Operations Manual

CM Automation PM-64



Creative Tools for New Technologies

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Feature Set

Sound quality is the primary concern of the PM64. It will deliver up to 20 times the signal information compared to a 24 bit digital audio device. The PM64 will not generate or introduce errors to the signal path.

Matrix Size

32 line level inputs, 32 line level outputs. Choose either mono or stereo (pairs) for both input and output. You can configure multiple units to either be a single master and multiple slave units or each unit having autonomous control.

External Computer

PM64 is not dependant upon a host computer. All functions and memory storage are resident within the unit. You can, however, set up and operate the PM64 from a host computer if you wish.

Program Memory

90 separate programs (user defined) are stored in nonvolatile internal memory. You won't loose your programming if the power fails. Each program stores; A. source/destination (routing), B. separate input levels for all 32 channels, C. separate output levels for all 32 channels D. MIDI patch map data.

Labeling

You can label each input channel and each output channel. This information can be stored internally in nonvolatile internal memory. You can even use a word processor so that you can print out channel strips that can be applied to the faceplate of the unit.

MIDI Mapping

Each of the 90 programs can be configured to send up to16 MIDI patch change commands to other devices in the MIDI chain.

Connections

Gold plated DB25 female. This means the PM64 is doubly shielded for superb RF immunity. RF interference can't get into the device.

Serial Port

Allows complete read/write of all parameters including memory locations, routing, level settings, meter readout, channel labels and all operating system functions.

Standard RS232

Serial data port on DB9 male connector. Baud rate is 38.4k.

MIDI Input/Output Port

MIDI cable runs of up to 50 ft. are possible.

GPI Port

2 pin general control input (pulled to +5 internally). "High" state is default. Select "ground" to recall user defined patch for paging/safety override use. Return to "High" state recalls previous patch. Pins have internal RF suppressors to minimize RF interference.

Power Supplies

High quality, low noise toroidal transformer supply for audio circuits with 6 voltage regulators. Separate transformer and power supply for digital circuits prevent noise coupling between audio and digital circuits.

Power Glitch Rejection

Use of excess capacity power supplies and watchdog timers prevent system lockup due to power line glitches. This eliminates the need to repower due to minor power fluctuations unlike some other digital systems.

There are 3 separate lockout features to protect the device and programming during operation.

"Soft Lock"

Loosely translated means any brachiator can defeat this locking function from the front panel. You can still see input/output level settings, channel metering and routing. Simple override of locking function allows quick editing and saving to memory.

"One Patch Lockout"

Allows you to protect program memory #1. This includes level settings, routing information and MIDI Patch Map. System parameters (stereo assignments, patch map, master/slave status and device number) are also locked. This lock is in the Utility Mode of the operating system. You are able to read/write this lock either manually or from a host computer.

"Overall Lockout"

Is quite literal. It protects ALL 90 program memory locations. This includes level settings, routing information and MIDI Patch Map. All system parameters (stereo assignments, patch map, master/slave status and device number) are also locked. This lock is in the Utility Mode of the operating system. You are able to read/write this lock either manually or from a host computer.

Applications

Recording Studio:

1. Adds precise total recall of all outboard effects and devices. Many modern studios using current fully automated digital consoles have total recall, but all the outboard gear remains manual. The MIDI mapping features allows you to send one simple patch command to the PM64 and it can fire off a salvo of 16 patch changes to MIDI-controllable effects.

2. No more pencil and paper notes to recreate complex patch setups. Perfectly accurate send/return level recalls are possible because input/output level controls on outboard gear are left untouched - the PM64 recalls the levels.

3. The various locking features and the undo feature prevent loss or tampering with your studio configuration.

4. A/B activities are made simple because you can combine both routing and level control. Any undesirable level differences are easily balanced, making A/B decisions more reliable.

5. Add control and recall capability of monitor speaker routing and levels so engineers can recreate a desirable studio monitoring situation.

6. Simplifies creation, distribution and level control, and recall of stereo headphone mixes including mix-minus one applications.

7. The PM64 metering feature greatly simplifies complicated troubleshooting procedures. Any input or output can be examined for signal present, overload, level matching or alignment work.

8. Mixing automation by placing PM64 channels in line with tape inputs or console channels, the channel level can be automated by using MIDI patch change commands (snapshot automation), or external MIDI controllers (dynamic fader automation).

Dubbing Studio:

1. Speeds up machine-to-machine switching for large dubbing systems and compensates for unmatched levels.

2. The reliability of the routing connections is much greater than manual patching. This insures minimum downtime and no intermittent noise on dubs.

3. PM64 metering feature greatly simplifies complicated troubleshooting procedures. Any input or output can be examined for signal present, overload, level matching or alignment work.

Post Production:

1. A/V switching for both linear and nonlinear editing setups.

2. Adds precise recall of all outboard effects and devices. Post houses using recallable automated digital consoles can add total recall to all their outboard gear. The MIDI mapping feature allows you to send one simple patch command to the PM64 and it can fire off a salvo of 16 patch changes to MIDI controllable effects or devices.

Touring Sound:

1. Channel swapping for all multi-act performances.

2. Level control to fine tune speaker cluster levels for crowd size or acoustic changes.

3. Monitor speaker or in-ear monitor routing and level control.

4. Adds precise total recall of all outboard effects and devices. The MIDI mapping feature allows you to send one simple patch command to the PM64 and have it fire off a salvo of up to 16 MIDI patch changes to MIDI controlled effects devices.

Installed Sound:

1. Paging with ducking for multizone stereo or mono music distribution, paging and emergency notification systems.

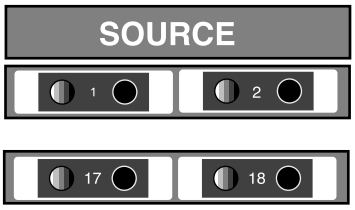
2. Level control to fine tune speaker cluster levels for crowd size or acoustic changes.

3. Front panel controls in combination with various lockout features.

4. Appropriate for use with all installed sound installations including: schools, airports, restaurants, shopping malls, casinos, sports arenas, churches and theaters.

Source Switch Field

Each input channel has a button to select that channel. Three different functions can be addressed when a destination is selected. They are: ROUTE mode, LEVEL mode and METER mode. Only one source can be activated at one time. When working with STEREO sources you will select sources as pairs. LED indicates that a source selection is active.



Source Switch Field

Destination Switch Field

Each output channel has a button to select that channel. Three different functions can be addressed when a destination is selected. They are: ROUTE mode, LEVEL mode and METER mode. Multiple destinations can be chosen when in route mode. LED indicates that a destination selection is active.



Destination Switch Field

Save

This switch, when pushed is used to activate SAVE mode to store current settings as the user has defined. You have 90 different program memories.

Route

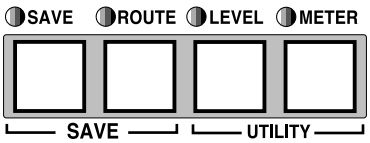
This switch activates ROUTE mode and is used to determined the routing of a source to desired destinations.

Level

This switch activates LEVEL mode and is used to adjust source and destination levels.

Meter

This switch activates METER mode and is used to verify audio signal strength of sources and destinations.



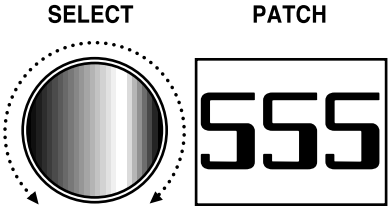
Save, Route, Level, Meter Switches

Encoder (Push/Dial Type)

Used to select program memories (both save, undo and recall), set source and destination levels, adjust all system parameters.

Numeric Readout

Displays: Program memory, source/destination level setting, stereo balance and system parameters such as device number and RS232 baud rate.

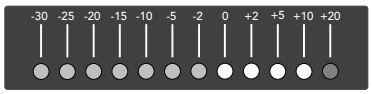


Encoder & Numeric Readout

Rear Panel Controls

Audio Signal Strength Meter

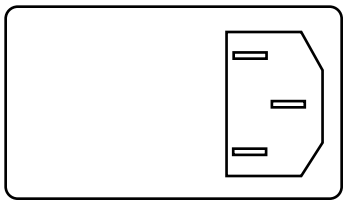
Calibrated from -30 dB to +20 dB. 0 is is referenced to either +4 dBv (default) or -10 dBu. Scale is devided in finer increments on either side of 0, scale becomes more coarsly defined at outer extremes. Make meter sensitivity selection in Utility mode.



Audio Signal Strength Meter

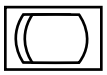
Power Plug

IEC power connection module - Power cord connection, fuse holder, 110/240v selector switch and RF line filter.


Power Plug

On/Off Switch

Do you really need an explaination?


Power Switch

GP Input

Active "Low" logic input (internally pulled to +5v). To engage a predetermined patch. Typically used to attach a remote switch as in fire alarm or paging applications.


GP Input

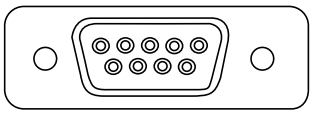
MIDI Input/Output

For connection to MIDI computers or creating PM64 networks.


Midi Connecter

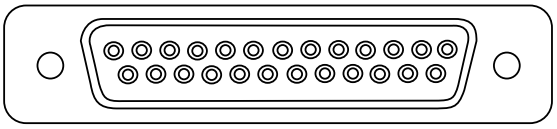
RS232 Connector

To connect to computer serial port at 38.4k baud rate. Pin 3 "receive", Pin 2 "transmit", Pin 5 "ground".


RS232 Connecter

Audio Source Input Connectors

Each DB25 connector has 8 electronically balanced inputs. Connector #1: Source inputs 1-8, Connector #2: Source inputs 9-16, Connector #3: Source inputs 17-24, Connector #4: Source inputs 25-32.


DB25 Connecter

Audio Destination Output Connectors

Each DB25 connector has 8 electronically balanced outputs with phantom power protection. Connector #5: Destination outputs 1-8, Connector #6: Destination outputs 9-16, Connector #7: Destination outputs 17-24 ,Connector #8: Destination outputs 25-32.

DB 25 Pin Out Diagram

See Fig 5.1

Each DB25 connector has 8 electronically balanced outputs with phantom power protection. Connector #5: Destination outputs 1-8, Connector #6: Destination outputs 9-16, Connector #7: Destination outputs 17-24 ,Connector #8: Destination outputs 25-32.

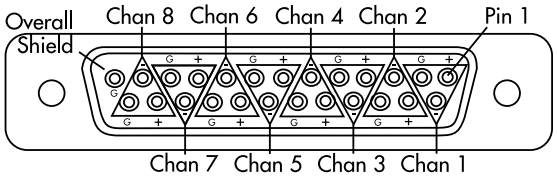


Fig 5.1

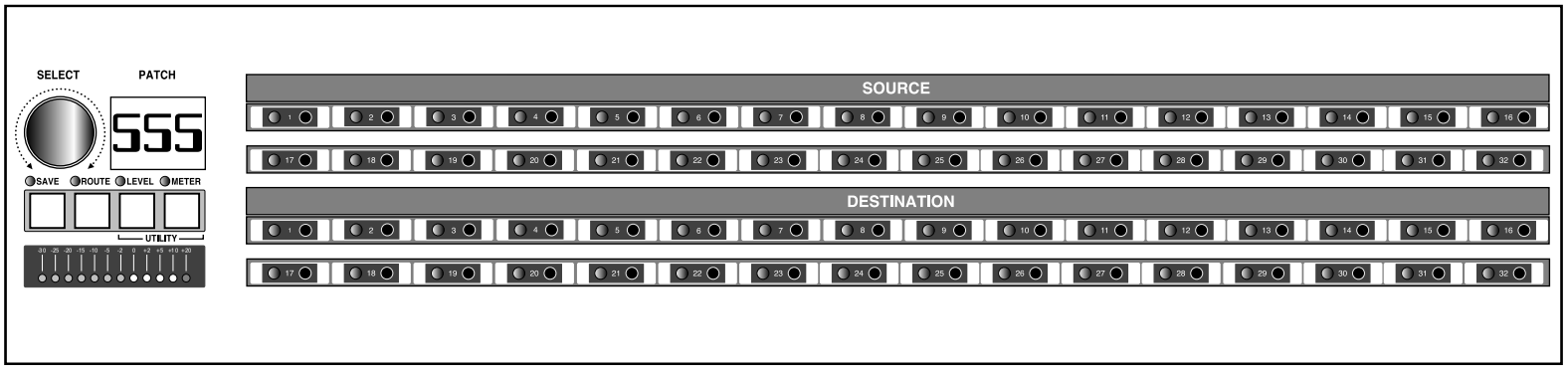


Fig 6.1
Front panel view

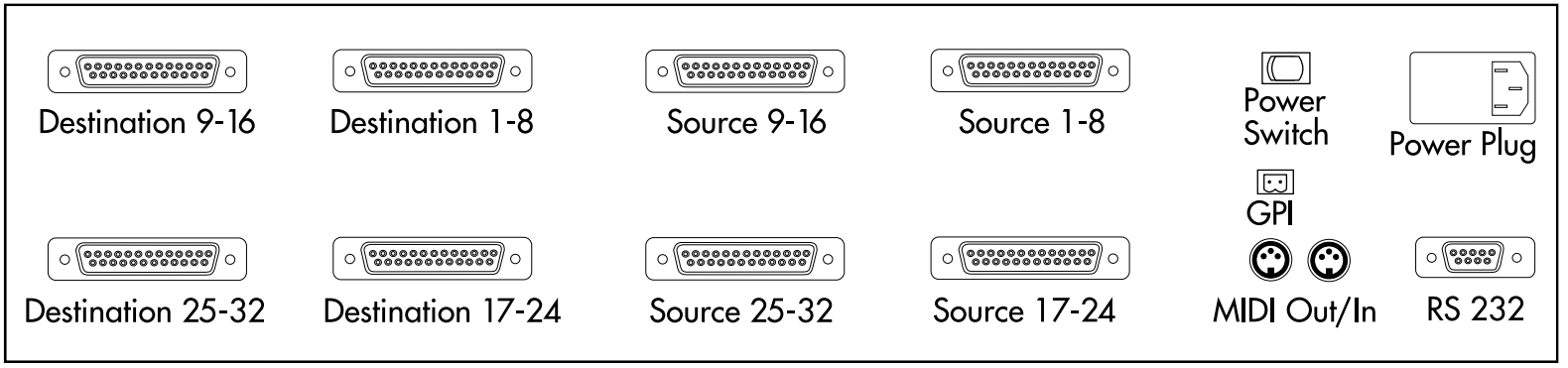


Fig 6.2
Rear panel view

Unlocking the PM64

See Fig 7. 0

In order to gain access to routing, setting levels or utility mode, you first must "unlock" the PM64. The unit powers on with the "Soft Lock" engaged. The two yellow LED's above "Lock" & "Save" will be flashing indicating the unit is locked. To unlock, simply press the two buttons labeled "Save" & "Route" at the same time. Notice that just below these two buttons, the graphic labels the pair as "Lock". The PM64 is now unlocked and you have access to all controls. When you are ready to lock the unit, simply press the same two buttons. The LED's above "Save" & "Route" will now flash indicating the "Soft Lock" is engaged once again.

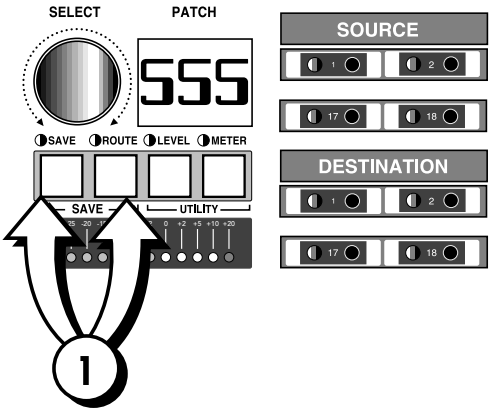


Fig 7.0

Operations available while "Soft Lock" is engaged.

See Fig 7.1

1. Pushing a source or destination switch will show routing already assigned.

2. You can see the level setting already assigned to a source or destination. Press the "level" button to enter LEVEL mode. Now choose the source or destination you wish to examine.

3. You can meter a source or destination. Press the "meter" button to enter METER mode. Now choose the source or destination you wish to examine.

This is a good time to describe the PM64's autoscanning features. This can be done whether the "Soft Lock" is engaged or not. Its purpose is to allow quick review of the operations already stored within the unit. If you press and hold the route, level or meter buttons for more than one second, the unit begins to cycle through the source or destinations (which ever is appropriate for the function) and show their status.

For example, if you press the routing button, the PM64 will light up source #1 and any destinations assigned to that source. The unit will automatically advance to source #2, then #3 and so on until all sources have been examined. When your choice is either Level or Meter, the PM64 will cycle through all sources and destinations and report the desired data automatically.

To stop the scanning mode you can do one of two things. First, simply press the route button once again and the scanning will simply stop - regardless of what function it is scanning for. Second, you can press any source or destination button and the scanning function will go to that choice and give you the specific information being scanned for, but only for that choice.

Finally, you can control the speed of scanning with the rotary control knob. Try it! You'll see what we mean.

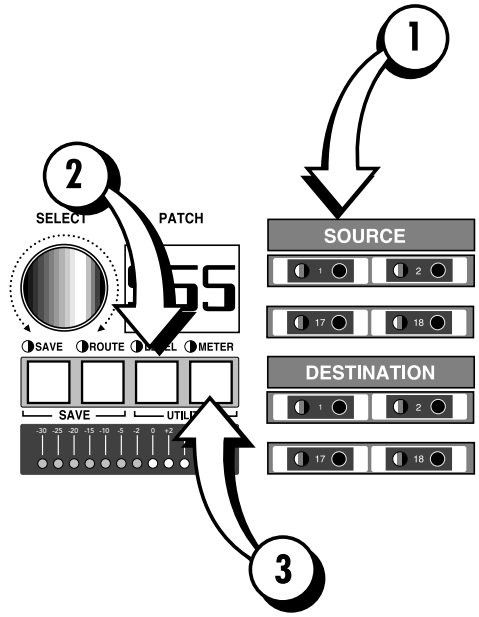


Fig 7.1

Routing:

See Fig 7.2

1. With "Soft Lock" off, choose source first. Press the button on front panel that designates the desired source (button #1 for source # 1, etc,). LED will light up indicating that source is active. The user may choose only 1 mono or 1 stereo source to be routed at this time. Repeat entire routing procedure for each source device.

2. Choose all intended destinations for active source by pressing the button next to each destination channel on front panel. Red LED will light up next to each destination channel chosen indicating that as an active choice. You may choose as many destinations as necessary to assign to the active source. Example: Source 1 is active and it needs to be routed to destinations 1-14. With source 1 chosen, proceed to activate destinations 1-14. Red LEDs for destinations 1-14 should be illuminated at this time.

3. Repeat this procedure for each source. You may not combine multiple sources at the same destination. In order to have multiple sources combine at a common destination, you will have to install a remote mixer at the output device (speaker) and run individual wires from the PM64 to the remote mixer.

Note: If you reroute a destination already in use you may have made a mistake! You will unravel the first routing assignment. To avoid this calamity, "undo" the second routing choice by pressing the rotary control knob, the original routing choices will be restored.

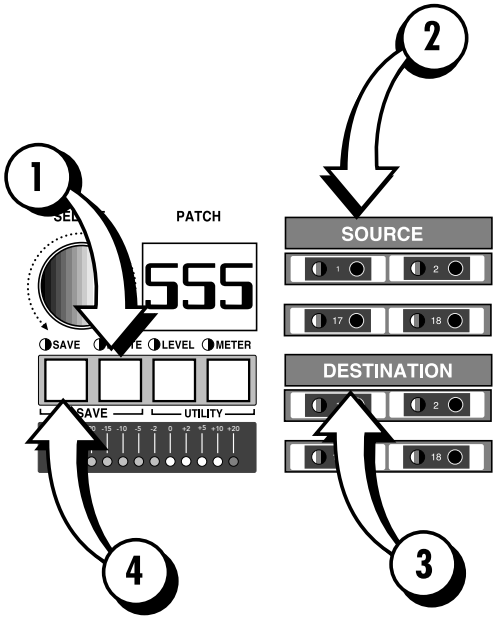


Fig 7.2

Routing Stereo

See Fig 7.3

1. Enter Route Mode .

2. Choose a stereo source. It doesn't matter which of the two source buttons you push, you will have simply chosen a stereo source.

3. Next, choose the destination stereo pair. When you push the left button of the stereo destination pair, you will have created a left to left/right to right route (both LEDs will glow steadily). If you push the right button of the stereo destination pair, the left button LED will start flashing. this indicates you have created a left to right/right to left route.

4. When unit is in operation, any subsequent changes made to routing can also be saved. Be aware that when you save the most recent change, the memory saves ALL routing choices - overwriting previously saved routing information. There is no "undo" function in this procedure, nor is there a "revert to last saved" function, so be sure that routing information is correct before saving.

If you want to create multiple routing maps for use at specific times. It is recommended that the first routing map be saved as a "patch" or program. You can then copy patch 1 make the desired changes and save those changes as patch 2. In this manner, up to 90 routing setups can be saved in the internal memory and recalled when desired.

You can undo any routing changes at anytime before saving by simply pressing the encoder knob to revert to the previously saved setting. Keep in mind that if there is a blinking period in the lower right-hand corner of the numeric display, the PM64 programming has been changed but not yet saved.

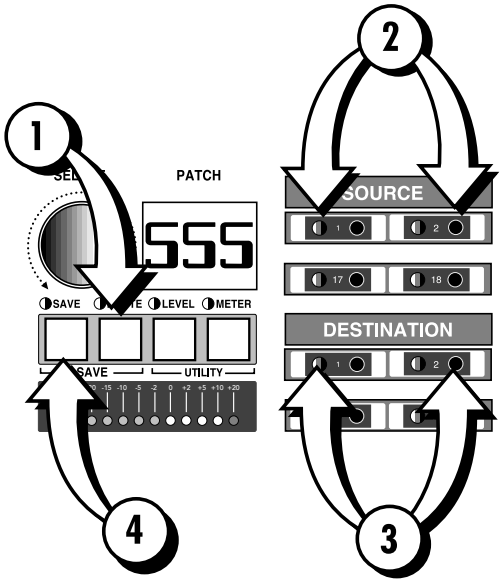


Fig 7.3

Setting Levels:

Audio levels can be addressed for both source and destination. Source level changes affect all destinations routed to that source. Destination level changes only affect the destination (specific). You can change the level on only one source or one destination at a time. You can undo any level changes at anytime before saving. Simply press the encoder knob to revert to the previously saved setting.

See Fig 7.4

To make source level changes, first unlock the PM64.

1. Choose the source to be adjusted. You do this by pressing the appropriate source button on front panel, the LED will light up indicating the source is active.

2. Then press the "level" button on the front panel. The numerical display will show the current level setting in relative decibels from -96 to +10.

3. To change the level, simply rotate the encoder knob until the desired level is chosen. Note that by simply rotating the encoder knob you will change levels in 1 dB increments. By pressing and rotating encoder knob, levels will change in 10 dB increments for mono destinations.

4. Once you have made the change, save that to memory by pressing the "save" button.

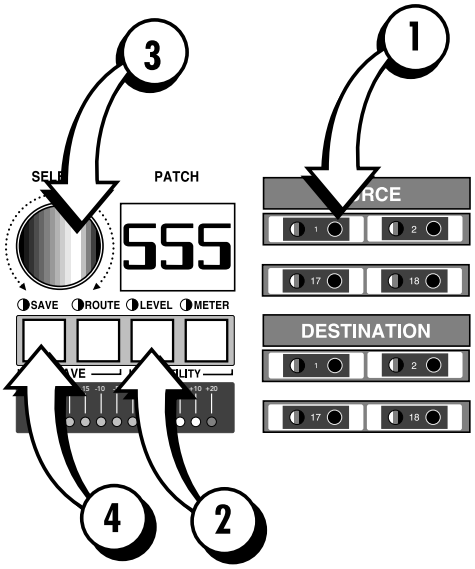


Fig 7.4

See Fig 7.5

1. To make changes to destination levels, first press the "level" button on front panel.

2. Then choose the specific destination by pressing the appropriate destination button on front panel. The numerical readout will indicate current level for that destination.

3. To change the level, simply rotate the encoder knob until the desired level is chosen. Note that by simply rotating the encoder knob you will change levels in 1 dB increments. By pressing and rotating encoder knob, levels will change in 10 dB increments.

4. Once you have made the change, save that to memory by pressing the "save" button.

In the event that it is a stereo source or destination, you will know that because if source one is a stereo source, by pressing button #1, button #2 will also illuminate. the same holds true for destinations. When you press then rotate the encoder knob, you will be adjusting stereo balance between left and right channels of the destination.

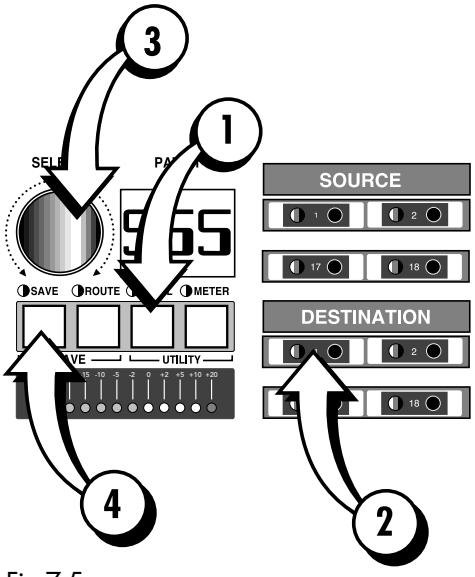


Fig 7.5

Save

See Fig 7.6

Save program data to the PM64's internal memories by pressing the "save" button on front panel once. This enters the "save" mode. To actually commit the parameters to memory, you must press the "save" button a second time to execute the "save" function. It is not necessary to save each time you route or adjust an individual parameter - simply save once at the end of the entire editing procedure.

When you first press the "save" button, two things will happen;

1. The yellow LED next to the "save" button will be flashing and

2. The numerical display will have the letter "P" in the first position and the program number (1-90) in the other position.

3. Rotate the encoder knob to select the desired memory location for storing these settings.

4. Then simply press the "save" button once again and you will have memorized them.

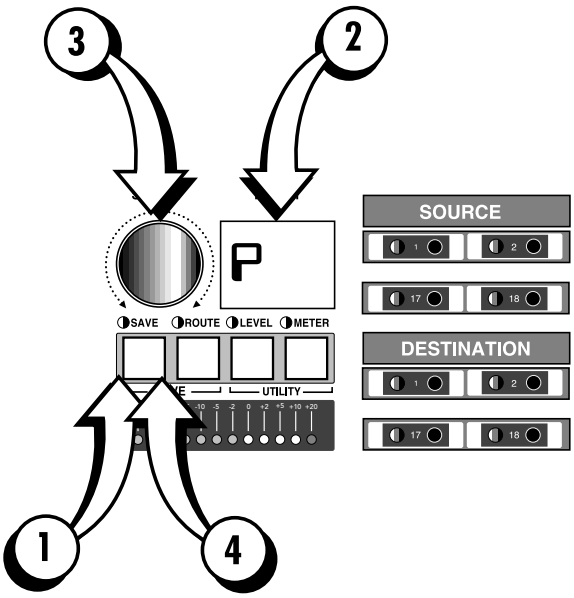


Fig 7.6

When unit is in operation, any subsequent changes can also be saved. Be aware that when you save the change, the memory saves ALL choices - overwriting previously saved information. There is no "undo" function at this point in the procedure, nor is there a "revert to last saved" function, so be sure that information is correct before saving.

Exit "Save"

See Fig 7.7

If you want to exit "save" mode without actually saving, press any of the other 3 command buttons or press the rotatry encoder knob and you will exit the "save" mode and undo all changes made to the program.

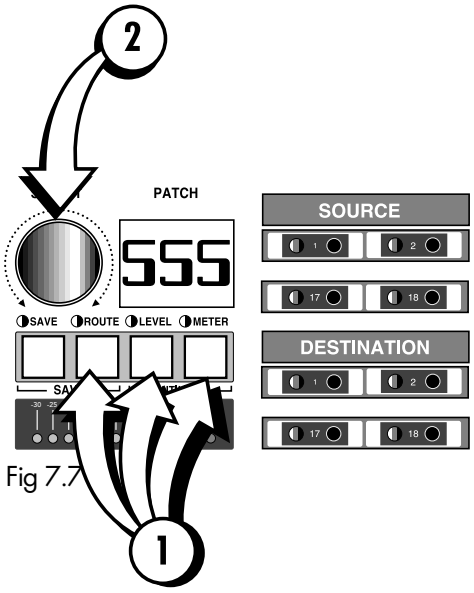


Fig 7.7

Metering:

See Fig 7.8

Metering can be addressed for both source and destination. You can meter only one source or one destination at a time.

When you are monitoring a source, you are seeing the raw input signal before any control of levels. When you are monitoring a destination, you are seeing the final result of all routing, and level settings (see block diagram).

1. To monitor a source or destination, choose the desired source or destination first.

2. Now press the control button labeled "meter". the display will now give the readout for that choice.

If source or destination is stereo, meters only reference one channel at a time. The meter cannot monitor both left and right channel at the same time.Fine meter mode works only on sources.

3. While in meter mode and metering sources, press the rotary control knob and "FIN" will appear in numeric display. The meter will now become 1/4 dB accurate around zero dB. If only the -30 or +20 light illuminates then that indicates signal is off the scale.

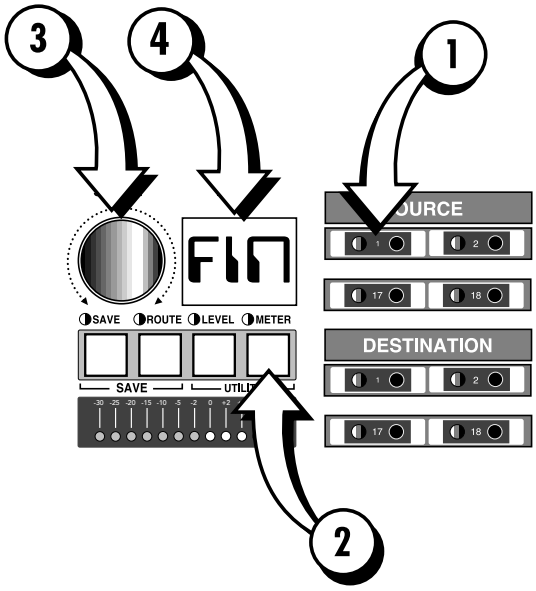


Fig 7.8

Undo

See Fig 7.9

Remember, when you are in any of the command modes (route, utility or level) and you make some changes but decide you don't wish to save those changes, you can undo those changes by simply pressing the encoder knob before you have pressed the "save" button the second time. This will undo the changes you have just made and return the program memory to the previously saved settings.

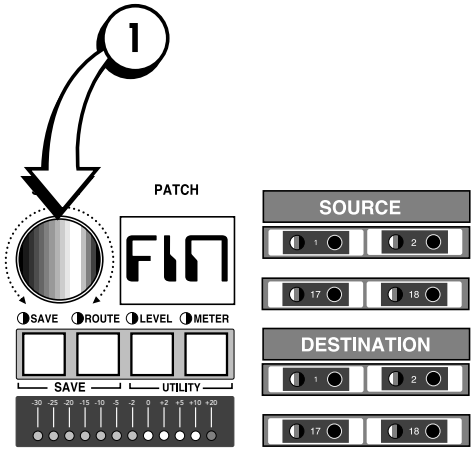


Fig 7.9

Quick Tricks

When you just want to clear the boards - there are a few shortcuts to speed up the process.

While not in Route, level or meter mode, you can do the following;

1. If you want to . . . . Clear all routing assignments. Press and hold the rotary control knob then push the route button - you will clear all current routing information.

2. If you want to . . . . Normalize all level settings. Press and hold the rotary control knob then push the level button - you will set all mono level to unity gain and all stereo levels to unity gain/pan center.

3. If you want to . . . . Clear the MIDI patch map. Press and hold the rotary control knob then push the meter button - you will clear the MIDI patch map.

If you have executed one of these quick tricks by mistake and want to back up, simply push and release the rotary control knob once to undo the quick trick. You will have restored the information.

4. Now if you want to reset the machine to factory default - just like it was when you opened the box, do the following; 1. Hold down all four control knobs and the push the rotary control when you power the unit up. You now have a clean PM64. There is no undo function. Once its clean - its clean.

5. Now if you want to erase all 90 program memories - do the following; 1. Hold down all four control knobs when you power the unit up. You have erased all 90 program memories. There is no undo function. Once its clean - its clean.

Utility Mode

See Fig 7.10

Utility mode is where you determine the manner in which the unit will operate. Menu choices under Utility Mode are: A. Create Patch Map, B. Create Stereo Pairs, C. Set Master/Slave, D. Set Device Number, E. Set Locks.

1. First, disengage the "Soft Lock".

2. Now, press both "Level & Meter" buttons at the same time. The graphic just below the buttons identifies them as "Util". Now both LED's above the buttons will be flashing, indicating you are in utility mode. To select a menu choice once you are in utility mode, press the rotary control knob. Each time you press and then release the rotary control knob, the next menu selection will appear in the numeric display.

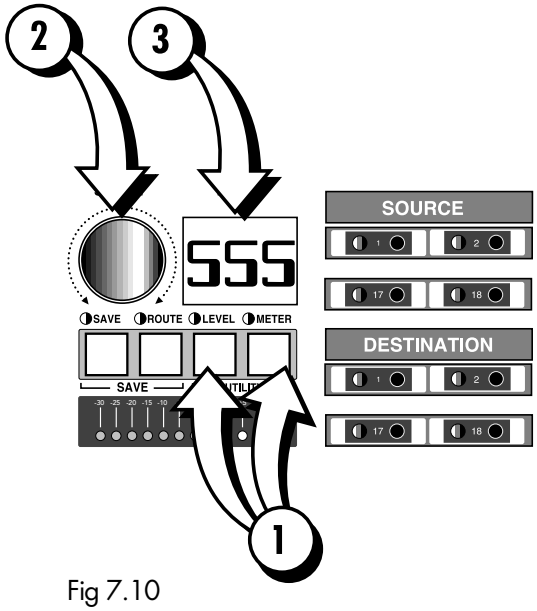


Fig 7.10

1. Create Patch Map

See Fig 7.11

Shows as NAP in numeric display. Sources #1 - 16 will begin flashing. Each source light corresponds to a MIDI channel.

1. Press source button #1 and the numeric display will show its status.

2. If "Off", press rotary control knob to turn on. Rotate the knob until the desired MIDI command appears in the numeric display.

4. Go on to Source #2 and repeat the assignment procedure. Once you have made all your assignments, save this information before exiting utility mode.

*Note: If there is a blinking period in the lower right-hand corner of the numeric display once you have exited utility mode, it means you have changed the patch map but have not yet saved the change. You will loose any changes at this point if the unit powers down for any reason and you have not executed the save function.

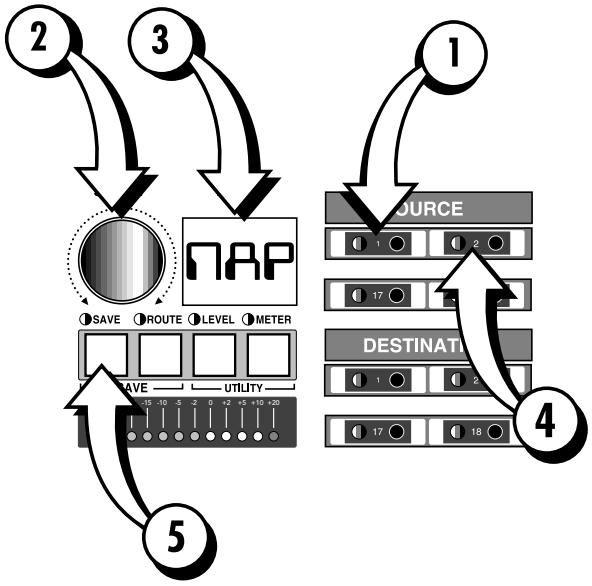


Fig 7.11

2. Stereo Pairs

See Fig 7.12

Shows as STE in the numeric display. Factory default is no stereo pairs assigned.

1. Choose source #1 and then source #2 by pressing button and causing the LED to light up.

2. Then push the rotary control knob and they will be designated as a stereo pair.

3. To confirm assignment, press source #1 - #2 will also light up indicating they are now a stereo pair. Repeat this procedure until all desired stereo pairs are assigned.

4. This procedure applies to destinations as well as sources. This command is a global command and is independent of all other parameters.

TWO WARNINGS! First, only adjacent #'s can be assigned as stereo pairs. ie: you can assign #1 & #2 as a stereo pair, you cannot assign #1 & #3 as a stereo pair. Second, stereo sources can only be assigned to stereo destinations.

Really great time saver! When you assign stereo pairs, the factory default levels are for mono devices. Rather than mess with levels and panning for each assignment, wait until all stereo pairs have created, then execute Quick Trick #5. You will have set levels to unity gain and panned all pairs to center plus, you will clear all 90 program memories.

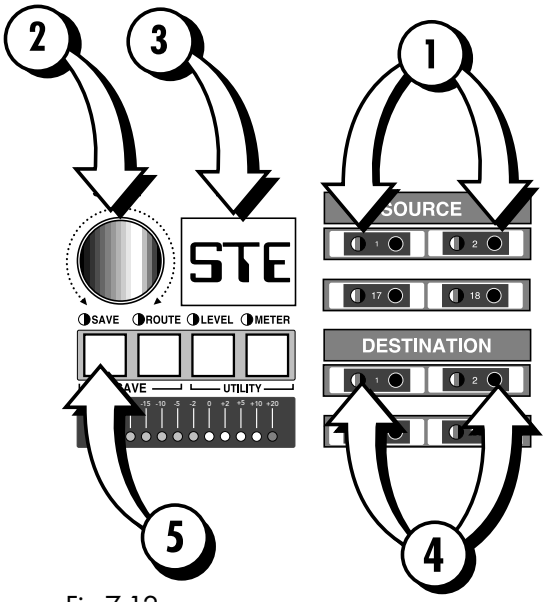


Fig 7.12

3. Mater/Slave

See Fig 7.13

Shows as either NST or SLV in numeric display. Simply turn the rotary control knob until the desired choice appears in the numeric display. Since several PM64's can be joined together to form a large system, the first unit in the chain must be master and all following units must be slave. Be aware that all set up procedures such as assigning, routing or stereo pairs must still be executed on each unit in the chain. Once the system is setup, you can control all units in the chain via the master's rotary control knob or the host computer.

When the PM64's are locked you can preview program memories. When units are unlocked, you can preview and recall program memories. This allows you to operate all the units in the chain from the master's rotary control knob.

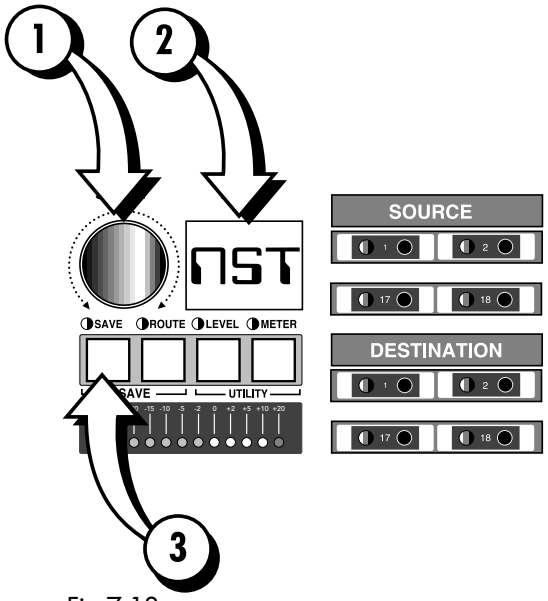


Fig 7.13

4. Meter Sensitivity

See Fig 7.14

1. In Utility Mode, push rotary control knob until "sen" scrolls through the numeric display.

2. At this point - turn the rotary control knob and the choices "+ 4" or "-10" will appear.

3. Make your choice now and then exit utility mode by pressing the two buttons labeled "Level" and "Meter".

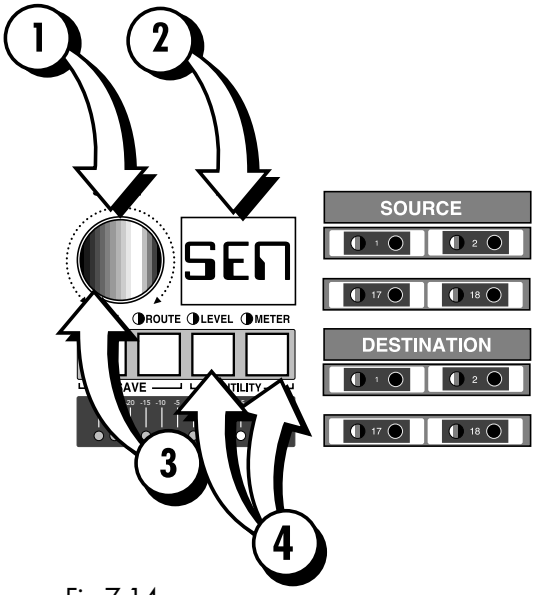


Fig 7.14

5. Set Locks
See Fig 7.15

These are the "One Patch Lockout" and "Overall Lockout".

1. In Utility Mode, push rotary control knob until "loc" scrolls through the numeric display.

3. At this point - turn the rotary control knob and the choices "Off", "One" or "All" will appear.

4. Make your choice now and then exit utility mode by pressing the two buttons labeled "Level" and "Meter".

*Note: Regarding saving this information, in utility mode - only patch maps must be manually saved. All other programing information is automatically saved at the time the choice is made.

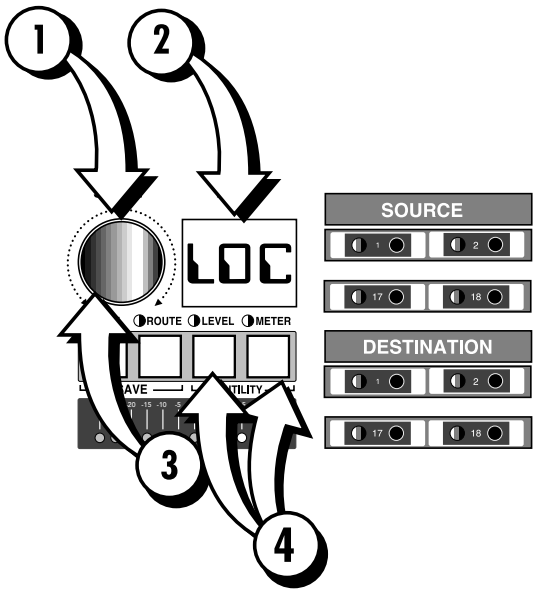


Fig 7.15

Multiple Units

Network with RS 232 host communication
See Fig 8.1

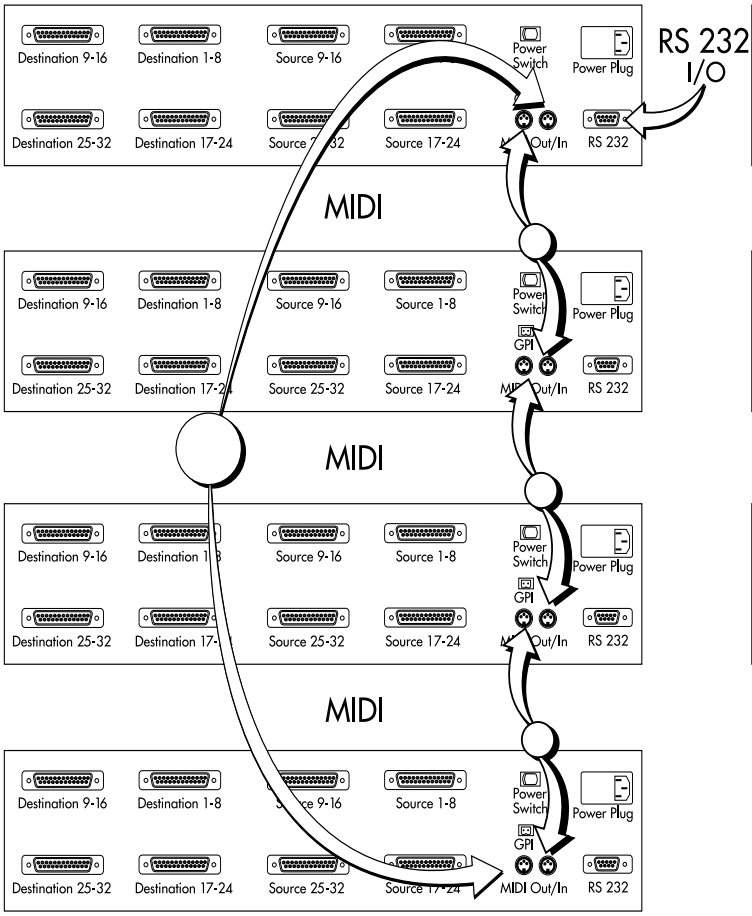


Fig 8.1

Network with MID host communication
See Fig 8.2

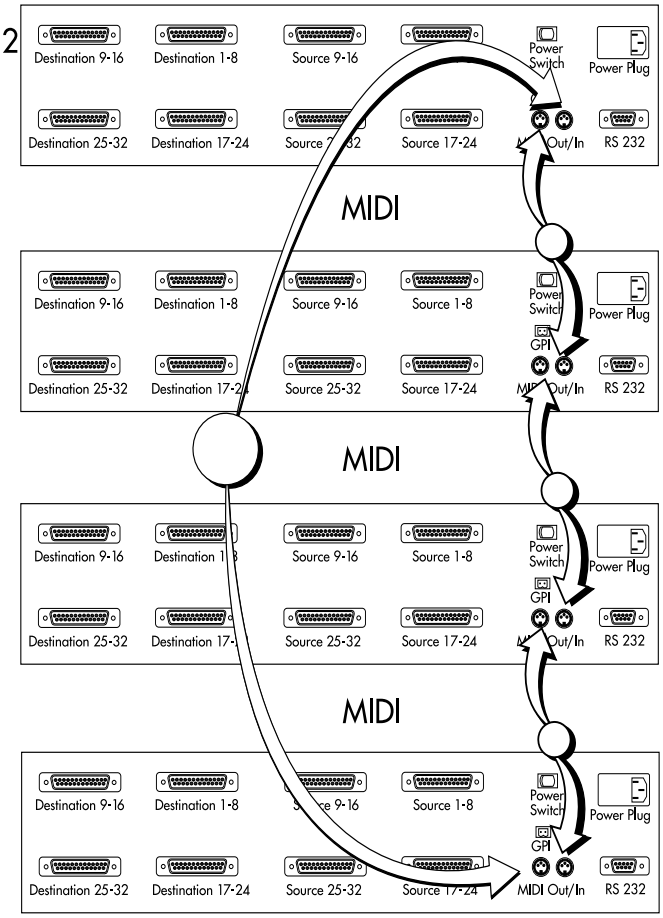


Fig 8.2

Connecting Input Devices
(referred to as "sources").

Mono Input Devices (source)
Using terminal block connector (part # DB8, see Fig 9.1).

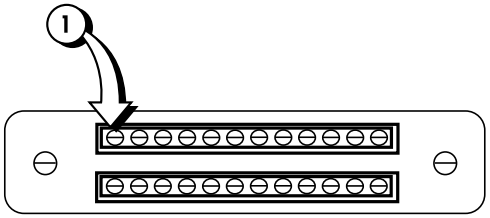


Fig 9.1

1. Strip insulation to expose 1/8" of wire. If wire is multi-strand, gently twist wire to form clean bundle.

2. Insert wire into desired pin number screw-down terminal and tighten screw until wire is firmly secured.

3. Repeat procedure until all input devices are secured in terminal blocks. Keep track of which device is wired into a specific pin number in order to store this information in the device's memory.

Stereo Input Devices (source)
Using terminal block connector (part # DB8, see Fig 9.3).

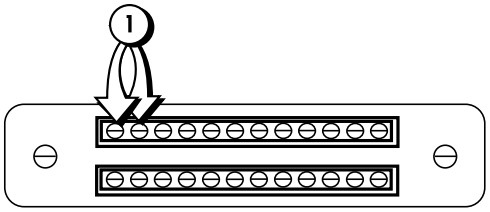


Fig 9.3

1. Start with Left channel of input device. Strip insulation to expose 1/8" of wire. If wire is multi-strand, gently twist wire to form clean bundle.

2. Insert wire into desired pin number screw-down terminal and tighten screw until wire is firmly secured.

3. Repeat procedure with right channel of input device using the adjacent pin in terminal block. It is recommended that you use the odd-numbered pin for left channel and the next higher even-numbered pin for the right channel.

4. Repeat procedure until all input devices are secured in terminal blocks. Keep track of which device is wired into a specific pin number in order to store this information in the device's memory.

Connecting Output Devices
(referred to as "destinations").

Mono Output Devices (destinations)
Using terminal block connector (part # DB8, see Fig 9.2).

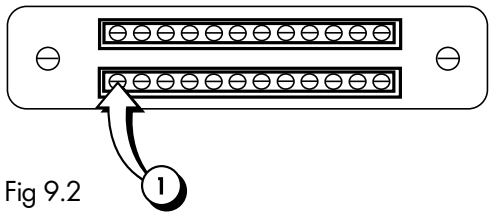


Fig 9.2

1. Strip insulation to expose 1/8" of wire. If wire is multi-strand, gently twist wire to form clean

2. Insert wire into desired pin number screw-down terminal and tighten screw until wire is firmly secured.

3. Repeat procedure until all input devices are secured in terminal blocks. Keep track of which device is wired into a specific pin number in order to store this information in the device's memory.

Stereo Output Devices (destination)
Using terminal block connector (part # DB8, see Fig 9.4).

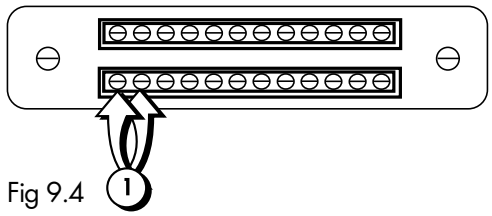


Fig 9.4

1. Start with Left channel of output device (destination). Strip insulation to expose 1/8" of wire. If wire is multi-strand, gently twist wire to form clean bundle.

2. Insert wire into desired pin number screw-down terminal and tighten screw until wire is firmly secured.

3. Repeat procedure with right channel of output device (destination) using the adjacent pin in terminal block. It is recommended that you use the odd-numbered pin for left channel and the next higher even-numbered pin for the right channel.

4. Repeat procedure until all output devices are secured in terminal blocks. Keep track of which device is wired into a specific pin number in order to store this information in the device's memory.

Troubleshooting

Installation Troubleshooting

Problem 1:
Input (source) reads 6dB below known input level.

Resolution: Input has only 1 phase present. Check the PM-64 input wiring or wiring at driving end for missing phase.

Problem 2:
Output at receiving device reads 6 dB below where it should.

Resolution: Output has only 1 phase present. Check the PM-64 input wiring or wiring at driving end for missing phase.

Problem 3:
Output at receiving device reads 12 dB below where it should.

Resolution: PM-64 input has only 1 phase present (check as in problem 1). Additionally, output has only 1 phase present. Check the PM-64 output wiring for missing phase.

Problem 4:
Destination output is out of phase.

Resolution: Plus and minus phase wiring is reversed at either source input or destination output. If the source wiring is the problem, then any (all) destination(s) assigned to that source will also be out of phase. If only that destination wiring is out of phase, only that destination output is wired incorrectly. Refer to the PM-64 rear panel for proper pin connections. If you are using the TS-8 terminal adaptors, the refer to the pinout designation of the adjacent terminals.

Problem 5:
Output at receiving device is lacking high frequency content.

Resolution: Check for excessively long or defective input/output cables. The PM-64 is capable of driving up to 500 ft. of most balanced audio cables (20 pf/ft) with no appreciable loss of high frequency loss. Consult the owners' manual of the device driving the PM-64 inputs for its drive capabilities.

Problem 6:
Output at receiving device is lacking in low frequency content.

Resolution: Check for bad connections at the PM-64's inputs/outputs. Bad outputs can act like series capacitors and cause the cables to act like low-pass filters.

Problem 7:
Output at receiving device has hum present.

Resolution: Check for missing ground connections to the PM-64 audio input and output cables shields. Ideally you should connect the shields at both cable ends for best RF and hum immunity. If you routinely float one end of the shields in your installs, float the shield at the driving end only. Take care to insure minimum voltage differences exist between driving and receiving device AC safety grounds. Use proper low impedance grounding techniques.

Problem 8:
GP input does not activate.

Resolution: Check connections at GP input jack. The GP input is active "Low", and the driving device needs to sink 5 milliamps of current.

Problem 9:
No response from host computer on serial port (RS-232).

Resolution: Check the host application communications preferences for proper baud rate. Check the baud rate in the PM-64 to see that it matches. Adjust either preference so that the baud rate matches.

Problem 10:
No response from host computer on MIDI port.

Resolution: Check the MIDI cable connections. The PM-64 MIDI port should be connected to the MIDI interface "MIDI OUT" jack. The PM-64 "MIDI OUTPUT" should be connected to the MIDI interface "MIDI INPUT".
GP input does not activate.

Operation Troubleshooting:

Problem 1:
Input (source) is active on meter but no sound output is detected at required destination.

Resolution: Select "meter mode" and meter destination in question. If the meter is active, then check cabling or destination device. If meter is not active, deselect "meter mode" and press destination switch. The source driving that destination should illuminate. If none illuminates, then use "route mode" to send audio to that destination. If routing is ok, press and hold destination switch to see level setting of destination. If too low, then use "level mode" to set level desired at destination. If destination level is ok, press and hold source switch to see level setting of driving device. If too low, then use "level mode" to set input level of source.

Problem 2:
Recalling a program via MIDI recalls the wrong program (memory number is off by 1).

Resolution: The PM-64 uses MIDI programs change number 0-89 to select programs1-90 on the PM-64. Change the MIDI program numbers by 1 in the sending device to match the PM-64's behavior. If this cannot be done, use the PM-64's "save" features to copy all the program memories to one lower location in the PM-64's memory.

Problem 3:
When using the MIDI-PATCH map feature, recalling a program via MIDI to the front panel recalls the wrong programs to external devices.

Resolution: Enter "utility mode" at the MIDI page. All 16 source LEDs will blink. Source switch #'s 1-16 correspond to external devices on MIDI channels 1-16. Select one and its MIDI change number appears in the PM-64 character display if it is indeed selected, otherwise the display will say "OFF". Use the rotary encoder to change the program number. If no change is required, simply push the encoder knob to toggle the function "OFF". If this does not correct the problem, check the external device for its MIDI channel setting.

Problem 4:

When using the MIDI PATCH map feature, recalling a program via MIDI on the front panel of the PM-64 recalls no programs to external device(s).

Resolution: Enter "utility mode" at the MIDI page. All 16 MIDI source LEDs will blink. Source switch #s 1-16 correspond to external devices on MIDI channels 1-16. Select one and its MIDI change number appears in the PM-64 character display (if selected), otherwise it will say "off". Press the rotary encoder to toggle it "on", then rotate the encoder to select desired MIDI program number. If this does not correct the problem, check the external device for its MIDI channel setting.

Midi Implimentation Chart

PM-64 MIDI/RS232 Implementation Chart VI.15

Note: All numbers in hexadecimal unless otherwise noted.
R5232 is 38.4k Baud N, 8,1
Echo = Recieved and Echoed out
Make Master/Slave selection in PM-64 Util Mode
% = Responds only if Soft Lock Off
* = MIDI and RS232

Tx = Transmitted; Rx = Received
N = Channel from 0 to F
Echoinc = Recieved and Echoed on MIDI channel + 1

*Master/Slave	Message	Tx/Rx/Echo/Echoinc	Message Structure
*Master/Slave	Soft Lock Off	Rx	BN-60-00
*Master/Slave	Soft Lock On	Rx	BN-60-01
*Master/Slave	Route Mode	Rx	BN-60-02
*Master/Slave	Level Mode	Rx	BN-60-03
*Master/Slave	Meter Mode	Rx	BN-60-04
*Master/Slave	Mode Off	Rx	BN-60-05
*Master/Slave	Lock Mode Read	Rx	BN-6l-7F
*Master/Slave	Hard Locks Off	Rx, Tx	BN-61-00
*Master/Slave	Hard Lock One (locks Memory #1)	Rx,Tx	BN-61-01
*Master/Slave	Hardlock All (Locks Memories 1-90)	Rx, Tx	BN-61-02
*Master/Slave	Select Source	Rx, Tx	BN-62-Source
* % Master/Slave	Destination OFF	Rx, Tx	BN-63-Destination
* % Master/Slave	Destination ON	Rx, Tx	BN-64-Destination
*Master/Slave	Read Source assignments	Rx	BN-65-Source
*Master/Slave	Read Destination Source	Rx	BN-66-Destination
*Master/Slave	Read Source Stereo assignments	Rx	BN-67-Source
*Master/Slave	Source Stereo assignments	Rx, Tx	BN-68-Source
	Note: Source (R) not equal Source (L) + 1 = turn stereo off		BN-68-Source (R)
*Master/Slave	Read Destination Stereo assignments	Rx	BN-69-Destination
*Master/Slave	Destination Stereo assignments	Rx, Tx	BN-6A-Destination (L)
	Note: Destination (R) not equal Destination (L) + 1 = turn stereo off		BN-6A-Destination (R)
*Master/Slave	Read Source Level	Rx0	BN-6B-Source
*Master/Slave	Source Level	Rx, Tx	BN-Source-Level
*Master/Slave	Destination Level	Rx	BN-6C-Destination
*Master/Slave	Destination Level	Rx, Tx	BN-Destination +20-Level
*Master/Slave	Read MIDI Patch Map	Rx	BN-6D-7F
*Master/Slave	MIDI Patch Map	Rx, Tx	BN-6D-00
			BN-6E-Patch (Chan1)
	Note: If Patch = 7F Then it is Off		BN-6E-Patch (Chan2)
			BN-6E-Patch (Chan3)
			...
			BN-6E-Patch (Chan16)
*Master/Slave	Read label	Rx	BN-6F-Source or Destination+20
*Master/Slave	Label	Rx, Tx	BN-Source or Destination+20 CHAR 0
			BN-Source or Destination+20 CHAR 1
			BN-Source or Destination+20 CHAR A
	Note: Char Is ASCII Character		
*Master/Slave	Store current Audio and Patch map Settings to memory	Rx	BN-70-Patch#
*Master	MIDI GPI on	Rx, Tx, Echo	B0-7F-7E
*Master	MIDI GPI off	Rx, Tx, Echo	B0-7F-7F
*Slave	MIDI GPI on	Rx, Echo	B0-7F-7E
*Slave	MIDI GPI off	Rx, Echo	B0-7F-7F
Master Encoder	Push	Tx	B0-7F-7B
Master Encoder	Release - (LOCKED)	Tx	B0-7F-7C
Master Encoder	Release - (UNLOCKED)	Tx	B0-7F-7D

Master Encoder	Rotate	Tx	B0-7F-Patch
*% Master/Slave	PatchChange	Rx	CN-Patch (00 to 59)
Master	PingHi/Lo	Tx	80-00-01/80-00-00
Slave	PingHi/Lo N=Input Ping MIDI Channel	Rx, Echoin	8N-00-01,8(N+1),00,01/

Note: The decimal point on the most significant 7 segment display of a slaved PM-64 is blinked by the ping messages input to it from it's master

Master&Slave	Audio Meter N = MIDI Channel	Rx	AN-Audio Chan-Value

Audio Chan is 00 to 1F for sources and 20 to 3F for destinations.
Value 00 to 0C corresponding to -30, -25,-20,-15,-1 0,-5,-2,0,+2,+5,+1 0,+20

*% Master&Slave Source Level 32 destinations from 00 to 1F	Rx	B0-Source-Level

Sysex Messages:
Note: Header= F0-00-01-0F-00-10
CH is MIDI channel from 00 to 0F

Request all 90 patch memories:	Header - 40 - CH - F7	Rx
Request one patch memory:	Header - 41 - CH - Patch # - F7	Rx
Request current audio settings:	Header - 42 - CH - F7	Rx
Request channel labels:	Header - 43 - CH - F1	Rx
Request stereo assignments:	Header - 44 - CH - F7	Rx
Request system parameters:	Header - 48 - CH - F7	Rx
(One MIDI channel)		
Switch meters on/off:	Header - 49 - CH - State - F7	Rx
State = 00 for Meter Off	State = 01 for Meter On.	State = 02 for meter scan
Request system Parameters:	Header - 7F - 00 - F7	Rx
Any MIDI Channel)		
Patch memory update:	Header - 01-CH - Patch# - Body - F7	Tx, Rx

Wait 1/10 Second between sending these messages.

Switch Matrix Assignments:
Note: Bit 7=0, Bit 6=0, Bit 5=0, Bit 4=0

	Bit 3	Bit 2	Bit 1	Bit 0
Destination 1				
Byte # 0	Source 4	Source 3	Source 2	Source l
Byte # 1	Source 8	Source 7	Source 6	Source 5
Byte # 2	Source 12	Source 11	Source 10	Source 09
Byte # 3	Source 16	Source 15	Source 14	Source 13
Destination 2				
Byte # 4	Source 4	Source 3	Source 2	Source 1
Byte # 5	Source 8	Source 7	Source 6	Source 5
Byte # 6	Source 12	Source 11	Source 10	Source 09
Byte # 7	Source 6	Source 15	Source 14	Source 13
Destination 32				
Byte # 124	Source 4	Source 3	Source 2	Source l
Byte # 125	Source 8	Source 7	Source 6	Source 5
Byte # 126	Source 12	Source 11	Source 10	Source 09
Byte # 121	Source 16	Source 15	Source 14	Source 13
Destination 1				
Byte # 128	Source 20	Source 19	Source 18	Source 11
Byte # 129	Source 24	Source 23	Source 22	Source 21
Byte # 130	Source 28	Source 27	Source 26	Source 25
Byte # 131	Source 32	Source 31	Source 30	Source 29
Destination 2				
Byte # 132	Source 20	Source 19	Source 18	Source 17
Byte # 133	Source 24	Source 23	Source 22	Source 21
Byte # 134	Source 28	Source 27	Source 26	Source 25
Byte # 135	Source 32	Source 31	Source 30	Source 29
...	...	...	...	...

Midi Implimentation Chart

Destination 32

Byte # 252	Source 20	Source 19	Source 18	Source 17
Byte # 253	Source 24	Source 23	Source 22	Source 21
Byte # 254	Source 28	Source 27	Source 26	Source 25
Byte # 255	Source 32	Source 31	Source 30	Source 29

Source Levels: Note: 60 is Unity Gain, 6A is +lOdB Gain

Byte # 256	Source 1 level from 00 to 6A
Byte # 257	Source 2 level from 00 to 6A
Byte # 288	Source 32 level from 00 to 6A
...	
Byte # 322	Low Nibble Patch # to send out on MIDI Channel 1
Byte # 323	High Nibble Patch # to send out on MIDI Channel 1
Byte # 324	Low Nibble Patch # to send out on MIDI Channel 2
Byte # 325	High Nibble Patch # to send out on MIDI Channel 2l
Byte # 360	Low Nibble Patch # to send out on MIDI Channel 16
Byte # 361	High Nibble Patch # to send out on MIDI Channel 16

Current audio settings: Header - 02 - CH - 00 - Body - F7 Rx, Tx
Where Body includes the some as above.

Source/Destination Labels: Header - 03 - CH - 00 - Labels - F7

Where Labels includes:

Source l	10 ASCII Characters
Source 2	10 ASCII Characters
...	
Source 32	10 ASCII Characters
Destination 1	10 ASCII Characters
Destination 2	10 ASCII Characters
...	
Destination 32	10 ASCII Characters

Stereo Assignments:
Header- 04- CH -Stereo- F7 Rx, Tx

Where Stereo includes:
Note: Both nibbles = OF means not assigned stereo.

Byte # (Decimal)		
Byte # 0	Low Nibble of Source 1 Stereo Pair.	01H or OFH
Byte # l	High Nibble of Source 1 Stereo Pair	OOH or OFH
Byte # 2	Low Nibble of Source 2 Stereo Pair.	OOH or OFH
Byte # 3	High Nibble of Source 2 Stereo Pair.	OOH or OFH
Byte # 4	Low Nibble of Source 3 Stereo Pair.	03H or OFH
Byte # 5	High Nibble of Source 3 Stereo Pair.	OOH or OFH
Byte # 6	Low Nibble of Source 4 Stereo Pair.	02H or OFH
Byte # 7	High Nibble of Source 4 Stereo Pair.	OOH or OFH
...		

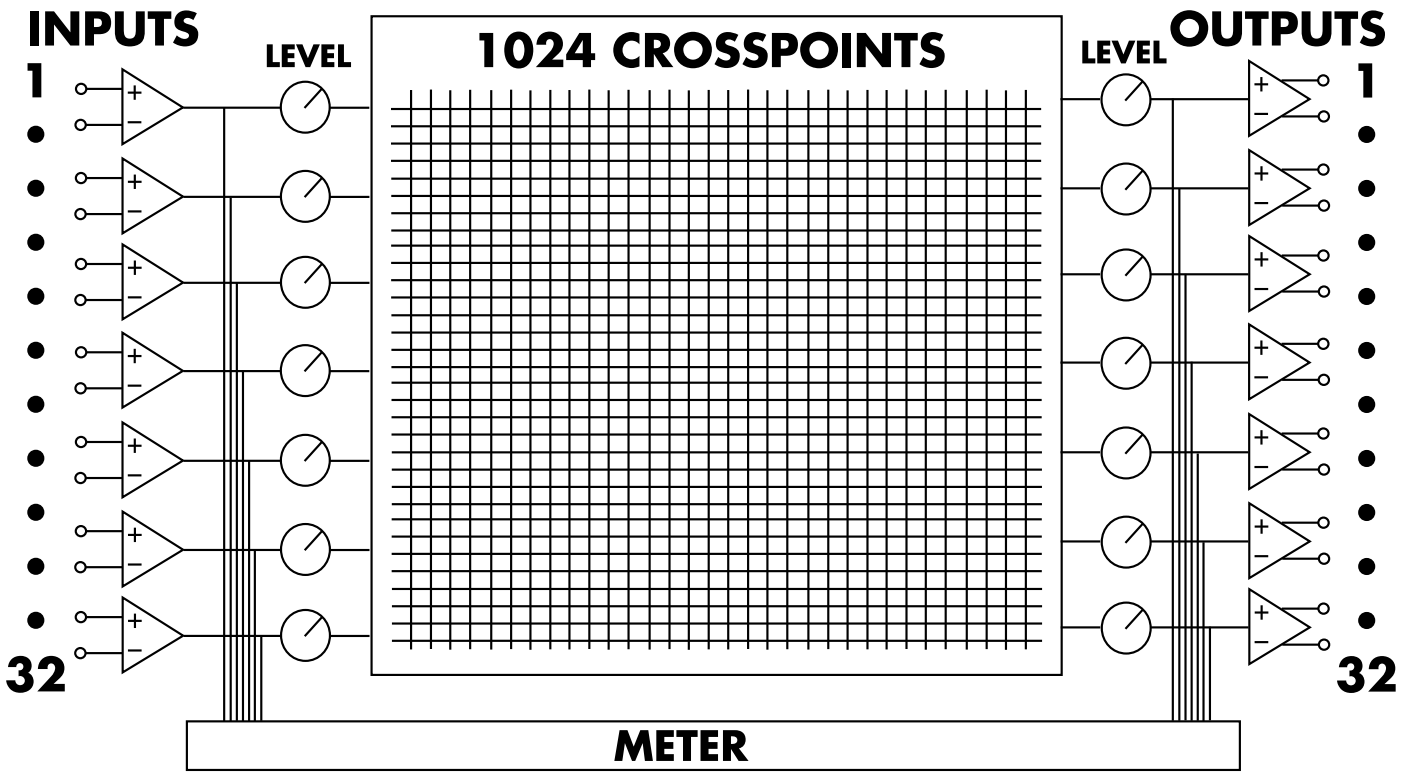
Byte # 60	Low Nibble of Source 31 Stereo Pair.	0FH or 0FH
Byte # 61	High Nibble of Source 31 Stereo Pair.	01H or 0FH
Byte # 62	Low Nibble of Source 32 Stereo Pair.	0EH or 0FH
Byte # 63	High Nibble of Source 32 Stereo Pair.	01H or 0FH
Byte # 64	Low Nibble of Destination 1 Stereo Pair.	01H or 0FH
Byte # 65	High Nibble of Destination 1 Stereo Pair.	00H or 0FH
Byte # 66	Low Nibble of Destination 2 Stereo Pair.	00H or 0FH
Byte # 67	High Nibble of Destination 2 Stereo Pair.	00H or 0FH
Byte # 68	Low Nibble of Source 3 Stereo Pair.	03H or 0FH
Byte # 69	High Nibble of Source 3 Stereo Pair.	00H or 0FH
Byte # 70	low Nibble of Source 4 Stereo Pair.	02H or 0FH
Byte # 71	High Nibble of Source 4 Stereo Pair.	00H or 0FH
...		
Byte # 124	Low Nibble of Destination 31 Stereo Pair.	0FH or 0FF
Byte # 125	High Nibble of Destination 31 Stereo Pair.	01H or 0FH
Byte # 126	Low Nibble of Destination 32 Stereo Pair.	0EH or 0FH
Byte # 127	High Nibble of Destination 32 Stereo Pair.	01H or 0FH

System Parameters: Header - 08 - Params - F7 Rx, Tx

Where Params includes:

Byte # 0	MIDIChannel 00-0F
Byte # 1	Lock type 0 = Off, 01= One, 02=All
Byte # 2	Autoscan time 08 (fast)- AF (slow)
Byte # 3	102 (Fixed)
Byte # 4	System Flags Bit # 0 is Master/Slave status. 0 = Master, 1 = Slave Meter sensitivity is Bit #1. 0 = +4 dBv, 1 = -10 dBu.

Schematic PM64



Meter Range: -30 dB to +20 dB with 12 Meter LED's at -30, -25, -20, -15, -10, -5, -2, 0, +2, +5, +10, +20.
Calibration Mode shows input levels with +/- 1/4 dB accuracy around 0 dB.
Meter sensitivity can be set at either +4 dBv or -10 dBu.

Program Memory: 90 programs stored in nonvolatile memory. Each program stores routing info, 32 input levels and 32 output levels and 16 Channel MIDI Patch Map. Input and Output labels are also stored internally in nonvolatile memory.

MIDI Patch Mapping: Each of the 90 programs can be mapped to send up to 16 MIDI patch change commands to other devices in the MIDI chain.

Bandwidth: 2 Hz to 120 kHz (-3dB)
Dynamic Range: 119 dB.

Noise Floor: -92 dBV (20 Hz - 20 kHz)

Maximum Input/Output: +27 dBV. (Balanced)

Distortion: .004% THD + N @ 1 kHz,

Crosstalk: Any channel to any other channel: -70 dB at 10 kHz.

Connectors: Gold plated DB25 Female connectors for each 8 inputs/outputs (uses standard Tascam pinout) and (optional) terminal strip adaptors for custom installations (point to point wiring).

Inputs: Electronically balanced with >40 dB common mode rejection.
40 kOhm input impedance.

Outputs: Electronically balanced with 200 ohm output impedance. All outputs are "Phantom" power protected.

Com Ports:
1.) Standard RS-232 serial data port on DB9 male connector. Baud rate is 38.4 k.

2.) MIDI input/output port
Power on Patch #1

Power Input: 103 - 130 volts or 208-252 volts AC. 50/60 Hz, 22 watts. Built in line filter with external 110/220 selector and fuse.

Dimensions: 3.5" by 19" by 9.5" (HxWxD) steel chassis with clear zinc coating

Weight: 9 pounds net.

Materials: All circuit boards are epoxy glass FR-4 with 94-V0 flame retardant rating. Power transformers are to U.L., C.S.A., and V.D.E. standards. All AC components are U.L. recognized.

Origin: Made in the USA.