused by accidental scene storage or recall operations.

Fade Time

Fade time settings can be used to create smooth transitions between recalled scenes. The fade time specified for a scene is common to all channel and VCA faders, but you can individually specify the faders to which the fade time will apply. The procedure for setting and assigning fade times is described below.
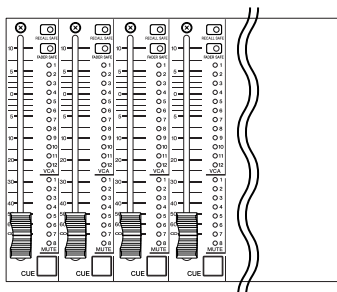
1 To set a fade time engage the ASSIGN MODE [FADE TIME] switch so that its indicator lights (at this point the [CUE] switches of input and VCA master channels currently assigned to fade time operation will flash).
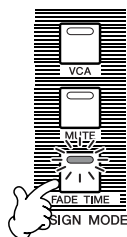
2 Press the [ENTER] key so that the fade time appears on the message display to activate the fade time function. The fade time function can be turned off at this point by pressing the [CLEAR/EXIT] key so that "OFF" appears on the display.
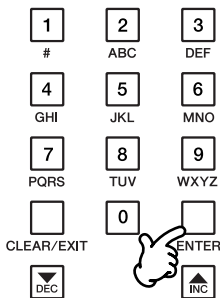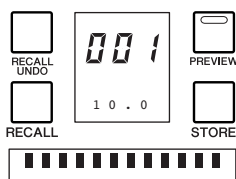
3 Engage the [CUE] switches of the input and master VCA channels to be assigned to the fade time function so that their indicators flash. Pressing a flashing [CUE] switch will cause the indicator to go out and that channel will be unassigned from the fade time function (it will not be affected by the fade time setting and the fader setting will change instantaneously when a scene is recalled).
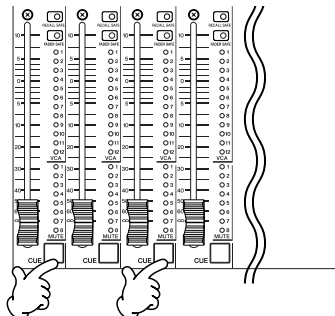
4 Use the [INC] and/or [DEC] keys to set the fade time from 0.1 to 60 seconds, as required. The fade time can be set in 0.1-second increments from 0.1 through 10 seconds, in 0.2-second increments from 10 through 20 seconds, and in 0.5-second increments from 20 through 60 seconds.
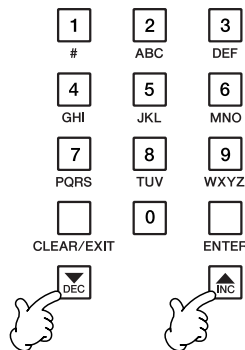
5 When all of the above settings have been made as required disengage the ASSIGN MODE [FADE TIME] switch (its indicator will go out). Pressing any other ASSIGN MODE switch will have the same effect (the assign mode will change to that of the newly selected switch).

6 The specified fade time and fader assignments can be stored in a scene memory as described in the following section. Please note that if you recall a different scene before performing the scene store procedure the fade time settings you have made will be lost.

NOTE

When a scene containing a fade time setting is recalled, "FADE" will appear on the message display while the scene fade is in progress (unless another message is being displayed at the same time).

Scene Store

The following procedure stores the panel settings along with the current fade time settings (set as described in the preceding section).
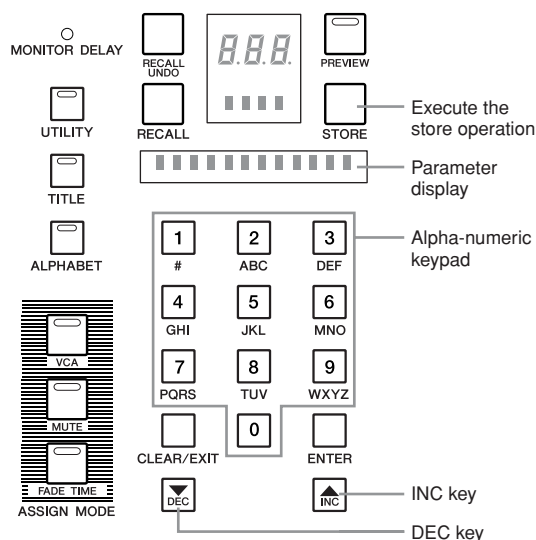
1 Specify the scene memory number to which the scene is to be stored (010 ~ 999). The desired scene number can be directly entered via the alpha-numeric keys, or the [INC] and [DEC] keys can be used to scroll through the available scene memory numbers. In either case the selected scene number will flash, and the current scene title will appear flashing on the parameter display (no title will appear if the scene contains no data).

2 Press the [STORE] switch and, if necessary, edit the scene title (steps 2 and 3 on page 54).
If not necessary, press the [STORE] switch again.

3 The following confirmation message will appear.

```
S U R E ? Y : 1   N : 3
```

4 Press the alpha-numeric [1] key to store the scene. The scene number will light continuously indicating that the current settings have been stored in the selected scene. Press the [3] if you want to abort the store operation.

> **NOTE**
>
> Settings cannot be stored in protected scenes. If the protect function is active, it must be turned off before new data can be stored in the scene (page 62).

Scene Recall

Stored scene data can be recalled as follows.
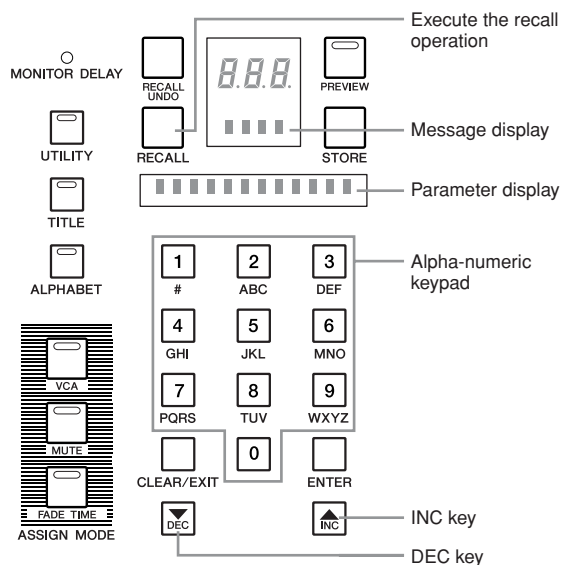
> **NOTE**
>
> Be sure to engage the [RECALL SAFE] or [FADER SAFE] switches for any channels on which the corresponding settings need to be maintained.

1 Specify the scene memory number from which the scene is to be recalled (000 ~ 999). The desired scene number can be directly entered via the alpha-numeric keys, or the [INC] and [DEC] keys can be used to scroll through the available scene memory numbers. In either case the selected scene number will flash, and the scene title will flash on the parameter display.

2 Press the [RECALL] switch. The scene number will light continuously and the corresponding scene settings will be recalled.

> **NOTE**
>
> If the selected scene contains no data "NoDT" will appear on the message display and the recall operation will be ignored (no changes will be made to the panel settings).

> **NOTE**
>
> When the theater mode is engaged, it is possible to directly recall scenes in sequence by using the [INC] and [DEC] keys, without having to press the [RECALL] key (page 69). The DIRECT RECALL switches can also be used for direct scene recall (page 71).

> **NOTE**
>
> Normally the channel and VCA faders will physically move to the recalled settings via the console's motor drive system. Motor drive can be turned off if necessary (page 70).

Recall Undo

The previous scene recall operation can be undone by pressing the [RECALL UNDO] switch. If the [UNDO RECALL] switch is then pressed a second time the pre-undo state will once more be recalled.
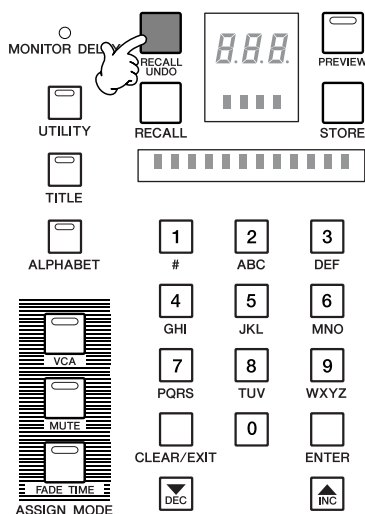
NOTE

The [RECALL UNDO] switch will have no effect immediately after the console power has been turned on, before any recall operations have been performed.

Title Edit

Titles of up to 12 characters can be entered for each scene.
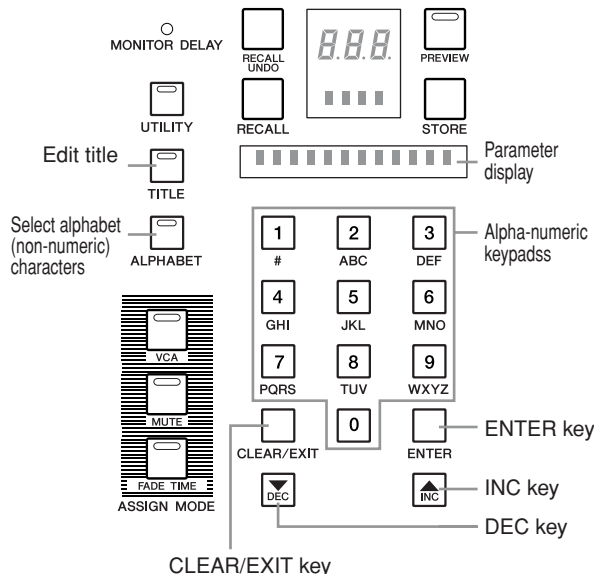
1 Select the scene for which you want to enter or edit a title (010 ~ 999). To edit the title of the current scene press the [TITLE] switch so that its indicator lights.

NOTE

Scene numbers 000 through 009 cannot be edited.

2 A cursor will appear on the parameter display, and the character at the cursor location will flash. The scene title can now be edited. Alphabet (non-numeric) characters can be entered via the alpha-numeric keypad after engaging the [ALPHABET] switch.

The [CLEAR] key deletes the character at the cursor position and moves all following characters to the left.

Numbers can be entered via the alpha-numeric keypad. When the [ALPHABET] switch indicator is lit the alpha-numeric keypad can be used to enter the characters of the alphabet.

The [INC] and [DEC] keys move the cursor left and right.
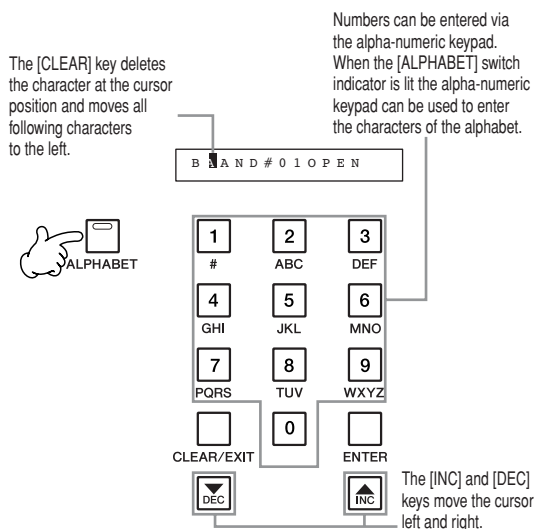
Number Key	Non-numeric Characters (selected sequentially by the key)
1	! " # $ % & ' ( ) * + , – . \ : ; < = > ? @ [
2	A B C a b c
3	D E F d e f
4	G H I g h I
5	J K L j k l
6	M N O m n o
7	P Q R S p q r s
8	T U V t u v
9	W X Y Z w x y z
0	(space)

3 When the [ENTER] key is pressed to confirm and enter the title, the [TITLE] switch indicator will go out and the scene number will revert to that of the current scene (if the title of the current scene was edited after the scene was stored, the scene number will not change). If you have edited the title of the current scene the new title will appear on the display immediately.

A title edit operation in progress can be aborted by disengaging the [TITLE] switch.

NOTE

The preview function, described below, can be used to check the title of a scene other than the one that is currently.

The Preview Function

The preview function is sort of an "offline editing function" that allows you to check and edit the contents of a scene memory location without affecting the console's current status and audio output.

1 To turn the preview function on, engage the [PREVIEW] switch. Both the [PREVIEW] switch indicator and the PREVIEW indicator on the meter bridge will flash while the preview function is on.
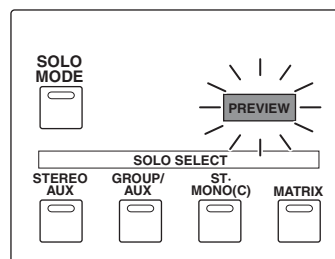
Flashes while the preview function is engaged.
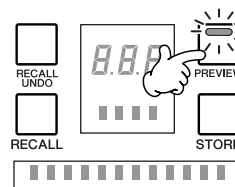
NOTE

The preview function cannot be engaged while the utility mode is active (i.e. while the [UTILITY] switch indicator is lit).

---

2 To select a scene to preview simply enter the desired scene number (000 ~ 999). The desired scene number can be directly entered via the alpha-numeric keys, or the [INC] and [DEC] keys can be used to scroll through the available scene memory numbers. In either case the selected scene number will flash, and the scene title will appear on the parameter display.

NOTE

The preview function cannot be engaged during a scene fade (i.e. a fade specified by the console's fade time function).

---

3 Press the [ENTER] key to confirm the selected scene number and the scene number will light continuously. At the same time the scene settings will be reproduced by the panel controls but no change will occur in the console's audio output.

NOTE

During preview all stored settings will be reproduced on the panel controls. In this state the [CUE] switches cannot be operated (the pre-preview settings are maintained), but the [RECALL SAFE] and [FADER SAFE] switches can be set as required.

---

4 If necessary, change the fader and switch settings as required (page 51). If you press the [STORE] switch at the point the edited settings will be stored in the scene memory selected in step 2, above (the scene number currently being displayed). If you select a different scene number and then press [STORE] the edited settings will be stored in the newly selected scene number.

5 When confirmation and/or editing of the scene settings has been completed, exit from the preview mode in any of the following three ways.

  • **Press the [PREVIEW] switch:** The console will return to the pre-preview state. If the setting changes made in step 4 above have not been stored, they will be lost.

  • **Press the [RECALL] switch:** The current preview settings become the active console settings and console operation continues normally. If, however, a different scene number is selected before the [RECALL] switch is pressed, the current preview settings are overwritten by the settings from the recalled scene. In the latter case the preview settings will be lost if they have not been stored as described in step 4, above.

  • **Press the [UTILITY] switch:** The utility mode will be engaged and the console will return to the pre-preview state.

NOTE

If the panel settings are saved to a CompactFlash memory card in CSV file format, the scenes can be edited offline on a personal computer (page 59).

Utility Functions

Overview

The utility functions include functions that facilitate operation of the PM5000 as well as the console's basic setup parameters. Press the [UTILITY] switch to access these functions and parameters.
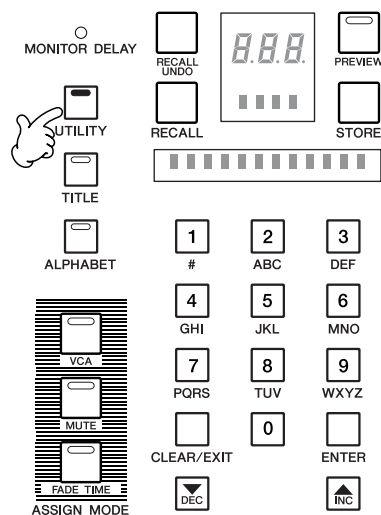
NOTE

The utility mode cannot be engaged while a scene title is being edited (page 54). If the title edit mode is active it will be necessary to disengage the [TITLE] switch and return to normal console operation before pressing the [UTILITY] switch to engage the utility mode. Similarly, the scene preview function (page 55) cannot be engaged while the utility mode is active.

Common Operations

All utility functions are accessed and edited by using the alpha-numeric keypad, [CLEAR/EXIT] key, [ENTER] key, and [INC] and [DEC] keys while checking functions and values on the scene display, message display, and parameter display.

1 Press the [UTILITY] switch so that its indicator lights, a parameter will appear on the 12-character parameter display. At the same the corresponding parameter number will flash on the scene display.

$$U01$$

BATT. CHECK

NOTE

When the [UTILITY] switch is engaged the last selected parameter will be recalled.

2 The various utility parameters are selected by using the [INC] and [DEC] keys to select the desired parameter number. You can also directly enter the desired parameter number (1 ~ 28) via the alpha-numeric keypad. The parameter numbers will appears as "U01" through "U28" on the display.

1 #	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
CLEAR/EXIT	0	ENTER
▼ DEC		▲ INC
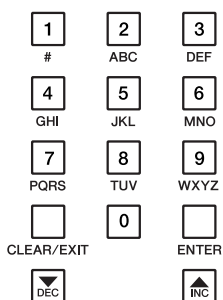
Function Category	Parameter No.	Parameter
Basic	1	BATTERY CHECK
	2	DATE/TIME
	3	COMPACT FLASH MEMORY
	4	LOCK MODE
	5	MEMORY PROTECT
	6	SCENE EDIT
Bus Mode*	7	G/A BUS MODE
	8	STMATRIX MODE
Safety & Protection*	9	GROUP ASSIGN SAFE
	10	G/A BUS ASSIGN SAFE
	11	RECALL SAFE SELECT
	12	SOLO ENABLE
	13	INPUT SOLO SAFE
Monitor*	14	MONITOR MODE
	15	MONITOR DELAY
	16	MASTER CUE AFL POSITION
Scene Recall*	17	THEATER MODE
	18	FADER MODE
	19	AUTOMATION
	20	DIRECT RECALL/ MUTE MASTER
GPI*	21	SCENE INC/DEC
	22	GPI OUT
Cascade*	23	CASCADE
MIDI*	24	MIDI PGM CHANGE
	25	MIDI CTL CHANGE
	26	MIDI SETTING
	27	MIDI ECHO BACK
	28	MIDI PGM CHANGE TABLE

* In addition to storing the above parameters in the internal PM5000 setup memory, they can be saved externally on CompactFlash memory cards.

3 When the desired parameter has been selected, the first editable value for that parameter will appear on the parameter display.

$$U02$$

DATE

DT2003/02/10

4 When a parameter that can be edited is selected, the first editable parameter will appear flashing on the display. Use the [INC] and [DEC] keys or the alphanumeric keypad to edit the value as required, and then press [ENTER]. When available, the next editable value will flash and can be edited in the same way. To go back to the previous editable value press the [CLEAR/EXIT] key.

> **NOTE**
>
> The procedure described in step 4, above, is not necessary for parameters that are used only for confirmation (non-editable parameters). Although some editable parameters only have a single value while others have two or more editable values spanning more than one display page, the basic procedure for all is as described above (display pages are switched automatically). You can press the [ENTER] or [CLEAR/EXIT] key a number of times to step forward or backward to the value to be edited.

5 Repeat steps 2 through 4 to check or edit the required parameters. When all utility operations are complete press the [UTILITY] switch so that its indicator goes out to exit from the utility mode and return to normal console operation.

Basic Functions

Battery Check (Parameter No. U01)

The PM5000 has an internal memory backup battery that maintains the console's scene memory, setup memory, and time/date settings while the power is off. This function makes it possible to check the condition of the memory backup battery.

```
U01
```

```
BATT.  CHECK
```

Press [ENTER] after selecting the above display and one of the following status messages will appear on the parameter display:

Battery voltage OK.

```
OK
```

Battery voltage low.

```
Low  Battery!
```

No battery present.

```
No  Battery!
```

> **NOTE**
>
> For battery replacement, please contact your nearest qualified Yamaha service center or personnel.

Date/Time (Parameter No. U02)

This is the date and time maintained by the PM5000's internal clock. The date and time parameters are used to time-stamp scene memory and other data saved to external CompactFlash memory cards.

```
U02
```

```
D A T E / T I M E
```

1 Press [ENTER] after selecting the above display and the year, month, and day values will appear on the parameter display while "DT" (date) flashes. At this point you could use the [INC] and [DEC] keys to select "TM" (time) for editing rather than the date, but the date parameters will appear first since they are usually edited first.

```
D T 2 0 0 3 / 0 6 / 1 0
```
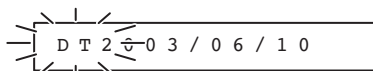
2 Press the [ENTER] key and the year value will flash. The flashing value can be edited by using the [INC] and [DEC] keys. When a value has been edited as required press [ENTER] to confirm the entry and move on to the next value.

```
D T 2 0 0 3 / 0 6 / 1 0
```
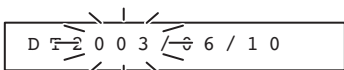
3 Once the day (rightmost) value has been edited and the [ENTER] key pressed, the date is confirmed and "DT" will flash again. Press the [INC] or [DEC] key and the display will change to the time parameters: hour, minutes, and seconds. The leftmost "hours" value will be flashing and ready for editing. In the same way as in the date display, edit each value as necessary and press [ENTER] to move on to the next value. When the final "seconds" value has been edited and the [ENTER] pressed the time entry is confirmed and complete.

```
T M   1 5 : 4 5 : 3 2
```
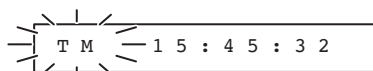
NOTE

If the backup battery runs out the date and time will be reset to 2001/1/1, 0:00:00, and will begin keeping time from that value.

CompactFlash Memory (Parameter No. U03)

This function allows internal scene and setup memory data to be saved to and loaded from external CompactFlash memory cards. A memory card formatting function is also provided.

```
U03
```

```
C F   M E M O R Y
```

NOTE

New CompactFlash memory cards must be formatted before use. CompactFlash memory cards are formatted in accordance with DOS (FAT16) format, and files are handled in CSV format. Data saved to memory cards can then be loaded into a personal computer via a card reader or similar device, and the data can then be edited in a standard spreadsheet application (file names comply with the DOS standard: 8 characters plus the ".CSV" extension).

1 Press [ENTER] after selecting the above display and one of the displays shown below will appear. Select LOD (load), SAV (save), DEL (delete), or FMT (format), as necessary, and press the [ENTER] key.

```
L O D : Y A M A H A 0 1
```

```
S A V : A L L
```

```
D E L : Y A M A H A 0 1
```

```
F M T : F O R M A T
```

NOTE

When the load or delete functions are selected the name of the CSV file on the card will appear on the display (the ".CSV" extension will not be shown).

NOTE

If a memory card is not inserted, the parameter display will not change even when you press [ENTER].

● **Format**

2 If you selected FMT and pressed [ENTER] in step 1, above, the following confirmation message should appear.

```
S U R E ? Y : 1    N : 3
```

3 Press the alpha-numeric [1] key to begin formatting the card, or [3] to abort the operation. Never remove a memory card from the card slot during a format operation. The following display will appear while the card is being formatted.

```
E x e c u t i n g
```

NOTE

CompactFlash memory cards can also be formatted using a computer, but we recommend that you format cards using the PM5000 format function to minimize the possibility of load errors.

● **Data Save**

2 After selecting SAV and pressing [ENTER] in step 1, above, you will need to select the type of data to be saved (below) and then press [ENTER] to confirm.

• **ALL:** All PM5000 data (scene memory, setup memory, program change table).

• **SCENE:** Scene memory data (scenes 010 ~ 999).

• **SETUP:** setup memory data (page 57).

• **TABLE:** The program change table data set up via utility function parameter number U28.

3 Whatever data type you select you will need to enter a name of up to 8 characters for the file to be saved. Enter a name so you can easily identify the data later.

```
S A V : N E W _ D A T A
```

NOTE

File names are entered using capital letters only. The character set available for file names is somewhat different from the set available for scene titles (refer to the chart below). Spaces cannot be used in file names.

Number Key	Usable Filename Characters (selected in sequence by the number key)
1	! # $ % & ' ( ) – @
2	A B C
3	D E F
4	G H I
5	J K L
6	M N O
7	P Q R S
8	T U V
9	W X Y Z

4 When the file name has been entered press the [ENTER] key. The following confirmation message will appear on the display.

```
S U R E ? Y : 1    N : 3
```

NOTE

If a file with the same name already exists the message will confirm that it is OK to overwrite the existing file – "SURE" in the above will appear as "OVWR".

5 Press the alpha-numeric [1] key to begin saving to the card, or [3] to abort the operation. Never remove a memory card from the card slot during a save operation. The following display will appear while the data is being saved.

```
E x e c u t i n g
```

● **Data Load**

2 After selecting LOD and pressing [ENTER] in step 1, above, you will need to select the data file you want to load from the memory card.

```
L O D : Y A M A H A 0 1
```

3 When you have selected the file to be loaded press the [ENTER] key. The following confirmation message will appear.

```
S U R E ? Y : 1    N : 3
```

4 Press the alpha-numeric [1] key to begin loading the file, or [3] to abort the operation. Never remove a memory card from the card slot during a load operation. The following display will appear while the data is being loaded.

```
Executing
```

● Data Delete

2 After selecting DEL and pressing [ENTER] in step 1, above, you will need to select the data file you want to delete from the memory card.

```
DEL:OLD_DATA
```

3 When you have selected the file to be deleted press the [ENTER] key. The following confirmation message will appear.

```
SURE?Y:1  N:3
```

4 Press the alpha-numeric [1] key to begin deleting the file, or [3] to abort the operation. Never remove a memory card from the card slot during a delete operation. The following display will appear while the data is being deleted.

```
Executing
```

Lock Mode (Parameter No. U04)

This function can be an assurance when you have to leave the console unattended during breaks, for example. It locks the panel switch and channel fader settings so they can't be changed. Panel settings that are not savable to the scene memory such as the channel rotary controls, EQ [ON] switch, HPF [ON] switch, etc., cannot be locked.

```
U04
```

```
LOCK  MODE
```

1 Press [ENTER] after selecting the above display and one of the displays shown below will appear: either ON or OFF with flash on the parameter display

```
LOCK:ON
```

```
LOCK:OFF
```

2 Use the [INC] and [DEC] keys to select either ON or OFF.

3 Press the [ENTER] key and the following confirmation message will appear. Press the alpha-numeric [1] key to confirm your selection, or [3] to abort the operation.

```
SURE?1:Y  3:N
```

When the lock mode is turned on, the [UTILITY] switch will be disengaged and "LOCK" will appear on the message display. In this state the system is locked and the only operation that can be performed is to engage the [UTLILITY] switch and repeat the above procedure to turn the lock mode off and restore normal operation.

NOTE

Even while the lock mode is active scene recall operations can be carried out from an external device. If fader and other settings are changed while the lock mode is active the pre-lock settings will be restored as soon as the lock mode is disengaged.

Memory Protect (Parameter No. U05)

This function can be used to temporarily protect the scene memory from being overwritten (only the recall operation is available).

```
U05
```

```
MEM.  PROTECT
```

NOTE

The scene edit function, described below, can be used to protect individual scenes rather than the entire scene memory. Also, when the memory protect function is active it is not possible to use the scene edit function or load scenes from an external CompactFlash memory card.

1 Press [ENTER] after selecting the above display and one of the displays shown below will appear: either ON or OFF with flash on the parameter display

```
PROTECT:  ON
```

```
PROTECT:  OFF
```

2 Use the [INC] and [DEC] keys to select either ON (memory protected) or OFF.

NOTE

If you attempt a scene save or delete operation while memory protection is active "PROT" will appear on the parameter display and the operation will be cancelled.

Scene Edit (Parameter No. U06)

Using this function you can change the order of stored scenes (010 ~ 999) to match the flow and sequence of a music or theatrical production. By then using the "theater mode" (described later) you can directly recall scenes in sequence simply by using the [INC] and [DEC] keys. This function also allows protection of individual scenes.

```
U06
```

```
SCENE  EDIT
```

1 Press [ENTER] after selecting the above display and one of the following messages will appear on the parameter display. Select MOV (move), CLR (clear), CUT (cut), CPY (copy), INS (insert), or PRT (protect), as necessary, and press the [ENTER] key.

Move scene:
> The contents of the target ("trg") scene memory are moved to the destination ("dst") scene number. This is similar to a cut-and paste operation on a personal computer.

```
MOV:  trg>dst
```

Clear scene:
> Clears the contents of the specified target ("trg") scene number, resulting in a "NO DATA" scene. You can also select "ALL" to clear all scenes (except those that are protected).

```
CLR:      trg
```

Cut scene:
> Cuts the selected target ("trg") scene. Since there is no associated "paste" operation, this function effectively clears the selected scene, but all subsequent scenes are shifted back so the operation does not produce a "NO DATA" scene.

```
CUT:      trg
```

Copy scene:

The contents of the target ("trg") scene memory are copied to the destination ("dst") scene number. This is similar to a copy-and paste operation on a personal computer.

```
C P Y :   t r g > d s t
```

Insert Scene:

Inserts a "NO DATA" scene immediately before the specified target ("trg") scene number. All subsequent scenes are shifted up one number to accommodate the inserted scene.

```
I N S :         t r g
```

Protect Scene:

Protects the specified target ("trg") scene from being changed by copy and clear operations.

```
P R T :   t r g : O F F
```

2 Use the [INC] and [DEC] keys to specify the target and destination scene numbers, and the [ENTER] key to confirm (scene protect ON or OFF is selected in the same way). The following message will appear on the parameter display.

```
S U R E ? Y : 1   N : 3
```

3 Press the alpha-numeric [1] key to execute the selected operation, or [3] to abort.

NOTE

Protected scenes cannot be cleared, cut, or specified as the destination scene for a copy operation.

Bus Mode

The PM5000's G/A and stereo matrix buses can be set up to suit a wide range of applications. These settings are saved in the console's setup memory, and are common to all scenes.

G/A Bus Mode (Parameter No. U07)

Each pair G/A buses (odd and even) handled by the G/A master modules can be used as dual mono group buses (GROUP PRE PAN), a stereo group bus (GROUP POST PAN), or dual mono aux buses (page 32). The main difference between the aux and group mode is that in the aux mode the input-module [PRE] switch can be used to determine whether the signal is sent to the G/A bus pre- or post-fader, while in the group mode the send is always post-fader. The difference between the two group modes is that in mono mode the send is pre-pan (i.e. before the [PAN/BAL] control), while in the stereo mode the send is post-pan.

```
U07
```

```
G / A   B U S   M O D E
```

1 Press [ENTER] after selecting the above display and it will become possible to select the target G/A bus via the parameter display: use the [INC] and [DEC] or alpha-numeric keys to select ALL (all G/A buses) or the desired pair (1-2, 3-4, 5-6, 7-8), and then press the [ENTER] key.

```
A L L : * * * * * * * *
```

```
1 - 2 : G R P   P O S T
```

```
3 - 4 : G R P   P R E
```

```
5 - 6 : A U X
```

```
7 - 8 : A U X
```

NOTE

Asterisks in the "ALL" display, as shown above, indicate that the G/A buses are set to different modes. If all buses are set to the same mode "GRP POST", "GRP PRE", or "AUX" will appear.

2 Use the [INC] and [DEC] keys to select GRP POST (group stereo), GRP PRE (group mono) or AUX, and the press the [ENTER] key. The following confirmation message will appear on the parameter display.

```
S U R E ? Y : 1   N : 3
```

3 Press the alpha-numeric [1] key to execute the selected operation, or [3] to abort.

NOTE

As soon as the mode change is confirmed the mode indicators on target G/A modules will change to reflect then new mode. All [CUE] switches will automatically be disengaged.

4 Make changes to other G/A buses as necessary.

Stereo Matrix Mode (Parameter No. U08)

The L and R buses that make up the console's four stereo matrices can also be used as mono matrices, both buses in each pair carrying the same L+R signal. When a stereo matrix is set for mono operation the corresponding MONO MODE indicator in the matrix out section will light (page 37).

```
U08
```

```
M A T R I X   M O D E
```

1 Press [ENTER] after selecting the above display and it will become possible to select the target stereo matrix via the parameter display: use the [INC] and [DEC] or alpha-numeric keys to select ALL (all stereo matrices) or the desired pair (ST1, ST2, ST3, ST4), and then press the [ENTER] key.

```
A L L : * * * * * * * *
```

```
S T 1 : S T
```

```
S T 2 : M O N O
```

```
S T 3 : S T
```

```
S T 4 : M O N O
```

NOTE

Asterisks in the "ALL" display, as shown above, indicate that the stereo matrices are set to different modes. If all stereo matrices are set to the same mode "ST" or "MONO" will appear.

2 Use the [INC] and [DEC] keys to select ST (stereo) or MONO.

3 Make changes to other stereo matrices as necessary.

Safety and Protection Functions

This category includes a number of "recall safe" functions that can be set to protect specific parameters when a scene is recalled, thus maintaining the settings of the protected parameters. There's also a solo safe function that can prevent improper operation of the solo system from playing havoc with the console's output by either making it impossible to engage the solo mode, or by preventing muting of specified input channels when the solo mode is engaged. These settings are saved in the console's setup memory, and are common to all scenes.

Group Assign Safe (Parameter No. U09)

This function prevents changes to input-channel mute and VCA group assignments due to scene recall operations, maintaining the current settings. The group assign safe function can be applied to all mute groups and/or all assign groups.

```
U09
```

```
G R P   A S N . S A F E
```

1 Press [ENTER] after selecting the above display and it will become possible to select the target group: select MUTE or VCA and press the [ENTER] key.

```
M U T E : O F F
```

```
V C A   : O N
```

2 Use the [INC] and [DEC] keys to select ON (protected – scene recall has no effect) or OFF (not protected – scene recall will affect settings).

G/A Bus Assign Safe (Parameter No. U10)

This function prevents changes to the G/A master module [TO ST] and [TO MONO] switch settings due to scene recall operations, maintaining the current settings. The G/A bus assign safe function applies to all G/A master modules.

```
U10
```

```
G / A   A S N . S A F E
```

Press [ENTER] after selecting the above display and use the [INC] and [DEC] keys to select ON (protected – scene recall has no effect) or OFF (not protected – scene recall will affect settings).

```
G / A   S A F E : O F F
```

Recall Safe Select (Parameter No. U11)

Each input, VCA master, master out, and matrix out channel on the PM5000 features [RECALL SAFE] and [FADER SAFE] switches that can be used to protect all of the corresponding channel's settings or just the fader setting from scene recall operations, allowing the specified settings to be maintained while scene recall operations only affect unprotected channels or settings. This functions as the master ON/OFF switch for entire recall safe system. There's also a mute safe function for all input channels which, when active, exempts the channels on which the [RECALL SAFE] switch is engaged from MUTE MASTER switch mute operation when the channel is assigned to a mute group.

NOTE

Protecting input channels from mute operation using the [RECALL SAFE] switch is not affected by the master recall safe ON/OFF setting. Although the same [RECALL SAFE] switch is used for both scene-recall and mute protection, the two functions are essentially unrelated. If, for example, the recall safe master setting is OFF but the mute safe function ON, engaging a [RECALL SAFE] will protect the corresponding channel from mute master operation but not from scene recalls.

```
U I I
```

```
R C L   S A F E   S E L
```

1 Press [ENTER] after selecting the above display and it will become possible to select the target function: select RCL SAFE (recall safe) or MUT SAFE (mute safe) and press the [ENTER] key.

Recall Safe:
Enables (ON) or disables (OFF) the recall safe function for all [RECALL SAFE] switches.

```
R C L   S A F E : O N
```

Mute Safe:
Enables (ON) or disables (OFF) the mute safe function for all input-channel [RECALL SAFE] switches.

```
M U T   S A F E : O F F
```

2 Use the [INC] and [DEC] keys to turn the selected function ON or OFF.

Solo Enable (Parameter No. U12)

Enables or disables the console's solo function. If DISABLE is selected here the meter-bridge [SOLO MODE] switch will have no effect. The setting of this function cannot be changed while the solo mode is engaged.

```
U I2
```

```
S O L O   E N A B L E
```

Press [ENTER] after selecting the above display and use the [INC] and [DEC] keys to select ENABLE (solo mode enabled) or DISABLE (solo mode disabled).

```
S O L O : D I S A B L E
```

NOTE

If the solo mode is engaged it will not be possible to change the setting to "DISABLE". If the solo mode is disengaged "ENABLE" will begin flashing on the display and it will be possible to change the setting as required.

Input Solo Safe (Parameter No. U13)

The PM5000 allows independent solo monitoring for the input channel, VCA and master sections: when the solo mode is active only channels on which the [CUE] switch is engaged are output while all other channels are muted. The input solo safe function can be applied to specified input channels so that they are not muted when the solo function is engaged.

```
U 13
```

```
IN   SOLO   SAFE
```

1 Press [ENTER] after selecting the above display and it will become possible to select the input channel to which the solo safe function will be applied (the last selected channel will initially be displayed).

```
CH01:ON
```

2 Use the [INC] and [DEC] keys to select an input channel, then press the [ENTER] key.

NOTE

Consecutive input-channel numbers are selected, with stereo input channels counted as one channel.

3 Use the [INC] and [DEC] keys to turn the function ON (the channel will be muted when solo is engaged) or OFF (the channel will not be muted when solo is engaged).

4 Set the solo safe function for other input channels as required.

Monitor

These functions are used to set up the operator's monitoring environment and monitor output parameters. The three monitor functions described in this section are stored in the PM5000 setup memory and are common to all scenes.

Monitor Mode (Parameter No. U14)

The console's three monitor sources are the cue signal, 2-track inputs, and stereo master signal, with priority in the order just listed. In other words, if the [CUE] and [2TR IN1/2] switches are off the stereo master signal will normally appear at the monitor outputs at all times. In some situations, however, you might want to have no signal at the monitor outputs during normal operation. This function determines whether the stereo master signal will or will not normally appear at the monitor outputs.

```
U 14
```

```
MONITOR   MODE
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select STEREO (the stereo master signal will normally appear at the monitor outputs) or MUTE (the stereo master signal will not normally appear at the monitor outputs).

```
MONI:STEREO
```

Monitor Delay (Parameter No. U15)

When the monitor speakers are located a significant distance from the main house speakers the resulting delay between the two sources can severely reduce the intelligibility of the sound. In such situations the PM5000's internal digital delay system can be used to delay the monitor output so that it becomes "time aligned" with the main house sound for maximum clarity.

```
U 15
```

```
M O N I   D E L A Y
```

1 Press [ENTER] after selecting the above display and one of the monitor delay parameters will appear on the parameter display: DELAY (the master delay switch), UNIT (the delay units to be used: milliseconds, feet, or meters), or TIME (the actual delay value). Normally you will start by turning the DELAY parameter ON, and then set the delay time as required. Select a parameter and press the [ENTER] key.

Master switch:
Turns the monitor delay ON or OFF. When ON the MONITOR DELAY LED will light.

```
D E L A Y : O F F
```

Delay units:
Determines whether the delay time will be set in milliseconds (msec), meters (meter), or feet.

```
U N I T : m s e c
```

Delay value:
The actual delay value based on the selected UNIT type. The maximum available delay is 1,800 milliseconds.

```
T I M E :   3 0 0 m s
```

2 Use the [INC] and [DEC] keys to set the selected parameter as required.

NOTE

If the unit type is changed after the delay value is set, the delay value will be recalculated and displayed according to the unit type selected (sound travels at 343.59 meters per second, or 1,127.26 feet per second under normal conditions). This is just an approximation, however, and for maximum accuracy it is advisable to set the delay value after the unit type has been specified.

```
UNIT:msec  →  TIME:  300ms
     ↓ Unit type changed.
UNIT:feet  →  TIME:  338ft
     ↓ Unit type changed.
UNIT:meter →  TIME:  103m
```
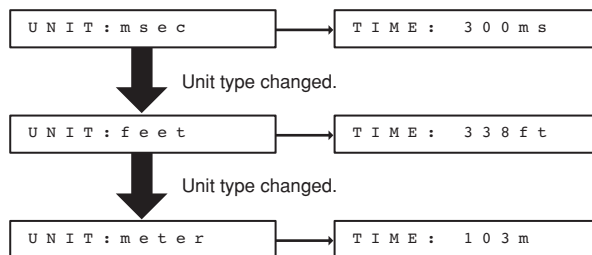
300/1000 (sec) x 1127.26 (feet/sec) = 338.178 (feet)

300/1000 (sec) x 343.59 (meter/sec) = 103.077 (meter)

Master Cue AFL Position (Parameter No. U16)

The cue signal from each master section can be switched to pre- or –post-fader via the [MASTER PFL] switch in the monitor control section (page 43). This function determines whether the cue signal is taken from before or after the master [ON] switch. If the cue signal is taken from before the master [ON] switch it will appear at the monitor outputs even if the main outputs are turned off.

```
U 16
```

```
C U E   P O S I T I O N
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select POST (normal operation: post master [ON] switch) or PRE (pre master [ON] switch).

```
P O S : P O S T   O N
```

Scene Recall

The following functions can provide maximum scene recall efficiency in a wide range of applications. You can also turn the scene memory function off altogether to prevent accidental operation. These settings are stored in the PM5000 setup memory.

Theater Mode (Parameter No. U17)

When the theater mode is engaged it is possible to directly recall scenes in sequence using only the [INC] and [DEC] keys. This only applies to scene numbers 010 through 999, and empty "NO DATA" scenes will automatically be skipped.

```
U 17
```

```
T H E A T E R   M O D E
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select ON (theater mode on) or OFF (theater mode off).

```
T H E A T E R : O F F
```

NOTE

When using the theater mode it can be handy to specify a "temporary scene." This can be done simply by entering a scene number via the alpha-numeric keys and pressing [ENTER] (don't press [RECALL]). Then, regardless of the currently active scene, the [INC] and [DEC] keys will increment or decrement and directly select scenes starting from the specified temporary scene number. This ability to "pre load" a specific scene can make critically-timed transitions much easier to execute.

NOTE

GPI input (page 72) and MIDI control change messages (page 77) can also be used to effect scene changes.

NOTE

"THTR" will appear on the message display while the theater mode is engaged.

Fader Mode (Parameter No. U18)

Normally the console's motor fader system will physically move the faders to recalled settings when a scene recall or preview operation occurs. This function makes it possible to defeat the motor-drive system so that the faders do not move when scenes are changed (the faders levels do change internally).

```
U 18
```

```
F A D E R   M O D E
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select ON (motor faders ON) or OFF (motor faders OFF).

```
M O T O R : O N
```

NOTE

When the motor faders are turned off level changes will result in a mismatch between the internal fader levels and the physical fader positions. This situation is indicated by a flashing [FADER SAFE] switch. If you want to match the fader's position with the internal level either press the [FADER SAFE] switch or move the fader slightly. In either case the motor drive for that fader will be temporarily engaged and the fader's position will be adjusted to match the internal level (after this has been done the [FADER SAFE] switch will stop flashing and will either light or go out according to the current fader-safe status).

NOTE

When the console is turned on the faders will initially move to match the internally set levels even if the fader mode function is OFF.

Automation (Parameter No. U19)

This function can be used to turn the PM5000's scene memory off. When the scene memory function is turned off all recall, preview, motor fader, safe switch, MIDI, and GPI functions are also disabled so that the PM5000 functions like a tradition analog console.

```
U 19
```

```
A U T O M A T I O N
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select ON (scene memory ON) or OFF (scene memory OFF).

```
A U T O : O F F
```

NOTE

"AUTOMODE OFF" will appear on the parameter display while the scene memory is turned off. Even when the scene memory is disabled the channel [RECALL SAFE] switches can be used for mute safe operation (page 66).

**Direct Recall/ Mute Master (Parameter No. U20)**

In addition to their normal function as mute master switches, the console's 8 MUTE MASTER switches can also be used as DIRECT RECALL switches for scene recall. In this case the scene numbers to be recalled by each direct recall switch must be assigned as described below.
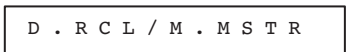
```
U20
```

```
D . R C L / M . M S T R
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select MUTE MASTER (mute master operation) or DIR RECALL (direct scene recall operation).

```
M U T E   M A S T E R
```

```
D I R   R E C A L L
```

Lights when "MUTE MASTER" selected. ———○ MUTE MASTER

Lights when "DIR RECALL" selected. ———○ DIRECT RECALL

| 1 |
| 2 |
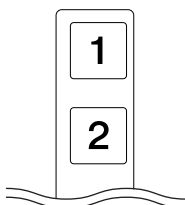
NOTE

The mode cannot be switched to "DIR RECALL" while any of the switches are engaged in mute master mode. Disengage all mute masters prior to changing the setting.

● **Scene Assignment**

1 Press [ENTER] after selecting "DIR RECALL" to move on to scene assignment. The parameter display should look like this.

```
D I R 1 : - - -
```
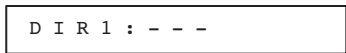
"DIR1" through "DIR8" on the display corresponds to MUTE MASTER switches [1] through [8].

2 Use the [INC] and [DEC] keys to select the switch for which a scene assignment is to be made and press the [ENTER] key. When the scene number parameter (rightmost) parameter begins flashing use the [INC] and [DEC] keys or the alpha-numeric keypad to enter the number of the scene to be recalled by that switch, and press [ENTER] again. Unassigned status "---" also can be selected.

```
D I R 1 : 1 2 8
```
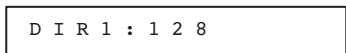
3 Assign scene numbers to the remaining switches in the same way.

NOTE

Switches that you don't intend to use can be left unassigned ("---" on the display). Unassigned status will also automatically be set if an assigned scene is cleared to "NO DATA" status using the U06 utility function. Also, if the scenes are re-ordered the switch assignments will be automatically changed accordingly.

NOTE

When the MUTE MASTER switches are set for direct recall operation, the only master mute function that will apply to the input channels is VCA muting (page 24). Unassigned switches cannot be used for group muting. Mute master control via MIDI control change messages is also disabled.

GPI

The PM5000's rear-panel GPI port provides 3 input and 8 output channels for GPI pulse communication with external equipment. One of the input channels controls talkback on/off (same function as the TB [ON] switch). One of the functions in this section determines whether or not the remaining two input channels are active for scene increment and decrement control. The second function determines which of the 8 output channels are used for fader start signal transmission and scene linking.

Scene Inc/Dec (GPI In) (Parameter No. U21)

The GPI inputs can be used for sequential incrementing or decrementing of the PM5000 scene memory from external equipment. Scenes 010 through 999 can be recalled using this capability, and empty "NO DATA" scenes are automatically skipped. These settings are maintained in the PM5000 setup memory.

> **NOTE**
>
> Scene incrementing and decrementing via the GPI port is slightly different from the way the panel [INC] and [DEC] keys function in that incrementing and decrementing will always occur from the current scene – the "temporary scene" that can be used with the [INC] and [DEC] keys (page 69) cannot be used with GPI port control. If the preview function is active and a GPI scene change command is received, the preview function will be disengaged.

```
 U21
```

```
G P I   I N C / D E C
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select ON (GPI scene recall enabled) or OFF (GPI scene recall disabled).

```
I N C / D E C : O N
```

GPI Out (Parameter No. U22)

This function makes it possible to specify the GPI outputs to be used for fader start control (a signal is sent when a fader is raised above –60 dB or lowered to -∞) and for scene linking. Although 8 GPI outputs are provided so that these operations can be separated, it is possible to assign control to the same GPI outputs. Fader start settings are maintained in the console's setup memory and are common to all scenes, while scene link settings apply to the current scene and are stored in the scene memory via a scene store operation.

```
 U22
```

```
G P I   O U T
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select either the FADER START or SCENE LINK function for setup.

```
F A D E R   S T A R T
```

```
S C E N E   L I N K
```

● **Fader Start**

1 After selecting FADER START and pressing the [ENTER] key a display like the one shown below will appear. The example display indicates that the input channel 34 fader ("CH34") will produce a signal at GPI output number 3 ("GP3") when fader is raised above –60 dB ("STR").

```
CH34:STR:GP3
```

2 Using the [INC] and [DEC] keys to set each parameter and the [ENTER] key to move on to the next parameter, set the fader start parameters in sequence as required: channel, fade type (STR or END), and the GPI output number. To prevent operational errors select "---" for GPI outputs you do not intend to use. The first of the two example displays below shows the channel 21 fader set to produce a signal at GPI output number 5 when the fader is lowered to -∞, while the second example shows the channel 21 fader set to produce no GPI output.

```
CH21:END:GP5
```

```
CH21:END:---
```

3 Set other channels in the same way, as required.

NOTE

Fader start signal output occurs with both manual and motor-driven fader operation (and is enabled even when the console's motor drive system is disabled). For this reason it is important to consider whether you want GPI output triggered by both manual fader and automatic scene recall operations when making GPI output settings. Remember that if you set a fader to produce GPI output when it is moved manually, a scene recall that moves the fader in the same range will also produce GPI output.

● **Scene Linking**

1 After selecting SCENE LINK and pressing the [ENTER] key a display like the one shown below will appear.

```
OUT PORT:GP3
```

2 Use the [INC] and [DEC] keys or the alpha-numeric keypad to select the GPI output to be used for scene linking of the current scene, and then press [ENTER]. If you do not want GPI output to be produced when the current scene is recalled set this parameter to "---" to prevent operation errors.

```
OUT PORT:GP8
```

```
OUT PORT:---
```

3 Perform a scene store operation to store the settings you have just made to the scene memory (page 53). Note that your scene link settings will be lost if you recall a different scene before storing the settings.

NOTE

The settings cannot be store to a protected scene. Be sure to disable scene protection before storing the settings (page 62).

Cascade

The PM5000 allows cascade connection to other consoles for master-slave operation. Two types of cascade connection are possible: type "A" for cascade connection of two PM5000 consoles, and type "B" for connection to PM4000/3500 series consoles (in the latter case the PM5000 is the master console).

PM5000 (Master)   PM5000 (Slave)

PM5000 (Master)   PM4000 or PM35000 (Slave)
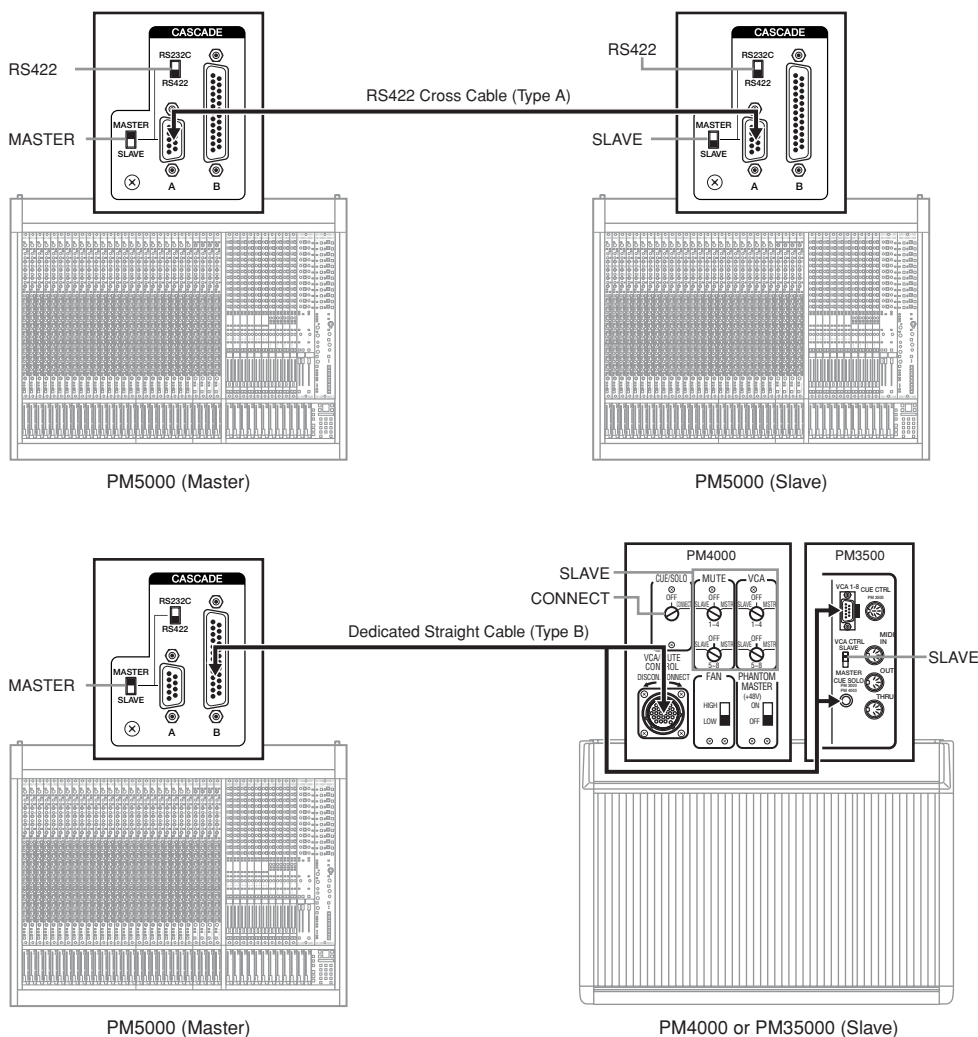
A standard 9-pin RS-422 cross cable can be used for type A connection. A dedicated straight cable must be used for type B connection. Refer to the appendix of this manual for connector pin assignments.

> ⚠ **Please observe the following points when making cascade connections:**
> • **Make sure the power to both consoles is off when connecting the cascade cable.**
> • **After making the cascade connection, turn both consoles on and wait for all start-up processing to finish before operating the consoles. Also, do not operate one console while the other is turned off.**

NOTE

The two cascade connection types cannot be used simultaneously. If both types of connection are made the type A connection will take priority. By connecting the master outs and matrix outs of the slave console to the master out and matrix out SUB IN connectors of the master PM5000 console the slave console can be used as an "expansion" console, increasing the number of available channels.

NOTE

On the salve PM5000 cascade-connected by TYPE A connector, setup memory data cannot be loaded from a memory card.

Linked Functions

When two PM5000 consoles are cascaded for channel expansion complete functional linking can be achieved as well (you can specify which functions are to be linked as described below). It is advisable only to link the functions you intend to use, however, to prevent confusion. The CUE function, in particular, can be bi-directionally linked between the consoles so that, for example, if an input channel on the slave console is cued channels in the same CUE group on the master console will also be engaged.

O: Linked, X: Not linked

Linked Functions (Type A)		Master → Slave	Exceptions (Not Linked)	Slave Operation
VCA Group 1~12	Fader & Level	O	-	X
	Mute	O	-	X
Mute Group 1~8	Mute Master ON/OFF	O	-	X
Cue/Solo	Cue Group Select	O **(Bi-directional link possible)**	-	O
	Last Cue (ON/OFF: MIX CUE switching)	O	-	X
	Cue Stack	O	-	X
	Solo Mode (ON/OFF)	O	-	X
	Master Solo Select	-	Not linked	O: Independent operation
Scene Recall	Same Scene Number	O	-	O: Linked VCA groups conform to master settings
Scene Store	Same Scene Number	O	-	X

NOTE

Please note that the various utility settings remain active for linked functions. For this reason unexpected problems such as faders not moving, inability to save a scene because the scene is protected, master mute not functioning because the MUTE MASTER switches are assigned to direct scene recall, and others can occur. Plan your cascade setup carefully to avoid confusion.

Since the functions provided by the PM5000 and other consoles differ, the functions that can be cascade-linked differ as well.

Linked Functions (Type B)		Master → Slave	Exceptions (Not Linked)	Slave Operation
VCA Group 1~8	Level (VCA level only. Faders do not move.)	O	-	X
	Mute (Slave VCA level set to -∞)	O	-	X
Mute Group 1~8	Mute Master ON/OFF *1	O	-	X
Cue/Solo	Cue Group Select (Input channels only)	O (Bi-directional link possible)	-	O: Master cue group not updated when slave cue engaged
	Solo Mode (ON/OFF) *2	O (Bi-directional link possible)	-	O: Slave solo mode cannot be disengaged from master
	Master Solo Select	-	Not linked	O: Independent operation

*1 PM3500 series consoles have no mute group function.
*2 The PM4000M (monitor version) has no solo function.

NOTE

If cue is engaged on the slave PM4000/3500 the PM5000 cue groups are input channel only. Further, since the number of VCA groups is different VCA group 9~12 operations on the PM5000 have no effect on the slave PM4000/3500.

NOTE

Be sure to set the slave PM4000/3500 console cascade mode to "SLAVE".

Cascade (Parameter No. U23)

To allow fuss-free type A connection of PM5000 consoles, the PM5000 is shipped from the factory with all of the function links listed in the above chart ON. If you want to turn some of these off, use the following parameter on the slave PM5000. In a type B connection, turn the master PM5000 console CUE/SOLO function link ON if you want to enable cue/solo control from the slave console.
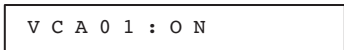
> **NOTE**
>
> If the physical cascade connection and hardware MASTER/ SLAVE selection has been completed, the following parameters turn function linking on or off the instant they are set. If a link is turned OFF it may be impossible to reproduce the previous slave settings. To avoid confusion it is advisable to make the hardware connections and settings after setting the software parameters.

```
U23
```

```
CASCADE
```

1 Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys or the alpha-numeric keypad to select VCA1 ~ VCA12 (VCA groups 1 ~ 12), MUTE1 ~ MUTE8 (mute groups 1 ~ 8), CUE/ SOL (the cue/solo function), SCN RCL (scene recall), or SCN STR (scene store), and then press the [ENTER] key.

VCA Group 1 (~ 12)

```
VCA01:ON
```

Mute Group 1 (~ 8)

```
MUTE1:ON
```

Cue Solo Function

```
CUE/SOL:ON
```

Scene Recall

```
SCN  RCL:ON
```

Scene Store

```
SCN  STR:ON
```

2 Use the [INC] and [DEC] keys to turn linking of the selected function ON or OFF.

```
SCN  STR:OFF
```

**3** Set the links for other functions in the same way, as required.

MIDI

The MIDI IN, OUT, and THRU connectors provided on the rear panel allow PM5000 operation to be linked to external MIDI devices. If the PM5000 MIDI OUT connector is connected to the MIDI IN connector of an external device, the external device can be controlled by operations performed on the PM5000. On the other hand if the MIDI OUT of the external device is connected to the MIDI IN of the PM5000, the external device can remotely control the PM5000. The connections can also be made both ways, allowing bi-directional control. The MIDI THRU connector can be used to retransmit MIDI commands received at the MIDI IN connector to another MIDI device.

If the MIDI Echo Back function is turned on (page 82), MIDI commands received at the PM5000 MIDI IN connector are mixed with internally generated MIDI commands and transmitted via the MIDI OUT connector.

Control from external device A

Control to external device B.

Commands from external device A retransmitted to external device C.
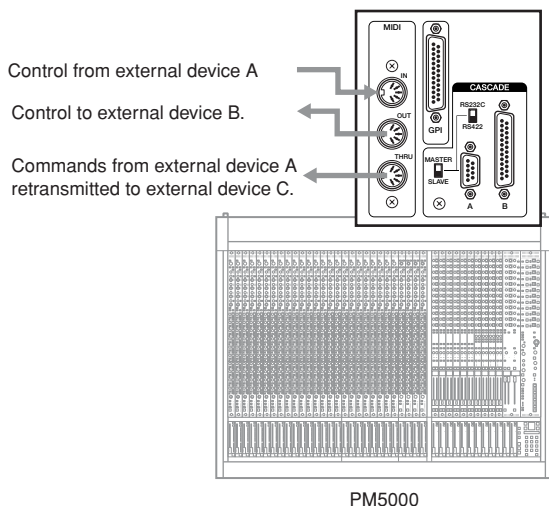
PM5000

MIDI commands that can be used with the PM5000 can be largely divided into Program Change and Control Change commands. The former apply to scene recall operations, while the latter apply directly to fader and switch operation. In other words, program change commands received from an external MIDI controller can be used to recall PM5000 scenes, while control change commands can be used to directly control the faders and switches.

MIDI provides a greater range and degree of control than the GPI interface. You could, for example, use MIDI to continuously vary a stage lighting effect in response to a PM5000 fader operation.

PM5000

Lighting Console
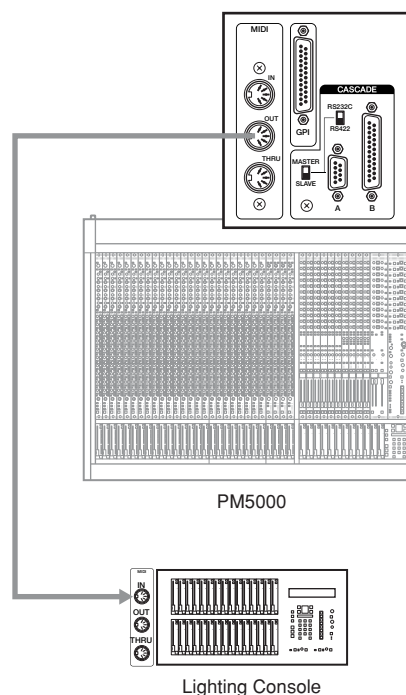
In order to effectively use the PM5000's MIDI capabilities it is necessary to have a good grasp not only of the MIDI standard itself, but of the MIDI functions provided by both the PM5000 and the external MIDI devices used as well. For example, although the standard MIDI program change numbers only allow selection of 128 program numbers, the PM5000 has 1000 scene memories that need to be accessible. In the same way, the basic MIDI standard provides control change capability for up to 128 different parameters – a figure that is exceeded by the PM5000's controllable faders and switches by a wide margin.

Program Change

The PM5000 employs a number of "strategies" to ensure full functionality with the standard MIDI implementation. For example, in order to be able to handle recall of all 1,000 PM5000 scenes via MIDI program change commands, bank select commands (a type of control change command) are used in conjunction with the program change messages in the same way that they are used in many synthesizers and tone modules. The parameters described below can be used to create a "program change table" that specifies which scene numbers will be recalled by which MIDI bank and program change numbers. The reverse is true, too: when a scene is recalled via the PM5000 controls the corresponding bank and program change numbers can be transmitted to an external MIDI device.

MIDI Channel/ Bank No.	Program No.	Scene No.
1	1	10
1	2	11
1	3	12
1	4	13
:	:	:
1	128	137
2	1	138
2	2	139
:	:	:
2	128	265
3	1	266
:	:	:
3	128	393
:	:	:
8	94	999
8	95	NO ASSIGN
:	:	:
16	1	NO ASSIGN
:	:	:
16	128	NO ASSIGN

In order to provide the most flexible operation with external MIDI devices, the PM5000 provides two MIDI program change modes: SINGLE and MULTI. Sixteen MIDI channels (1 through 16) are available for transmission and reception of MIDI commands, and in large MIDI setups it is common to assign a different channel number to each MIDI device so that programs can be recalled independently on each device.

Also part of the standard MIDI implementation is an "OMNI" mode which, when enabled, allows commands to be received on any or all 16 MIDI channels. When the OMNI mode is disable MIDI commands can only be received via the device's specified MIDI channel(s). The PM5000 takes advantage of this situation in the SINGLE mode, using four combinations of bank select number, OMNI ON/OFF status, and a separately specifiable MIDI receive channel to specify how the program change table will be used for scene recall.

MIDI MODE	OMNI	BANK	Receive			Transmit		Transmit/Receive Messages	
			MIDI Channel	Bank number referred to in table	Maximum Selectable Scenes	MIDI Channel	Bank number referred to in table	Bank Select	Program Change
SINGLE	OFF	OFF	RX CH	Same number as RX CH	128	TX CH	1	-	1~128
	ON	OFF	1~16	Same number as RX CH	128	TX CH	1	-	1~128
	OFF	ON	RX CH	Received bank number	1000	TX CH	Bank number corresponding to selected scene	1~16	1~128
	ON	ON	1~16	Received bank number	1000	TX CH	Bank number corresponding to selected scene	1~16	1~128
MULTI	-	-	1~16	Same as received MIDI channel	1000	Smallest bank number corresponding to selected scene	-	-	1~128 (Smallest program number corresponding to selected scene)

Note that the PM5000 uses the same number of bank and MIDI channel numbers (1 ~ 16). If the bank number referred to in the program change table is limited to the same number as the receive channel, then a maximum of 128 scenes can be recalled from an external device. But if bank select numbers are used, and if the MIDI channel numbers embedded in received program change commands are converted to bank numbers, all 1,000 scenes can be recalled directly from an external device. In the same way scene recall operations performed on the PM5000 the corresponding program change commands can be transmitted according to the above conversion table.

NOTE

The above explanation may seem a little confusing, but this system has been implemented to allow effective connection with the widest possible range of external MIDI devices. For example the SINGLE mode (OMNI OFF, BANK OFF) allows some control even with external MIDI devices that have limited capabilities. If an external MIDI device is capable of bank number transmission it can be used to recall scenes on the PM5000. If the PM5000 OMNI mode is enabled scene recall can be effected from multiple external MIDI devices. You could also organize your scenes in the PM5000 scene memory into banks, transmitting the appropriate bank numbers from the controlling MIDI device to access your scenes.

NOTE

Bank select messages should be transmitted as a pair of MSB (CC#10) and LSB (CC#32), and the MSB value should be always set to "0". The bank numbers can be specified by LSB value (0 ~ 15).

Control Change

Control change command reception and transmission are relatively simple compared to program change commands. Each PM5000 fader and switch is pre-assigned a number that is used for both reception and transmission.

Parameter			Control Change		NRPN		Value (hex)
Category	Name	Total (max.)	MIDI Channel	Control Number (CC#)	MSB (CC#99)	LSB (CC#99)	
Level (Fader)	Input channel 1~30 (MSB)	30	1	1-5, 7-31	0	1-5, 7-31	0x0000(-∞) ~ 0x3FFF(+10dB)
	Input channel 1~30 (LSB)	30	1	33-37, 39-63			
	Input channel 31~52 (MSB)	22	2	1-5, 7-23	1	1-5, 7-23	
	Input channel 31~52 (LSB)	22	2	33-37, 39-55			
	VCA(MSB)	12	3	1-5, 7-13	2	1-5, 7-13	
	VCA(LSB)	12	3	33-37, 39-45			
ON Switch	Input channel	52	4	1-5, 7-23, 33-37, 39-55	3	1-5, 7-23, 33-37, 39-55	Transmit (MSB is NRPN) OFF: 0x00 ON: 0x7F Receive (MSB is NRPN) 0x00~0x3F: OFF 0x40~0x7F: ON
	ST AUX	12	4	64-75	3	64-75	
	GROUP/AUX	8	4	76-83	3	76-83	
	ST MATRIX	4	4	84-87	3	84-87	
	MATRIX	8	4	88-95	3	88-95	
	ST MASTER	2	4	102, 103	3	102, 103	
	MONO	1	4	104	3	104	
Group Mute	VCA MUTE	12	5	1-5, 7-13	4	1-5, 7-13	
	MUTE MASTER	8	5	14-21	4	14-21	

* The number of input channels refers to the number of input modules. There is no differentiation between mono and stereo modules.

For example, to control the fader levels of input channels 1 ~ 30 from an external device, set the MIDI channel to "1" and specify the control numbers (01 ~ 05, 07 ~ 31) and the control value as required. Normally the control value is a number from 0 to 127 (7 bits), but higher resolution is required for fader control. For this reason the PM5000 uses two values – MSB and LSB – to provide 1,024-step control (the MSB and LSB are both 7-bit values providing a total of 14 bits, but only the highest 10 bits are actually used).

● NRPN Control

In the PM5000 NRPN (Non-Registered Parameter number) data can be used for the same control functions as control change commands. NRPN is actually a subset of the MIDI control change numbers (CC#99, 98), and is commonly employed to allow system exclusive data transfer between different devices. Because of their special status, NRPN commands are omitted from the control change commands (refer to the above chart).

The PM5000 panel controls can be controlled using either control change or NRPN commands. The parameters described below allow control change and NRPN control to be independently enabled and disabled as required. If both are enable control change commands take priority.

> **NOTE**
>
> As with program change commands, control change commands are transmitted and received via specific MIDI channels. The transmit and receive MIDI channels specified by the following parameters (TX CH, RX CH), however, do not directly affect control change operation (they do affect NRPN and scene number increment/decrement control which has independently programmable transmission and reception).

> **NOTE**
>
> If the MUTE MASTER switches are assigned to direct scene recall (page 71), MUTE MASTER control via control change commands will be ignored. If the preview mode is active any received control change or NRPN commands will affect the currently active scene rather than the scene being previewed. Also, continuous level variations produced by fade time variations between scene changes will not be transmitted.

MIDI Program Change (Parameter No. U24)

Determines whether the PM5000 will transmit and receive program change commands. The program change table to be used is also specified here.

```
U24
```

```
MIDI  PGM  CHG
```

1 Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select the required setting, then press the [ENTER] key.

OFF:
> Program change commands will not be transmitted or received.

```
PC:OFF
```

ON:
> The corresponding program change command will be transmitted when a successful scene recall operation has been executed, but no data will be transmitted when an empty "NO DATA" scene is recalled.

```
PC:ON
```

LOCAL:
> The corresponding program change command will be transmitted whenever a scene recall operation is performed, regardless of the results.

```
PC:LOCAL
```

2 Use the [INC] and [DEC] keys to select the program change table to be used: either the pre-programmed DEFAULT program change table, or the user-programmable USER table.

DEFAULT:
> The pre-programmed program change table.

```
DEFAULT
```

USER:
> A user-defined program change table configured via the function described on page 83.

```
USER
```

MIDI Control Change (Program No. U25)

The functions in this section determine whether the PM5000 sends and receives control change commands, as well as whether NRPN will be enabled.

```
U25
```

```
M I D I   C T L   C H G
```

1 Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select the required setting, then press the [ENTER] key.

Control Change

```
C T L : O F F
```

NRPN

```
N R P N : O N
```

2 Use the [INC] and [DEC] keys to turn the selected parameter ON (reception and transmission enabled) or OFF (reception and transmission disabled).

```
C T L : O N
```

3 Set the other functions as required.

MIDI Setting (Parameter No. U26)

This is the basic PM5000 setting for MIDI transmission and reception, including selection of the SINGLE or MULTI mode for program change transmission and reception.

```
U26
```

```
M I D I   S E T T I N G
```

1 Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select the required setting, then press the [ENTER] key.

RX CH (Receive Channel):
Program change commands will be received on the specified channel.

```
R X   C H : 1 0
```

TX CH (Transmit Channel):
Program change commands will be transmitted on the specified channel.

```
T X   C H : 1 0
```

OMNI:
When ON program change commands can be received on all 16 MIDI channels. When OFF reception occurs only on the specified RX CH.

```
O M N I : O F F
```

MODE:
When set to SINGLE operation is determined by the RX CH, BANK, and OMNI parameters. When set to MULTI the OMNI and BANK settings are ignored and both parameters are forced ON.

```
M O D E : M U L T I
```

BANK:
Bank select numbers will be received when this parameter is ON.

```
B A N K : O N
```

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The transmit and receive channels are not used for control change transmission and reception (page 79). Since they are used for NRPN and scene number INC/DEC transmission and reception, it is necessary to set the transmit and receive channels of the external MIDI device to match those of the PM5000.

2 Use the [INC] and [DEC] keys to set the selected parameter as required.

3 Set the other functions as required.

MIDI Echo Back (Parameter No. 27)

Independently determines whether program change and control change commands internally generated by the PM5000 will be mixed with program change and control change messages received at the MIDI IN connector and transmitted via the MIDI OUT connector.

```
U27
```

```
M I D I   E C H O
```

1 Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select the required setting, then press the [ENTER] key.

Program Change Echo

```
P G M   E C H O : O F F
```

Control Change Echo

```
C T L   E C H O : O F F
```

2 Use the [INC] and [DEC] keys to turn the selected parameter ON (echo enabled) or OFF (echo disabled).

```
P G M   E C H O : O N
```

3 Set other MIDI functions as required.

MIDI Program Change Table (Parameter No. 28)

The program change table determines the correspondence between the PM5000 scene numbers and the program change numbers that will be received and transmitted. The table itself is a simple combination of MIDI channel/bank number, program number, and scene number parameters, but the way it operates will depend on the MIDI mode setting (page 78). The table can be initialed to return it to the initial factory-preset state when you want to start a new table from scratch.

```
U28
```

```
M I D I   P G M   T B L
```

Press [ENTER] after selecting the above display and a display like the one shown below will appear. Use the [INC] and [DEC] keys to select SETTING (edit the user program change table) or INITIALIZE (initialize the table to its initial factory settings).

```
S E T T I N G
```

```
I N I T I A L I Z E
```

● Editing the User Table

1 After selecting SETTING and pressing the [ENTER] key a display like the one shown below will appear. From left to right the parameters on the display are: MIDI channel/bank number (1 ~ 16) : Program number (1 ~ 128) : Scene Number (000 ~ 999).

```
1 5 :   1 2 8 :   9 9 9
```

2 Use the [INC] and [DEC] keys or the alpha-numeric keypad to set each parameters and then press the [ENTER] key to move ahead.

3 Repeat step 2 until the program change table is complete.

NOTE

In this table one scene number is assigned to each combination of MIDI channel/bank number and program number. Any scene number (000 ~ 999) can be assigned to each program change combination, so it is possible to assign the same scene to different external program change commands. The program change command transmitted by a PM5000 scene recall operation, however, will always be unique. The program change data transmitted (MIDI channel/bank number and program change number) will depend on the selected MIDI mode and other settings. Refer to "Program Change" on page 78 for more details.

● Initialize User Table

1 After selecting INITALIZE and pressing the [ENTER] key a display like the one shown below will appear.

```
S U R E ? Y : 1   N : 3
```

2 Press the alpha-numeric keypad [1] key to execute the initialization operation, or the [3] key to abort. After initialization the contents of the user table will be the same as the default table.

Appendix

Installing Options And Changing Internal Switch Settings

⚠ **Please refer module installation and internal setting changes to your Yamaha dealer or one of the Yamaha service centers.**

The following optional (sold separately) modules and transformer are available:

● Input Section Modules

- MNM5000: Monaural input module.
- MNR5000: Rear panel for monaural input module (includes wiring).
- STM5000: Stereo input module.
- STR5000: Rear panel for stereo input module (includes wiring).

● Master Section Options

- SAM5000: Stereo Aux master module.
- GAM5000: Group/Aux master module.
- SMM5000: Stereo/Mono master module.
- MON5000: Monitor module.

● Other Options

- BLM5000: Blank module (includes rear panel).
- ITR5000: Input transformer.

The process of replacing faulty modules or changing internal switch settings requires removal and replacement of the modules. A Philips-head ("+") screwdriver will be required.

⚠ **Before performing any of the operations described below be sure that the power supply is turned OFF.**

Module Removal and Replacement

The procedure for removal of top-panel modules is the same for the input and master section.

● Top-panel Module Removal

1 Turn the console's power supply OFF.

**2** Loosen the screws at the top and bottom of the module.
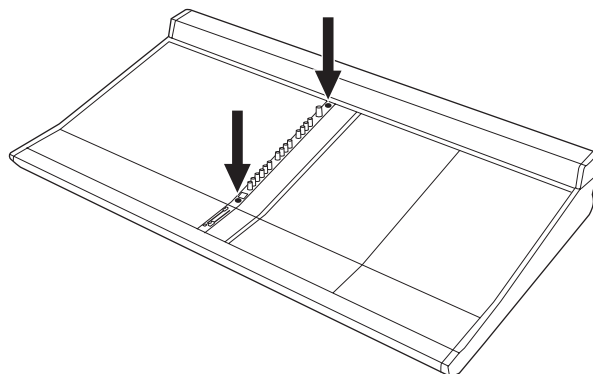
The screws are fitted with stop-washers that prevent them from being removed entirely.

3 Once loosened, grasp both screws firmly and pull straight upward to remove the module. This completes removal of master modules.

The mono and stereo input modules are wired to the rear panel. Exercise caution when removing the modules so as not to damage the wiring. Once the module being removed is free of the top panel, gently lay it on its side on the top panel, without placing undue strain on the wiring.
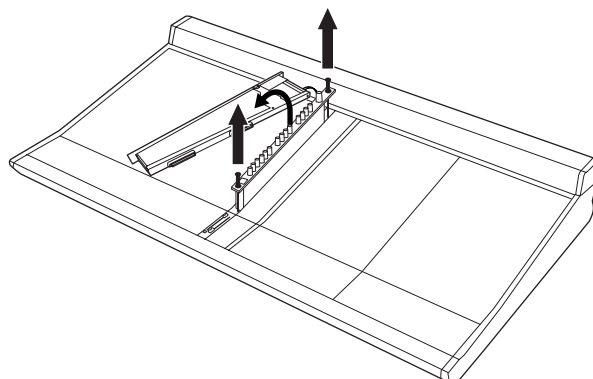
4 Unplug the wiring connectors at the top (rear) end of the module that connect the module to the rear panel. There are two connectors on both mono and stereo modules, but their locations are slightly different.
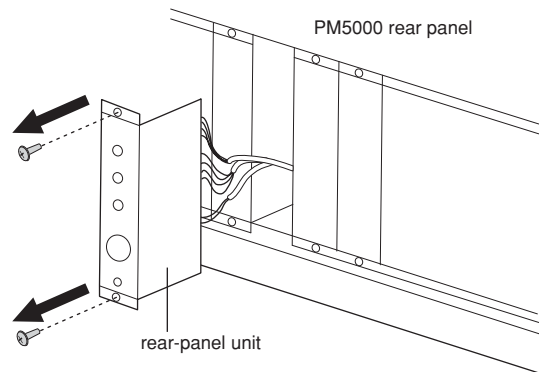

Unplug these connectors
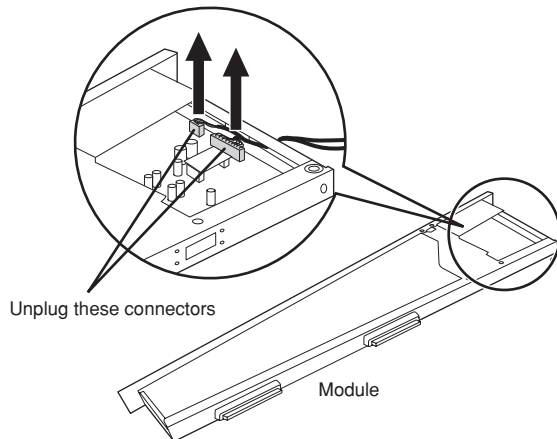
Module

5 Press the snap button on the wiring harness to release the wire bundle, then remove the wiring from the module. When removing the wiring, be careful that the connectors don't get caught on the module frame. This completes removal of the input module.
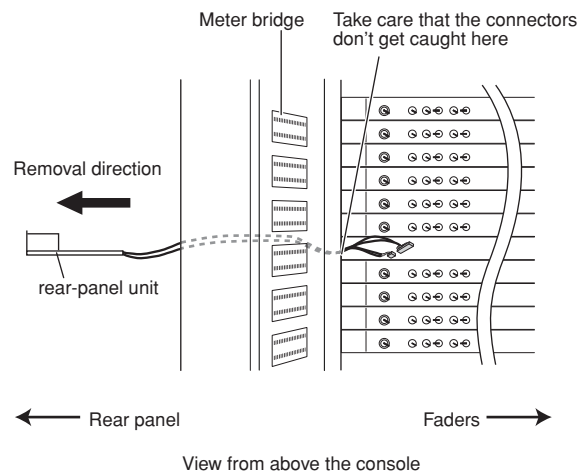

Wiring bundle

Module frame

Press the snap button
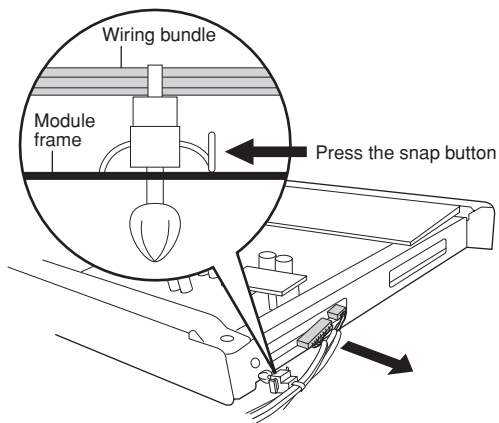
● **Removing Rear Panel Input Units**

When removing rear-panel input units that correspond to each mono and stereo input channel (these are available as options), it is necessary to first remove the corresponding input channel and all connected wiring, as described above.

1 Make sure that the rear-panel unit you are about to remove corresponds to the input channel you have removed, then unscrew the upper and lower screws and remove the input unit.

PM5000 rear panel

rear-panel unit

2 Press the snap button on the wiring harness to release the wire bundle, then remove the wiring from the console frame. Carefully pull the wiring and connectors through the rear-panel opening, making sure that the connectors don't catch on any part of the console frame.
This completes removal of the rear-panel unit.

Meter bridge

Take care that the connectors don't get caught here

Removal direction

rear-panel unit

← Rear panel

Faders →

View from above the console

● Module Installation

The module installation procedure is the reverse of the removal procedure described above.

Rear Panel Input Units

First pass the wiring through the opening in the rear panel and pull it through to the open module area. Then attach the rear-panel unit with two screws.

Top-panel Modules

When an input module is being installed it is first necessary to connect the wiring from the corresponding rear-panel input unit to the connectors on the module and secure the wire bundle in the wiring harness.

When inserting the module into the console make sure that the connectors on the bottom of the module are aligned with the corresponding connectors on console frame. Input modules have two connectors (see the illustration below), while master modules have three. Guide pins are provided to make alignment easy – as long as the guide pins are properly inserted into the corresponding holes on the bottom of the module frame alignment should be almost automatic. Insert the module firmly until its panel is flush with the console top, but avoid using excessive force.

Guide pins
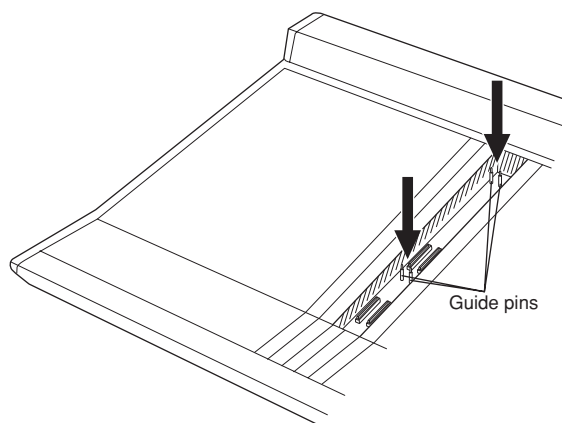
Finally, secure the module with the two screws.

NOTE

When a module and/or rear-panel unit has been sent out for repair and the module slot is likely to be empty for a while, it is a good idea to install the blank module panels (BLM5000) to prevent objects from falling into the console and potentially causing damage. The BLM5000 blank module option includes blank panels for both the top-panel and rear-panel.

Input Transformer Installation

The PM5000 input modules feature electronically balanced inputs that do not normally require any additional isolation. If you would rather have conventional transformer-isolated balanced inputs, optional ITR5000 input transformers can be installed.

NOTE

The input impedance will change when the transformers are installed: electronically balanced input impedance = 3 kΩ, transformer input impedance = 1 kΩ.

The number and location of input transformers is different for mono and stereo input modules. The installation procedure is outlined below.
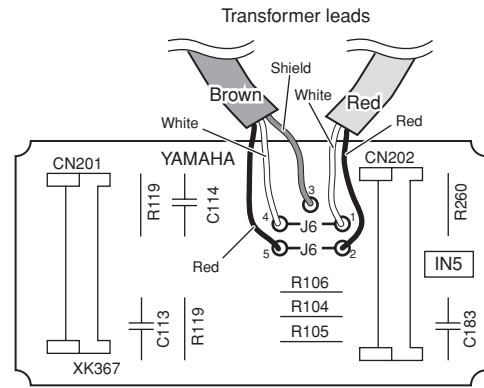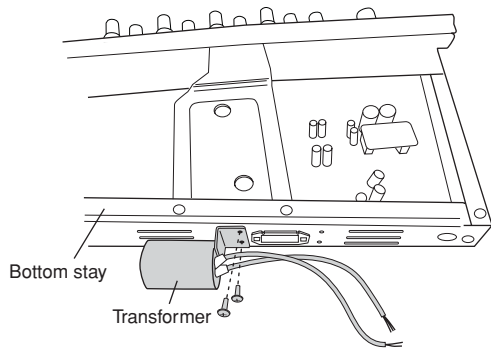
● Transformer Installation On Input modules

1 Turn the console's power supply OFF.

2 Remove the mono or stereo console on which the transformer(s) is to be installed as per the module-removal instructions above.

3 Attach the transformer to the mounting bracket supplied with the ITR5000 transformer kit with the nut as shown in the illustration. Make sure that the transformer leads are positioned in relation to the mounting bracket as shown in the illustration (the transformer leads must not be clamped between the transformer and mounting bracket).
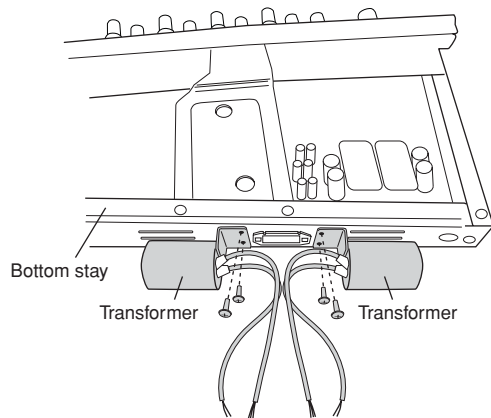
Do not clamp the transformer leads when mounting

Transformer   Transformer mounting bracket
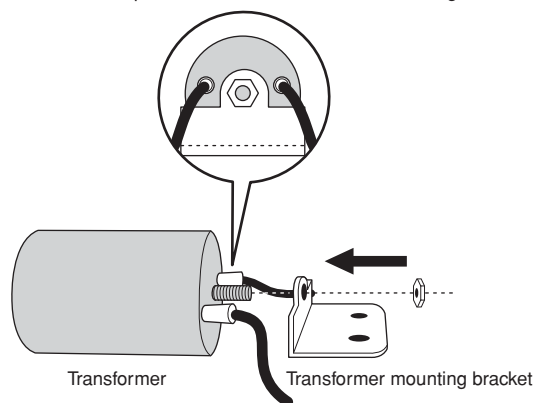
4 Attach the transformer to the bottom stay of the module. Align the screw holes in the transformer mounting bracket with the screw holes just in front of (toward the fader end of the module) the square hole through provided for the transformer leads as shown in the illustration below, and secure with the two small M3 screws. On mono modules the transformer should face toward the front (fader) end of the module, and on stereo modules the second transformer should be mounted on the other side of the square lead hole, facing in the other direction so that the lead hole is not obstructed.
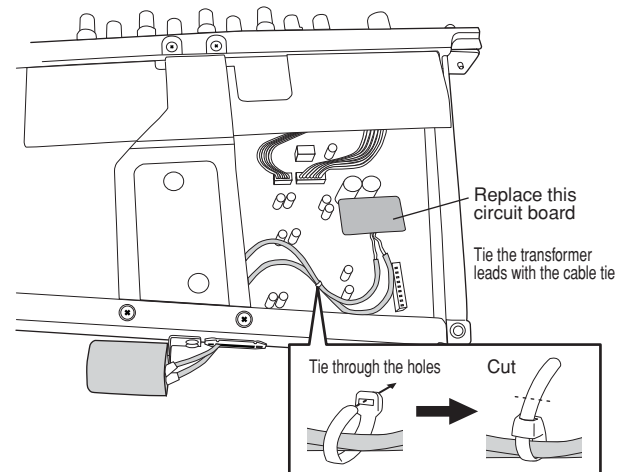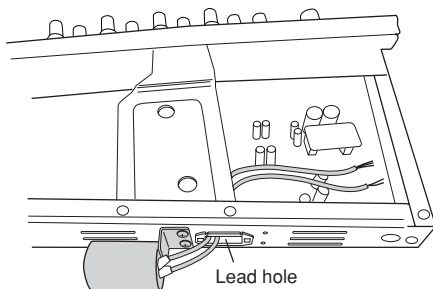
Mono Input Module

Bottom stay

Transformer

Stereo Input Module

Bottom stay

Transformer   Transformer

5 Pass the transformer leads through the square lead hole.

Mono Input Module

Lead hole

Stereo Input Module

Lead hole
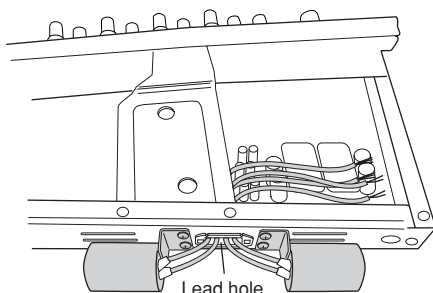
6 The transformer leads must now be soldered to the small circuit board included in the ITR5000 package. One circuit board is used for each transformer on stereo modules. The leads must be soldered to the circuit board as shown in the illustration below.

Transformer leads

Shield

Brown   White   Red

White   Red

7 Remove (unplug) the existing small circuit board from the module, and replace it with the circuit board now soldered to the transformer leads. Next, neatly tie the transformer leads using the supplied cable tie, and cut off the excess tie.
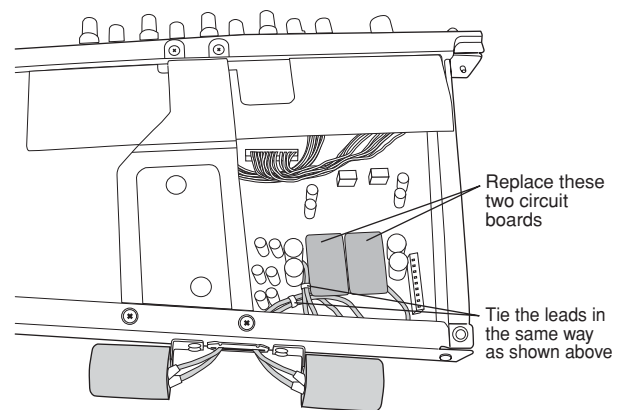
Mono input module

Replace this circuit board

Tie the transformer leads with the cable tie

Tie through the holes   Cut

Stereo input module

Replace these two circuit boards

Tie the leads in the same way as shown above

8 Make sure the transformer leads are completely contained within the module.

That completes transformer installation.
Be careful that the leads don't get caught on any part of the console when installing or later removing the module.

Internal Switch Settings For Each module

As you tell from the PM5000 block diagram, each module has a number of internal switch settings. These settings can be changed to "customize" the PM5000 signal flow to most ideally suit your mixing requirements.
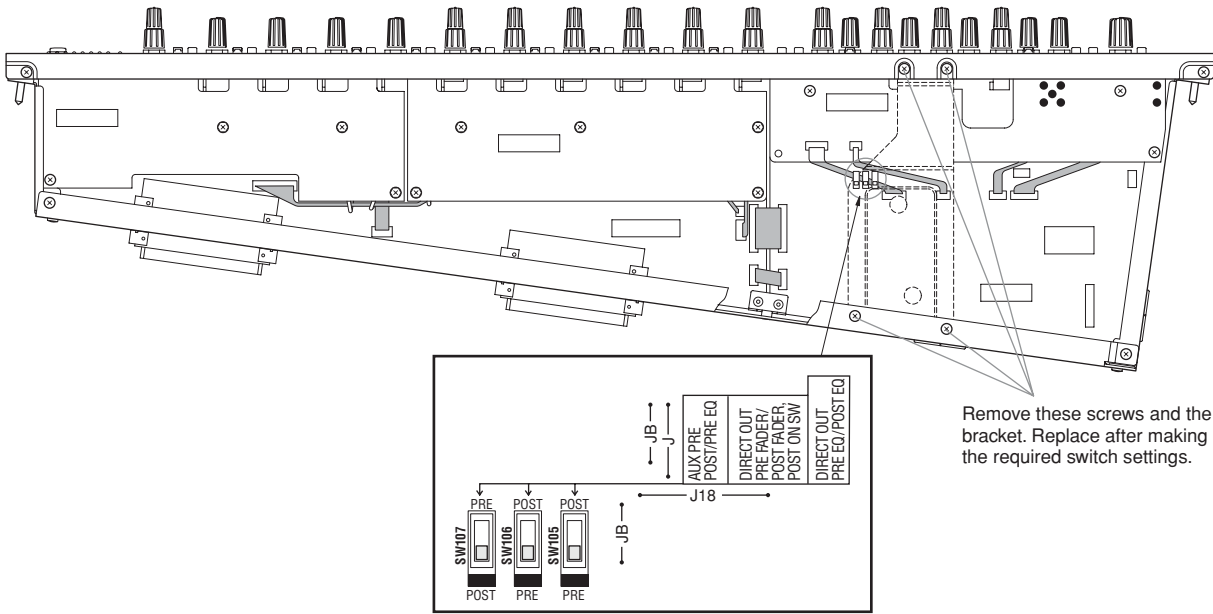
The chart below lists the switches and their functions. In some cases two switches must be set appropriately to specify a function. When changing internal switch settings make only the necessary changes while referring to the block diagram.

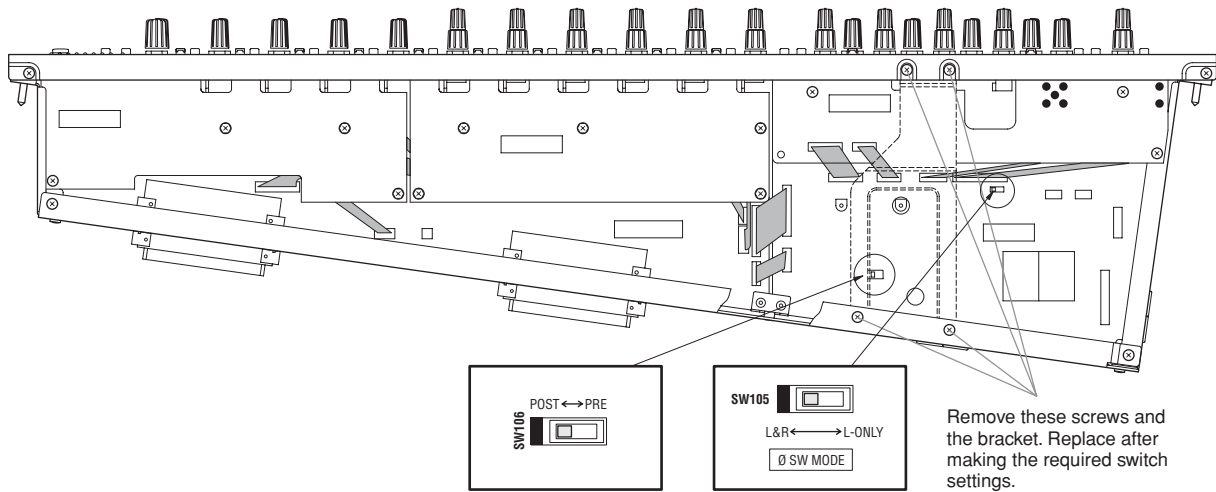[   ] = initial factory settings.

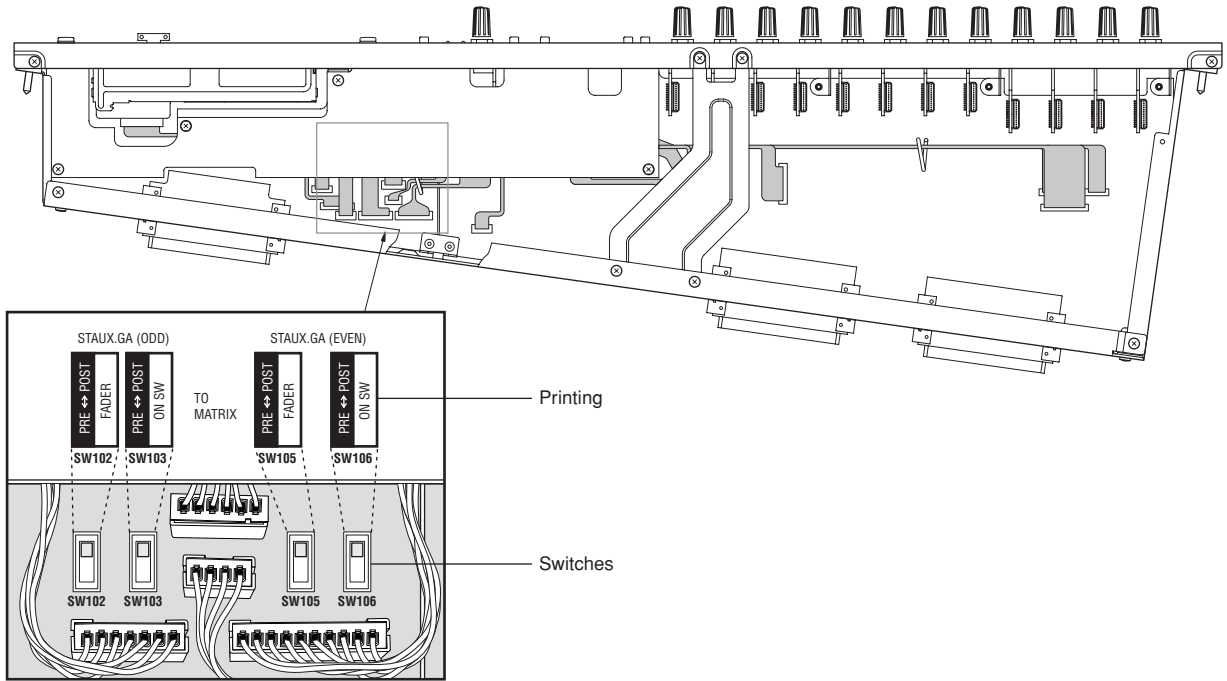| Module	Target	Switch No./Setting	Switch No./Setting	Selectable function	Module	Target	Switch No./Setting	Switch No./Setting
MONO Input	DIRECT OUT	**SW105**	**SW106**					
		PRE	n/a	The direct out signal is pre-EQ (SW106 has no effect).				
		POST	PRE	The direct out signal is post-EQ, pre-fader.				
		POST	POST	The direct out signal is post-fader, post-on switch.				
	AUX PRE FADER	**SW107**						
		PRE		The pre-fader aux signal is sent to the bus pre-EQ (PRE) or post-EQ (POST).				
		POST						
STEREO Input	AUX PRE FADER	**SW106**						
		PRE		The pre-fader aux signal is sent to the bus pre-EQ (PRE) or post-EQ (POST).				
		POST						
	Ø SW MODE (Phase SW Mode)	**SW105**						
		L&R		Input signal phase inversion is applied to both stereo channels (L&R) or only the left channel (L ONLY).				
		L ONLY						
STEREO AUX MASTER	Odd-channel ST AUX TO MATRIX	**SW102**	**SW103**		Even-channel ST AUX TO MATRIX		**SW105**	**SW106**
		PRE	PRE	The odd-numbered channel ST AUX TO MATRIX signal is pre-fader, pre-on switch.			PRE	PRE	The even-numbered channel ST AUX TO MATRIX signal is pre-fader, pre-on switch.
		POST	PRE	The odd-numbered channel ST AUX TO MATRIX signal is post-fader, pre-on switch.			POST	PRE	The even-numbered channel ST AUX TO MATRIX signal is post-fader, pre-on switch.
		PRE	POST	The odd-numbered channel ST AUX TO MATRIX signal is pre-fader, post-on switch.			PRE	POST	The even-numbered channel ST AUX TO MATRIX signal is pre-fader, post-on switch.
		POST	POST	The odd-numbered channel ST AUX TO MATRIX signal is post-fader, post-on switch.			POST	POST	The even-numbered channel ST AUX TO MATRIX signal is post-fader, post-on switch.
G/A MASTER	Odd-channel G/A TO MATRIX	**SW102**	**SW103**				**SW105**	**SW106**
		PRE	PRE	The odd-numbered channel G/A TO MATRIX signal is pre-fader, pre-on switch.			PRE	PRE	The even-numbered channel G/A TO MATRIX signal is pre-fader, pre-on switch.
		POST	PRE	The odd-numbered channel G/A TO MATRIX signal is post-fader, pre-on switch.			POST	PRE	The even-numbered channel G/A TO MATRIX signal is post-fader, pre-on switch.
		PRE	POST	The odd-numbered channel G/A TO MATRIX signal is pre-fader, post-on switch.			PRE	POST	The even-numbered channel G/A TO MATRIX signal is pre-fader, post-on switch.
		POST	POST	The odd-numbered channel G/A TO MATRIX signal is post-fader, post-on switch.			POST	POST	The even-numbered channel G/A TO MATRIX signal is post-fader, post-on switch.
	Odd-channel G/A TO STEREO	**SW101**			Even-channel G/A TO STEREO			
		PRE		The odd-numbered channel G/A TO STEREO signal is pre-on switch (PRE) or post-on switch (POST).			PRE		The even-numbered channel G/A TO STEREO signal is pre-on switch (PRE) or post-on switch (POST).
		POST					POST		
ST MONO MASTER	L TO MATRIX	**SW102**	**SW103**		R TO MATRIX		**SW105**	**SW106**
		PRE	PRE	The left-channel TO MATRIX signal is pre-fader, pre-on switch.			PRE	PRE	The right-channel TO MATRIX signal is pre-fader, pre-on switch.
		POST	PRE	The left-channel TO MATRIX signal is post-fader, pre-on switch.			POST	PRE	The right-channel TO MATRIX signal is post-fader, pre-on switch.
		PRE	POST	The left-channel TO MATRIX signal is pre-fader, post-on switch.			PRE	POST	The right-channel TO MATRIX signal is pre-fader, post-on switch.
		POST	POST	The left-channel TO MATRIX signal is post-fader, post-on switch.			POST	POST	The right-channel TO MATRIX signal is post-fader, post-on switch.

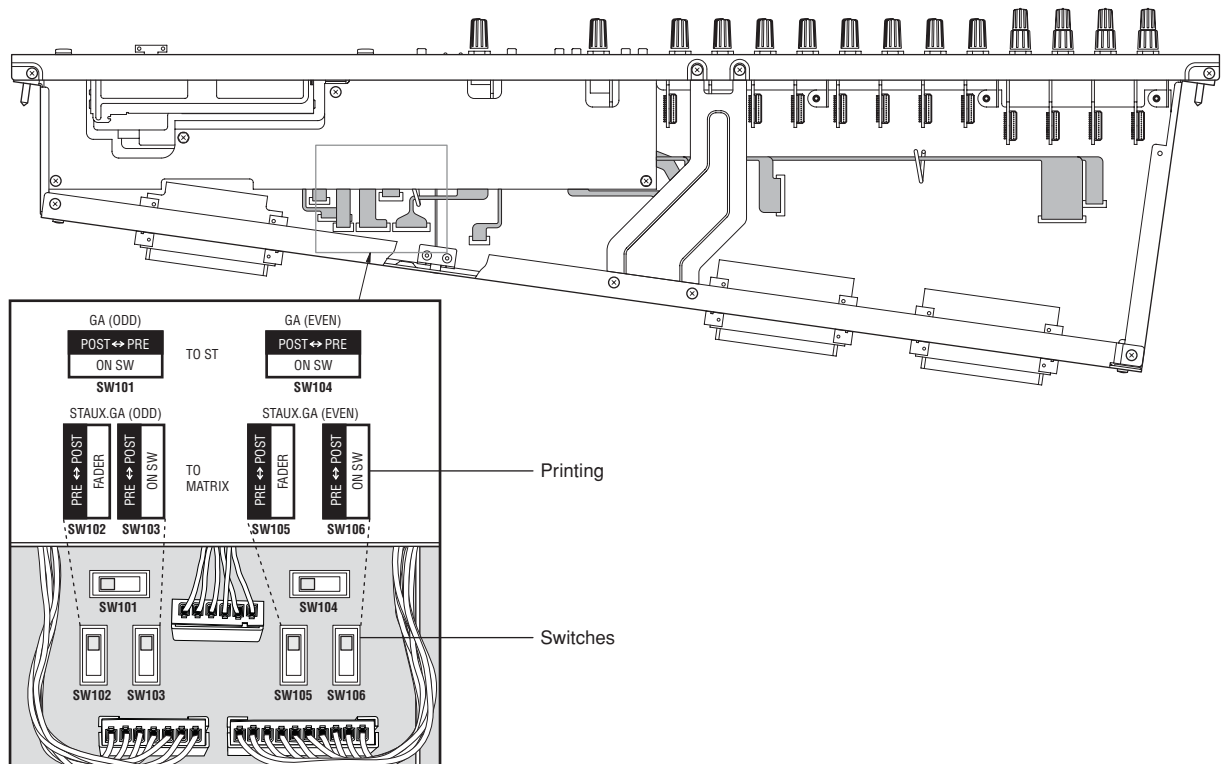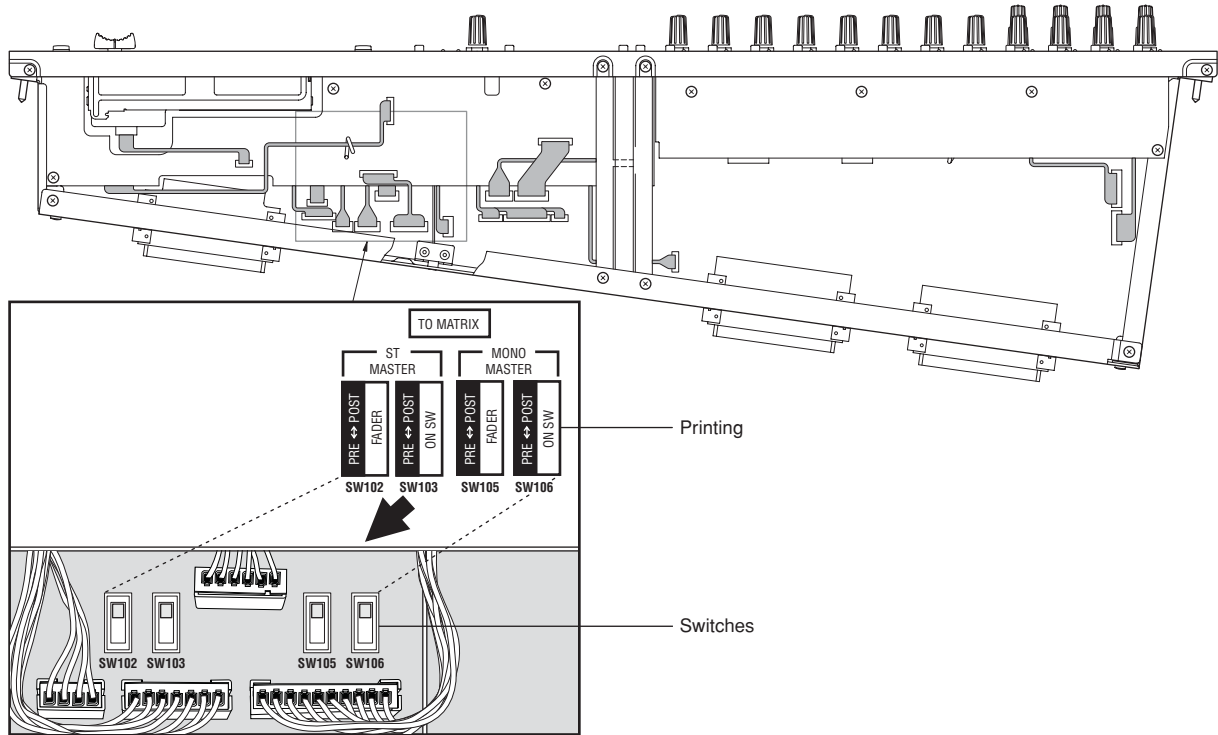## Internal Switch Locations On Each module

Mono Input Module

JB ↓ J

AUX PRE
POST/PRE EQ

DIRECT OUT
PRE FADER/
POST FADER,
POST ON SW

DIRECT OUT
PRE EQ/POST EQ

J18

PRE — SW107 — POST

POST — SW106 — PRE

POST — SW105 — PRE

JB

Remove these screws and the bracket. Replace after making the required switch settings.

Stereo Input Module

SW106   POST ←→ PRE

SW105   L&R ←→ L-ONLY   Ø SW MODE

Remove these screws and the bracket. Replace after making the required switch settings.

Stereo/Aux Master Module

STAUX.GA (ODD)
STAUX.GA (EVEN)

PRE ↔ POST
FADER
PRE ↔ POST
ON SW
TO
MATRIX
PRE ↔ POST
FADER
PRE ↔ POST
ON SW

SW102   SW103

SW105   SW106

Printing

SW102   SW103

SW105   SW106

Switches

G/A Master Module

GA (ODD)
GA (EVEN)

POST ↔ PRE
ON SW
TO ST
POST ↔ PRE
ON SW

SW101

SW104

STAUX.GA (ODD)
STAUX.GA (EVEN)

PRE ↔ POST
FADER
PRE ↔ POST
ON SW
TO
MATRIX
PRE ↔ POST
FADER
PRE ↔ POST
ON SW

SW102   SW103

SW105   SW106

Printing

SW101

SW104

SW102   SW103

SW105   SW106

Switches

Stereo/Mono Master Module

TO MATRIX

ST
MASTER

MONO
MASTER

PRE ↔ POST
FADER

PRE ↔ POST
ON SW

PRE ↔ POST
FADER

PRE ↔ POST
ON SW

SW102 SW103 SW105 SW106

Printing

SW102 SW103 SW105 SW106

Switches

Connector Pin Assignments

The connector diagrams refer to the console connectors.

Cascade Connector

These are the cascade connector pin assignments for the PM5000 as well as the PM4000/3500 series consoles that can be cascade-connected to the PM5000.

PM5000

CASCADE TYPE B Pin Assignments
(D-sub 25-pin Connector)
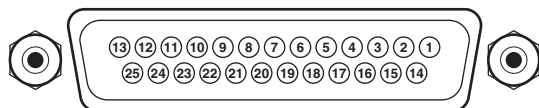
Pin #	Function	Pin #	Function
1	VCA EXT 1	14	VCA EXT 2
2	VCA EXT 3	15	VCA EXT 4
3	VCA EXT 5	16	VCA EXT 6
4	VCA EXT 7	17	VCA EXT 8
5	GND	18	MUTE EXT 1
6	MUTE EXT 2	19	MUTE EXT 3
7	MUTE EXT 4	20	MUTE EXT 5
8	MUTE EXT 6	21	MUTE EXT 7
9	MUTE EXT 8	22	GND
10	INPUT CUE EXT	23	SOLO EXT
11	GND	24	NC
12	NC	25	NC
13	NC		

PM4000/4000M

VCA/MUTE CONTROL Pin Assignments
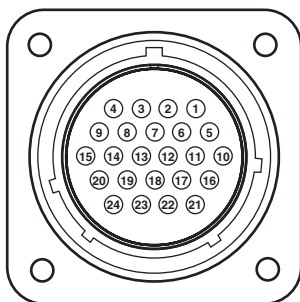
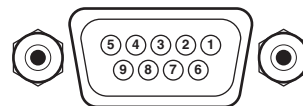| Pin #	Function	Pin #	Function
1	VCA EXT 1	13	MUTE EXT 3
2	VCA EXT 2	14	MUTE EXT 4
3	VCA EXT 3	15	MUTE EXT 5
4	VCA EXT 4	16	MUTE EXT 6
5	VCA EXT 5	17	MUTE EXT 7
6	VCA EXT 6	18	MUTE EXT 8
7	VCA EXT 7	19	GND
8	VCA EXT 8	20	GND
9	GND	21	GND
10	NC	22	INPUT CUE EXT
11	MUTE EXT 1	23	SOLO EXT / NC (*)
12	MUTE EXT 2	24	NC

* = SOLO EXT on the PM4000, NC on the PM4000M

• *Compatible plug: JAE (Japan Aviation Electronics Industry, Limited) #SRCN6A25-24P*

PM3500/3500M
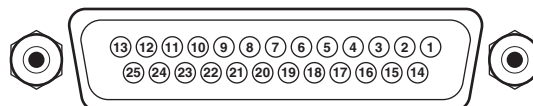
Rear Panel
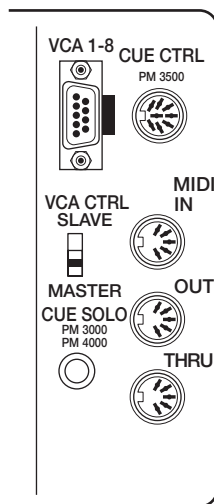
VCA1~8
(D-sub 9-pin Connector)

Pin #	Function
1	VCA EXT 1
2	VCA EXT 2
3	VCA EXT 3
4	VCA EXT 4
5	VCA EXT 5
6	VCA EXT 6
7	VCA EXT 7
8	VCA EXT 8
9	GND

CUE/SOLO Jack

Tip	INPUT CUE EXT
Ring	SOLO EXT
Shield	GND

GPI Connector

(D-sub 25-pin Connector)

Pin #	Function	Pin #	Function
1	GPO 1	14	GPO 2
2	GPO 3	15	GPO 4
3	GPO 5	16	GPO 6
4	GPO 7	17	GPO 8
5	GND	18	GND
6	GND	19	GND
7	GND	20	GND
8	GND	21	NC
9	NC	22	INC
10	DEC	23	GND
11	GND	24	TB REMOTE
12	NC	25	TB REMOTE GND
13	NC		

PM5000 Self-diagnostic Function

The PM5000 automatically performs a battery of internal tests when the power is turned on. If no problems are encountered the scene number will appear on the display and normal operation will be possible.

If a system or other internal error is found console operation will be suspended and/or an error message will appear on the display.

If an error message appears, refer to the Error Messages on page 94.

Initializing the Internal Memory

If an error occurs during the self-diagnostic memory check (above), normal operation can sometimes be restored by initializing the internal memory (initial factory setup).

The memory initialization procedure described below can also be used to return the memory to a blank state prior to re-programming for the next show or tour.
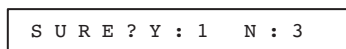
NOTE

The scene memory, setup memory, and MIDI program change table are all initialized by this operation. If you want to keep any of the data be sure to save it to an external memory card before initializing the memory.

1 Turn the console power ON while holding the [STORE] key to start the initialization procedure.
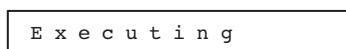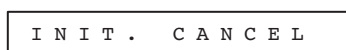
```
┌─────────────┐
│             │
│             │
│             │
│   I N I T   │
│             │
└─────────────┘
```

```
┌─────────────────────────┐
│ S U R E ? Y : 1   N : 3 │
└─────────────────────────┘
```

2 Press the alpha-numeric keypad [1] key to initialize the memory.

```
┌─────────────────────┐
│ E x e c u t i n g   │
└─────────────────────┘
```

Press the [3] key to abort the initialization operation.

```
┌─────────────────────────┐
│ I N I T .   C A N C E L │
└─────────────────────────┘
```

3 Normal operation resumes once the memory has been initialized.

Error Messages

Any of the following messages appearing on the 4-character message display indicate that an error has occurred. Refer to the information listed below in combination with the "Troubleshooting" section on next page.

Error	Message	Meaning	Action
Startup Error	[H.ER]	Fatal hardware error.	The system cannot be started. Contact your Yamaha dealer or service center.
	[S.ER]	Internal data error.	There is a problem with the internal data, but the system can be started by pressing the [ENTER] key. Save all (ALL) data to a memory card and contact your Yamaha dealer or service center.
	[LoBT]	Low backup battery.	If the battery voltage drops any further all data saved in the internal memory will be lost. Contact your Yamaha dealer or service center as soon as possible.
Error During Normal Operation	[CmER]	Internal communication error.	Contact your Yamaha dealer or service center.
	[RxER]	MIDI transmit/receive error.	Make sure that all external MIDI equipment is properly connected. This error can also be caused by attempting to send a large amount of data to the PM5000 at once.
	[BfER]		
	[CsER]	Cascade connection error.	Check that both of the cascaded consoles are connected properly, that the correct cascade cable is being used, and that the [MASTER/SLAVE] switch settings have been made properly.
	[CfER]	Memory card access error.	Check that the memory card has been properly inserted into the console's card slot, that the card has sufficient remaining capacity, and that it is properly formatted.
Operation Error	[PROT]	You attempted to store to a protected scene.	Use the utility mode to turn memory protection off. If the entire memory is protected use the MEMORY PROTECT function. If a specific scene memory is protected use the SCENE EDIT function (page 62).
	[NoDT]	You attempted to recall a NO DATA scene.	If the left dot on the scene display is lit, that scene is empty and cannot be recalled. Make sure scene data is stored in the scene number to be recalled.
	[FULL]	You attempted to insert a scene when scene number 999 exists.	Move or delete the data in scene number 999.
	[SPC!]	There is a space in the name of the file you attempted to save.	Save the file after deleting the space.

Troubleshooting

Symptom	Possible Cause & Solution
Power won't turn on. **Panel displays and illumination won't light.**	• Is the dedicated PW5000 properly connected via the supplied power cable? • Is the PW5000 [POWER ON/OFF] switch in the ON position? • Is the [PANEL LED DIMMER] control on the meter bridge turned all the way down? • If all of the above check out OK and the power still won't turn on, contact your Yamaha dealer or service center.
A cascade-connected slave PM5000 or PM4000/3500 doesn't respond.	• Are you connected to the right connector? The TYPE A connector is for connection between two PM5000 consoles, while the TYPE B connector is for connection to a PM4000/3500 console. • If you're using the TYPE A connector is the [MASTER/SLAVE] switch set properly (page 74)? • If you're using the TYPE B connector is the PM4000/3500 set to SLAVE mode? (Refer to the PM4000/3500 manual). • Are both the TYPE A and TYPE B connectors connected? If both are connected the TYPE A connector will take priority.
An external device connected to the GPI connector doesn't respond.	• Are the GPI OUT scene link and fader start functions accessible via the utility mode set appropriately (page 72)? • Have you selected the same port number for scene link and fader start control (page 73)?
The PM5000 doesn't response to control from an external GPI device.	• If you intend to use the scene increment/decrement function, is SCENE INC/DEC turned ON (page 72)? Also are scenes actually stored in scene numbers 010 ~ 999?
No sound input.	• Is the input channel [ON] switch engaged? • Is the input channel fader set to an appropriate level? • Have you engaged the [CUE] switch of a channel that is receiving no input while the SOLO mode is engaged? • Is the VCA fader assigned to the input channel set to an appropriate level? Is a [VCA MUTE] or [MUTE MASTER] switch assigned to the channel engaged?
No sound output.	• Are the appropriate master module [ON] switches engaged? • Is the [LCR] switch engaged and the [CSR] control turned all the way to the right (CSR) (page 19)?
No sound from the headphone or monitor outputs.	• Is the "MUTE" monitor mode selected (page 67)? In this case monitor output will be muted when the CEU/SOLO function is OFF.
Sound from the headphone and monitor outputs is delayed.	• Has a monitor delay been programmed (page 68)?
Only certain channels can be heard via the headphone and monitor outputs.	• Is a [CUE] switch engaged?
Sound level is too low.	• Are the [PAD] switch and [GAIN] controls in the head amplifier blocks set appropriately? • Are the input channel faders set to appropriate levels? • Are the master module faders set to appropriate levels? • Are VCA faders assigned to the channels set to appropriate levels?
Distorted sound.	• Are the [PAD] switch and [GAIN] controls in the head amplifier blocks set appropriately? • Are the input channel faders set too high? • Are the master module faders set too high? • Are one or more EQ gain controls set too high?
The sound does not change when console settings are changed.	• Is the [PREVIEW] switch engaged (page 55)? • Is the LOCK mode engaged (page 61)? • Is the cascade [MASTER/SLAVE] switch set to the SLAVE position?
Can't store a scene.	• Are you attempting to save to a read-only scene number (000~009)? • Is the memory protect function turned ON (page 62)? • Has the scene been protection via the SCENE EDIT settings (page 62)? • Is console automation turned OFF (page 70)?
Can't recall a scene.	• Are any [RECALL SAFE] or [FADER SAFE] switches engaged? • Is console automation turned OFF (page 70)?
Can't save data to a memory card.	• Has the memory card been properly formatted to DOS format (page 59)? • Does the memory card have enough remaining capacity to store the data?
Can't load data from a memory card.	• Has the memory card been properly formatted to DOS format (page 59)? • Is the file to be loaded in CSV format? • Have more than 128 files been saved to the memory card? The PM5000 will recognize up to 128 files on one memory card. Files exceeding this number cannot be display by the PM5000.
Some channels are always active even when the SOLO mode is engaged.	• Is INPUT SOLO SAFE engaged for those channels (page 67)?
It takes a while for the faders to stop moving when a scene is recalled.	• Has a fade time been specified (page 52)?

Specifications

1. General Specifications

0dBu is referenced to 0.775 Vrms.

Total Harmonic Distortion (Master Output)	Less than 0.1% (THD+N)	20Hz-20kHz @ +14dBu 600Ω (Input Gain Control at Maximum)
Frequency Response (Master Output)	0+1,-3dB	20Hz-20kHz @ +4dBu 600Ω (Input Gain Control at Maximum)
Hum & Noise (20Hz-20kHz) *1	-128dBu	Equivalent Input Noise.
Rs=150Ω	-100dBu	Residual Output Noise.
Input Gain=Maximum	-92dBu (96dB S/N)	STEREO AUX Master fader at nominal level and all assign SW's off.
Input Pad =OFF	-87dBu (91dB S/N)	GROUP/AUX Master fader at nominal level and all assign SW's off.
Input sensitivity=-60dBu	-92dBu (96dB S/N)	STEREO, MONO (C) Master fader at nominal level and all assign SW's off.
	-64dBu (68dB S/N)	STEREO AUX, GROUP/AUX, STEREO, MONO (C) Master fader and one input fader at nominal level.
	-89dBu(93dB S/N)	MATRIX Master at nominal level and all Matrix mix controls at minimum level.
Maximum Voltage Gain *2	64dB	MONO IN to MONO IN INSERT OUT,DIRECT OUT (pre fader)
	80dB	MONO IN to STEREO AUX OUT (PRE),GROUP/AUX OUT (AUX mode & PRE)
	90dB	MONO IN to STEREO AUX OUT (POST),GROUP/AUX OUT (AUX mode & POST)
	84dB	MONO IN to GROUP/AUX OUT (GROUP mode), STEREO OUT(INPUT to ST), MONO (C) OUT (INPUT to MONO)
	90dB	MONO IN to MATRIX OUT (GROUP/AUX MASTER GROUP mode to MATRIX)
	64dB	ST IN to ST INSERT OUT
	80dB	ST IN to STEREO AUX OUT (PRE)
	90dB	ST IN to STEREO AUX OUT (POST)
	84dB	ST IN to GROUP/AUX OUT (GROUP mode), STEREO OUT (INPUT to ST)
	81dB	ST IN to MONO (C) OUT (INPUT to MONO)
	77dB	ST IN to GROUP/AUX OUT (AUX mode & PRE)
	87dB	ST IN to GROUP/AUX OUT (AUX mode & POST)
	10dB	SUB IN to Master OUT
	6dB	2TR IN to MONITOR OUT
Crosstalk	-80dB @ 1kHz, -70dB @ 10kHz	Adjacent inputs.
	-80dB @ 1kHz, -70dB @ 10kHz	input to output.(except between L and R)
MONO & ST INPUT PAD	26dB	
MONO & ST INPUT GAIN	50dB	Variable
INPUT High Pass Filter	12dB/octave roll off below 20-400Hz at -3dB points.	
INPUT Equalization *3	+15, -15dB maximum	
HIGH	1k-20kHz (peaking/shelving, Q=0.5-3)	
HI-MID	0.4k-8kHz (peaking, Q=0.5-3)	
LO-MID	80-1.6kHz (peaking, Q=0.5-3)	
LOW	30-600Hz (peaking/shelving, Q=0.5-3)	
Sweep sine wave oscillator/Pink noise with burst		4 mode selectable (100Hz/1kHz/10kHz/PINK)
		Selectable FIX or SWEEP for 100Hz/1kHz/10kHz by SWEEP/BURST ON/OFF switch, sweep range: x0.2-x2, Less than 1% T.H.D. @ +4dBu
		Selectable continue or BURST for PINK noise by SWEEP/BURST ON/OFF switch.
		PINK NOISE: fixed 200msec, INTERVAL: variable 1sec-20sec
Phantom Power		+48VDC is applied to balanced inputs for powering condenser microphones via 6.8kΩ current-limiting/isolation resistors.
Input LED Meter		9-points (PEAK/+12/+6/+3/0/-3/-6/-12/-25dB) LED level meter built into each MONO-IN and ST-IN module.
	PEAK	LED (red) turns on when pre-EQ level or post-EQ level or pre-Fader level reaches 3dB below clipping.
	+12/+6/+3/0	LED (yellow) turns on when pre-Fader level reaches +12/+6/+3/0dB.
	-3/-6/-12/-25	LED (green) turns on when pre-Fader level reaches -3/-6/-12/-25dB.
Output LED Meter		20-points (PEAK, +15, <3dB step>, -39dB) LED level meter. STEREO AUX 1 (L, R)-12 (L, R), STEREO MATRIX 1 (L, R)-4 (L, R) (STEREO AUX/STEREO MATRIX selectable) GROUP/AUX 1-8, MATRIX 1-8 (GROUP/AUX, MATRIX selectable) STEREO (L, R), MONO (C) CUE (L, R, C), TB/OSC (CUE C, TB/OSC automatic select)
	PEAK	LED (red) turns on when pre-LineAmp level reaches 3dB below clipping.
	+15/··/0	LED (yellow) turns on when pre-LineAmp level reaches +15/<3dB step>/0dB.
	-3/··/-39	LED (green) turns on when pre-LineAmp level reaches -3/<3dB step>/-39dB.

Dimensions	Width	28ch	1432 mm
		36ch	1671 mm
		52ch	2148 mm
	Depth		1113 mm
	Height		349 mm
Weight		28ch	153 kg
		36ch	179 kg
		52ch	228 kg

*1 Hum & Noise are measured with a 6dB/octave filter @ 12.7kHz; equivalent to a 20kHz filter with infinite dB/octave attenuation.
Temperature condition @+10 - +25°C

*2 PAN/BAL: the left or the right turning around.

*3 Turn over /roll-off frequency of shelving: 3dB below maximum variable level.

2. Inputs/Outputs

2.1 Input Characteristics

| Connection | PAD | Gain Trim | Actual Load Impedance | For Use With Nominal | Input Level *3 | | | Connector In Mixer *2 |
					Sensitivity *4	Nominal	Max. before Clip	
MONO IN 1-n ch *1 ST IN 1-4ch	0	-60	3kΩ	50-600Ω Mics 600Ω Lines	-80dBu (0.078mV)	-60dBu (0.775mV)	-40dBu (7.75mV)	XLR-3-31type
	26				-54dBu (1.55mV)	-34dBu (15.5mV)	-14dBu (155mV)	
	0	-10			-30dBu (24.5mV)	-10dBu (245mV)	+10dBu (2.45V)	
	26				-4dBu (0.489V)	+16dBu (4.89V)	+30dBu (24.5V)	
STEREO AUX SUB IN (1-12) [L, R] *5 GROUP/AUX SUB IN (1-8) *5 STEREO SUB IN [L, R] MONO(C) SUB IN MONITOR SUB IN [L, R, C] MATRIX SUB IN [L, R]			10kΩ	600Ω Lines	-6dBu (388mV)	+ 4dBu (1.23V)	+24dBu (12.3V)	XLR-3-31type
TALKBACK IN			3kΩ	50-600Ω Mics	-66dBu (0.39mV)	-50dBu (2.45mV)	-30dBu (24.5mV)	XLR-3-31type
MONO IN INSERT IN 1-n ch *1 ST IN INSERT IN 1-4ch			10kΩ	600Ω Lines	-16dBu (123mV)	+4dBu (1.23V)	+24dBu (12.3V)	Phones Jack (TRS)
STEREO AUX INSERT IN (1-12) [L, R] GROUP/AUX INSERT IN (1-8) STEREO INSERT IN [L, R] MONO (C) INSERT IN STEREO MATRIX INSERT IN (1-4) [L, R] MATRIX INSERT IN (1-8)					-6dBu (388mV)			
2TR IN 1, 2 (L, R)			10kΩ	600Ω Lines	-2dBu (616mV)	+4dBu (1.23V)	+24dBu (12.3V)	XLR-3-31type

*1 24ch, 32ch, 48ch

*2 All XLR connectors are balanced, Phone Jacks are balanced (T=+, R=-, S=GND).

*3 0dBu is referenced to 0.775Vrms.

*4 Sensitivity is the lowest level that will produce an output of +4dBu (1.23V), or the nominal output level when the unit is set to maximum level.

*5 Only 28ch version does not have STEREO AUX SUB IN and GROUP/AUX SUB IN.

2.2 Output Characteristics

Connection	Actual Source Impedance	For Use With Nominal	Output Level *3		Connector In Mixer *2
			Nominal	Max. before Clip	
STEREO AUX OUT (1-12) [L, R] GROUP/AUX OUT (1-8) STEREO OUT [L, R] MONO(C) OUT STEREO MATRIX OUT (1-4) [L, R] MATRIX OUT (1-8) MONITOR OUT (A,B) [L, R] TB/OSC OUT	150Ω	600Ω Lines	+4dBu (1.23V)	+24dBu (12.3V)	XLR-3-32 type
MONO IN DIRECT OUT 1-n ch *1	150Ω	600Ω Lines	+4dBu (1.23V)	+24dBu (12.3V)	Phone Jack (TRS)
MONO IN INSERT OUT 1-n ch *1 ST IN INSERT OUT 1-4ch STEREO AUX INSERT OUT (1-10) [L, R] GROUP/AUX INSERT OUT (1-12) STEREO INSERT OUT [L, R] MONO(C) INSERT OUT STEREO MATRIX INSERT OUT (1-4) [L, R] MATRIX INSERT OUT (1-8)	150Ω	10kΩ Lines	+4dBu (1.23V)	+24dBu (12.3V)	Phone Jack (TRS)
PHONES OUT x3	10Ω	8Ω Phones	100mW	150mW	Phones Jack (STEREO)
		40Ω Phones	75mW	150mW	

*1 24ch, 32ch, 48ch

*2 All XLR connectors are balanced, Phone Jacks (TRS) are balanced (T=+, R=-, S=GND). Phone Jacks (STEREO) are unbalanced.

*3 0dBu is referenced to 0.775Vrms.

2.3 Others

CASCADE TYPE A / PC (for PM5000 or PC)	Dsub-9P (male)	RS232C/RS422	digital

CASCADE TYPE B (for PM4000/PM3500 series)
    VCA GROUP 1-8,
    MUTE GROUP 1-8,
    CUE SOLO
	Dsub-25P (female)	-	analog

GPI (General Purpose Interface)	Dsub-25P (female)	-	digital

MIDI
    IN
    OUT
    THRU
	DIN 5P (female)	-	digital

DC POWER IN	+16V, -16V, +12V, +48V	-	

3. Others

3.1 Included Accessories

Power Supply Connection Cable (3.6m)

Gooseneck Lamps (4 for the PM5000-52C, 3 for the PM5000-36 and PM5000-28)

Console Cover

Owner's Manual

3.2 Optional Accessories

Option Modules

Input Transformer ITR5000

Power Supply Link Cable PSL5000

European models

Purchaser/User Information specified in EN55103-1 and EN55103-2.

Conforms to Environments: E1, E2, E3 and E4

* Specifications and descriptions in this owner's manual are for information purposes only. Yamaha Corp. reserves the right to change or modify products or specifications at any time without prior notice. Since specifications, equipment or options may not be the same in every locale, please check with your Yamaha dealer.

MIDI Data Format

1. TRANSMIT/RECEIVE DATA

1.1 CHANNEL MESSAGE

1.1.1 CONTROL CHANGE (Bn) BANK SELECT

<Reception>

In SINGLE mode when BANK is ON, this message can be received if the Rx CH matches. This will specify the bank for a subsequently received program change.

<Transmission>

In SINGLE mode when BANK is ON and you recall a scene memory, a bank select message will be transmitted on the specified Tx CH.

```
STATUS       1011nnnn Bn          Control Change
             00000000 00          Bank Select MSB
             0vvvvvvv vv          MSB Value
             00100000 20          Bank Select LSB
             0vvvvvvv vv          LSB Value
```

1.1.2 CONTROL CHANGE (Bn) ASSIGN

<Reception>

If CONTROL CHANGE is ON and this message is received, the parameter that is assigned to the MIDI channel will be changed.

<Transmission>

If CONTROL CHANGE is ON and an assigned parameter has been modified, this message will be transmitted from the selected MIDI channel.

```
STATUS       1011nnnn Bn          Control Change
             0ccccccc cc          Control No.(1-5,
                                  7-31,33-37,39-95,
                                  102-104)
             0vvvvvvv vv          Value
```

The values of channel or VCA faders are transmitted in 14-bit form using MSB and LSB bytes.

In the ON switch, 00H through 3fH is assigned to OFF and 40H through 7fH is assigned to ON.

1.1.3 CONTROL CHANGE (Bn) NRPN

<Reception>

If NRPN is ON and the Rx CH matches, this message will be received. This message will change the parameter corresponding to the received NRPN number. The CONTROL CHANGE ASSIGN numbers are the same as the LSB of the NRPN numbers.

<Transmission>

If NRPN is ON and an assigned parameter is modified, this message will be transmitted on the Tx CH.

If both CONTROL CHANGE and NRPN are simultaneously ON, an assigned parameter will be transmitted as a control change assign message.

```
STATUS       1011nnnn Bn          Control Change
             01100010 62          NRPN LSB
             0vvvvvvv vv          MSB Value
             01100011 63          NRPN MSB
             0vvvvvvv vv          LSB Value
             00000110 06          DATA ENTRY MSB
             0vvvvvvv vv          MSB Value
             00110110 26          DATA ENTRY LSB
             0vvvvvvv vv          LSB Value
```

60 h (INC) and 61 h (DEC) are not supported.

1.1.4 PROGRAM CHANGE (Cn)

<Reception>

In the SINGLE mode this message can be received if Program Change Rx is ON and the [Rx CH] matches. If OMNI is ON, however, this message will be received regardless of the channel. A scene memory will be recalled according to the settings of the Program Change Table.

In the case of the MULTI mode, if Program Change Rx is ON this message will be received on all MIDI channels, and will be divided into banks according to the channel.

If Program Change ECHO is ON, this message will be echoed.

<Transmission>

In the case of the SINGLE mode, if Program Change Tx is ON this message will be transmitted on the Tx CH channel when a scene is recalled. This will be transmitted according to the settings of the Program Change Table.

In the case of the MULTI mode, this will be transmitted on the MIDI channel according to the bank. If the recalled memory number is assigned to more than one program number, the program number for the lowest-numbered channel of the lowest-numbered bank will be transmitted.

```
STATUS       1100nnnn Cn          Program Change
DATA         0nnnnnnn nn          Program No.(0-127)
```
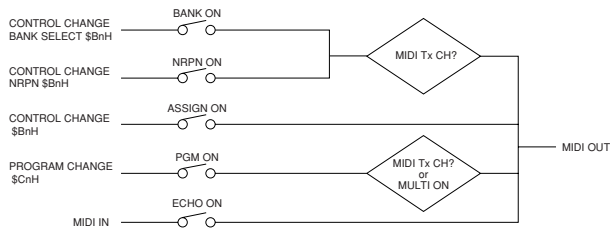
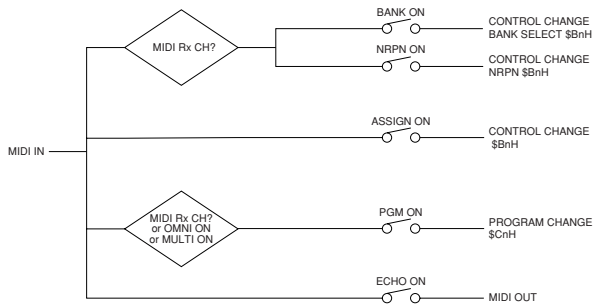## 1.2 ACTIVE SENSING (FE)

<Reception>

Once this message has been received, and there is an interval of 300 ms during which nothing is received, Running Status will be cleared, and MIDI communication will be initialized.

```
STATUS       11111110 FE          Active Sensing
```

2. TRANSMISSION CONDITION

3. RECEIVE CONDITION

MIDI Implementation Chart
YAMAHA [Mixing Console] / Model: PM5000

Function		Transmit	Receive	Remarks
Basic Channel	Default	1–16	1–16	Memorized
	Changed	1–16	1–16	
Mode	Default	X	OMNI off / OMNI on	Memorized
	Messages	X	X	
	Altered	******************	X	
Note Number		X	X	
	True Voice	******************	X	
Velocity	Note ON	X	X	
	Note OFF	X	X	
After Touch	Key's	X	X	
	Ch's	X	X	
Pitch Bend		X	X	
Control Change 0, 32		O	O	Bank Select
1–5, 7–31, 33–37		O	O	*1
39–95, 102–104				
98, 99		O	O	NRPN (Non-Registered Parameter Number)
6, 38		O	O	Data Entry (for NRPN)
Program Change		0–127	0–127	Assignable
	True#	******************	0–999	
System Exclusive		X	X	
System	Song Position	X	X	
Common	Song Select	X	X	
	Tune	X	X	
System	Clock	X	X	
Real Time	Commands	X	X	
Aux	Local ON/OFF	X	X	
Messages	All Notes OFF	X	X	
	Active Sense	X	O	
	Reset	X	O	
Notes		*1 See Control Change parameter assign chart.		

Mode 1 : OMNI ON, POLY   Mode 2 : OMNI ON, MONO   O : YES
Mode 3 : OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO   X : NO

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