

Using Waves MultiRack SoundGrid with Yamaha Digital Mixers



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1.0 The Possibilities

The following range of Yamaha digital mixers have the ability to interface with the Waves WSG-Y16 card and to remotely control the plug-ins of Waves MultiRack SoundGrid:

- CL5, CL3, CL1
- PM5D
- M7CL
- LS9
- DM2000, DM1000
- 02R96, 01V96, 01V96i

MultiRack SoundGrid enables a large range of interesting and innovative, creative and classic plug-ins to be used along side the full range of Yamaha's professional digital mixers. The SoundGrid system provides the type of reliability, high performance and low latency processing that Yamaha users are already familiar with, while the Waves plug-ins bring industry standard and familiar studio production tools to tours, festivals and other live events around the world.





The plug-ins are processed by a dedicated server to ensure low latency and reliable processing, while the control software is run on a separate PC (Windows or Mac). The Yamaha Mixer, however, is able to host the audio interface and provide some useful remote control functions: using either a simple MIDI connection or a USB cable, the faders, encoders and switches of the mixers can be used to navigate between plug-ins, edit parameters (as shown on the left) and recall MultiRack Snapshots.

Please refer to the Yamaha product manuals for specific details about the mixers, and the Waves manuals for specific details about MultiRack SoundGrid.

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Meanwhile, this guide suggests how best to integrate the two, focusing on the available MIDI remote control functions. It assumes the reader has already gained a basic level of knowledge and experience with each individual product.

2.0 Equipment List

2.1 Hardware

- 1. *Waves WSG-Y16 card*: The WSG-Y16 mini-YGDAI card will stream Audio in and out of a Yamaha console: 16 channels at 44.1/48 kHz or 8 channels at 88.2/96 kHz. Two cards can be used to double the channel count.
- 2. *Waves qualified SoundGrid Server*: A multi-core PC used for realtime audio processing. See a list of Waves-qualified servers at <u>http://www.waveslive.com/html/soundgrid-server.aspx</u>
- 3. Want redundancy? Get a second server...
- 4. **Network switch**: standard off-the-shelf Gigabit switch. See a list of Waves-qualified switches at <u>http://www.waveslive.com/html/soundgrid-switches.aspx</u>
- Desktop/Laptop host computer: A computer used for running the MultiRack SoundGrid software. Use any PC or Mac Dual Core 2GHz or higher.
- USB Flash Drive (optional): The USB key holds the licenses for the Waves V9 plugins and provides activated licenses on-the-go. Alternatively the host computer's hard drive can be authorized through the Waves License Center.
- 7. **CAT6/CAT5e network cables**: Used to connect all SoundGrid units. Between 3 and 5 cables are required, depending upon the system size. Available at a local computer store.
- 8. (*MIDI Controller + MIDI cable* optional if direct control from the console is not used).

2.2 Software and Licenses

- 1. *MutiRack SoundGrid*: Free with WSG-Y16 Card.
- 2. **SoundGrid Server Software**: Free and Pre-installed with Waves SoundGrid Server One, or available for purchase if an off-the-shelf server is used.
- 3. **Sound Grid enabler**: (license) either supplied with WSG-Y16, or available from <u>http://www.waveslive.com/html/soundgrid-for-yamaha.aspx</u>.
- 4. *Waves Plug-ins*: see a list of SoundGrid-compatible plug-ins at http://www.waveslive.com/html/all-plugins.aspx .

2.3 Software Authorization and Installation

Insert the Waves installation DVD to the host computer, and start the installation by double-clicking the Waves icon. Select the following options from the installation menu:

- MultiRack SoundGrid Application: this is the Waves host software required to run Waves plugins.
- SoundGrid Driver: an ASIO/Core Audio driver for PC/Mac. This driver is required for recording and playback with DAW software on the hose computer. Installation is optional.
- All SoundGrid compatible plugins.
- WLC (Waves License Center): this will manage the licenses for the Waves plugins. The licenses can be authorized on a USB flash drive or on the host computer's hard drive.

When installation is complete, restart the computer.

To authorize the plugins, launch Waves License Center with the host computer connected to the internet. Activation instructions are available here: <u>http://www.wavesupport.net/content.aspx?id=4074</u>. For more information about Waves License Center, visit <u>http://www.wavesupport.net/content.aspx?id=4219</u>.

Note:

V9 licenses can be activated on a USB flash drive or the host computer's hard drive, while V8 licenses can only be activated on an iLok key.

3.0 Hardware Setup

1. Before installing the WSG-Y16 into the Yamaha mixer, check the DIP switches on the card:







DIP Switch 1 On: 88.2/96 kHz

- 2. While the mixer is powered off, insert the WSG-Y16 card into any available mini-YGDAI slot.
- 3. Power on the mixer, and set its Word Clock to the required sample-rate. Note that the Yamaha mixer will provide Word Clock to the SoundGrid network.
 - a. If 44.1 or 48kHz is used, make sure the input and output format of the slot is either set to "SINGLE" or is blank.
 - b. If 88.2 or 96kHz is used, set the input and output format of the slot to "DOUBLE SPEED".
- 4. Connect the WSG-Y16 card(s) and SG Server(s) to the network switch using CAT5e or CAT6 cables.

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5. Connect the host computer (with MultiRack SG for Yamaha installed) to the network switch using CAT5e or CAT6 cables.



Standard MultiRack SoundGrid setup, shown with 02R96

6. Connect the USB flash drive or iLok key (which holds the necessary licenses) to one of the host computer's USB ports.

3.1 USB / MIDI Connection

In addition to the standard MultiRack SoundGrid setup, one additional cable can be used to provide extra control from the console.

In the case of CL-series, M7CL and LS9, this is a standard MIDI cable to connect the mixer's MIDI OUT port to the MIDI IN port of the WSG-Y16 card. Though the MIDI cable is connected to the card, the MIDI data is actually transferred through the network to the host computer of MultiRack SoundGrid.



MIDI link between M7CL and WSG-Y16

In the case of PM5D, DM2000, DM1000, 02R96 and 01V96, a MIDI cable could be used as above, but there are advantages to using a USB cable instead, between the mixer and the host computer of the MultiRack SoundGrid program. This USB cable can carry multiple channels of MIDI data, so offers some extended functionality and can be used for Yamaha Studio Manager software at the same time.



USB link from PM5D-RH to Host computer

The correct Yamaha USB-MIDI driver will be needed for the computer. This can be downloaded from

http://www.yamahaproaudio.com/downloads/firm_soft/index.html .

4.0 MultiRack SoundGrid Setup

4.1 Preferences

Start the MultiRack application and open the Preferences window (via the Edit menu on a PC, via the MultiRack menu on a Mac).

Preferences			_ 🗆 X
General Control Pl	ug-In Manager		
Local LAN Port	00:15:17:0a:f3:10 - Intel(R) PRO/I	000 PT Desktop Adapter - Packet Schedul	er Minig 💌
	Link Status: Up	Link speed: 1000Mbps	
	SoundGrid network found		
Host Recovery T	ype: C Off	C Manual	
Activate auto-s	save in show mode		
Show configur	ation change alert		
Recall first sna	ipshot when session loads		
Enable verbose	e log		
Load last sess	ion on application launch		
Open in Full Sc	reen mode		
		OK Cancel	Apply

In the Local LAN Port field, select the correct LAN/network adaptor.

Then the message "SoundGrid network found" will appear, as shown on the left.

MultiRack Preferences

4.2 Plugin Manager

Click the Plugin Manager tab in the Preferences window.



Depending on which version of plugins are intended for use, select either V8, V9 or both. In this example, both versions are installed. Whichever version(s) are checked here will be scanned when MultiRack loads. The

Plugin Manager will scan any connected USB drive, internal hard drive, and/or iLok key for any plugin licenses, and will update the plugin list.

Now the Preferences can be closed by clicking [OK].

4.3 System Inventory

From the Edit menu, select the SoundGrid Inventory, or press [F2].

SOUNDGRID	SOUNDGRID INVENTORY ×									
SYSTEM PARAMETERS										
SAMPLE RA	SAMPLE RATE 44100 NETWORK LATENCY 40 🔽 DRIVER LATENCY 256 💌									
SYSTEM INVENTORY TEST REDUNDANCY REFRESH										
I/O AND PR	OCESSING DEVICE	≣S								
ASSIGN	ASSIGN DEVICE CHAN NAME MAC ADDRESS / STATUS DEVICE ID									
1 💌 🛙	0: WSG-Y16	16	WSG-Y16		00:1c:d1:00:00:68	On	UPD	ATE	ID	
1	G Driver	64 🔻	SG Driver	-1	SHLOMID-XPPC	On				
2	ultiRack	128	MultiRack	-1	00:1b:21:29:af:01	On			\triangleleft	
3										
4										
-										
SOUNDGRI	D SERVERS									
ASSIGN	DE	/ICE			MAC ADDRESS / COMPUTER NAME		STATUS	DE\ FIRM	/ICE WARE	
1 🔻 S	G Server			00:1b:21:	29:af:e6		On	UPD	ATE	
						,				

This window lists all the SoundGrid components in the network, and allows them to be selected, assigned and updated.

First check if any device needs to have its firmware updated: click on the [Update] button in the Device Firmware column. During the update process a progress bar and status message will be displayed. Follow these messages and instructions carefully. In some cases the device will need to be rebooted at the end of the process. Once that is completed, click the [Refresh] button towards the top-right of this window.

The Device column lists all available components: I/O cards, MultiRack, SG Drivers and SG Servers. Use the Assign column to select which devices to use:

- **I/O Devices**: up to 4 I/O devices can be used. Assign number "1" for the first device, "2" for the second, and so on. This assignment will affect the order of I/O listing in MultiRack's I/O routing menus. It is not related to which slot the card is inserted in the console, though it makes sense to follow the same order.
- **MultiRack**: only one MultiRack device can be used, so is automatically assigned number "1".
- **SG Server**: it is possible to use up to 2 servers in the network, so set the first server to number "1" and the second (redundant) server to number "2".

• **SG Driver**: the inventory will see all installed drivers on the network, though only one can be assigned at a time. This is used for recording and playback with DAW software: it is not essential for using the plugins. Assign number "1" to the required driver, and set the number of channels to use for rec/play in the Chan column.

4.4 System Parameters

Still in the SoundGrid Inventory window, set the "Driver Latency" and "Network Latency". A lower setting will result in lower latency, but may increase the CPU load of the computer. A Driver Latency of 256 samples will work well on most systems (that's around 5.3ms at 48kHz). The settings are applied as the window is closed.

4.5 SoundGrid Connections Window

Open the SoundGrid Connections window from the Edit menu (or press the [F3] key. This window shows a table where virtual connections and audio routing can be made between the devices on the network.

SOUN	IDGRID CONNECTIONS													×
ON	sou	RCI	E				DESI	INAT	ION			1		
	DEVICE NAME		OUT	CH R/	ANGE		DEVICE NAME		IN C	H RA	NGE	STA	TUS	
	Yamaha Y16-1	-	1	То	16		MultiRack-1	•	1	то	16			
	MultiRack-1	-	1	То	16		Yamaha Y16-1	-	1	то	16			
	Yamaha Y16-1	-	1	То	16		SG Driver-1	-	1	то	16			
	SG Driver-1	-	1	То	16		Yamaha Y16-1	-	1	то	16			
				DO	UBLE-CI	LIC	CK TO ADD A CONNECTION							
-														
DE	LETE CONNECTION							I	ОК		CANC	EL	APPLY	

Each row in this table represents an audio connection between a source device (the audio transmitter) and a destination device (the audio receiver). A device first needs to be assigned in the SoundGrid Inventory before it will appear in the SoundGrid Connections table.

Double-click where indicated to create a new connection. Then select a Source Device, and choose the range of channels to transmit. Then select the destination device, and its range of input channels. Enable or disable the connection in the leftmost column (labeled "ON").

Note that it is possible to send audio from one source to multiple destinations. And it is possible for a destination device to receive different audio channels from different source devices.

The most usual case, as shown in the picture above, is of one Waves IO transmitting 16 channels to the MultiRack (the effect/insert sends) and to the SG Driver (for recording). Then for MultiRack to transmit 16 channels back to the Waves IO (the effect/insert returns).

4.6 SG Driver

The SG Driver is an ASIO (PC) and CoreAudio (Mac) driver for audio playback and recording, using any compatible DAW software. It is not necessary for using MultiRack SoundGrid, but is a useful additional feature. It can be installed either on the same computer that is running MultiRack SoundGrid, or a separate computer.

W SOUNDGRID DRIVER CONTROL P	ANEL	
MAIN		
DRIVER: ON	DRIVER MODE	STANDALONE O NETWORKED
LOCAL LAN PORT 00:1c:25:97:74	9a - Intel(R) 82567LM Gigabit Network Conn	
	LINK STATUS: UP	LINK SPEED: 1000Mbps
SAMPLE RATE N/A	DRIVER CHANNELS 64	ASIO BUFFER SIZE 256 💌
STATUS Ready!		
		SOUNDGRID DRIVER VERSION 2.0.0.13

- 1 Connect the computer to the network, and switch on all the devices.
- 2 Open the SoundGrid Driver Control Panel.
- 3 Open the Main tab and set Driver Mode to **Networked** (as it is being used on the same network as SG MultiRack).
- 4 Select the correct LAN port for the computer in the LOCAL LAN PORT setting. The driver will scan the network, and display "SoundGrid Network found" to indicate success.
- 5 Turn the driver ON, and it will be ready to use.

4.7 SG MultiRack

Now some Racks can be added to the system by double-clicking in the indicated area:



Add Ra	:k					
Add		New	Mono	•	Racks	+ -
				ОК		Cancel

5. This will open a dialogue box where the number and type of Racks can be specified.



6. Now one or more empty Racks will be visible, and the input and output channels must be assigned, according to the Slot inputs and outputs from the mixing console. Click on the left (input) and right (output) side rails of the Racks, where it shows "None". The Audio I/O pull-down menu will open, and the channel number can be chosen.

7. Click on the [+] button in the Racks to add the required Plugins.

See the MultiRack SoundGrid manual for more detailed information.

5.0 Console Setup & Patching

There are several steps to preparing the mixer for use with the Waves system. MultiRack SoundGrid can be thought of as an external multi-effects unit. So it can be patched in a conventional way, either inserted (in Input, Mix, Matrix or Master channels), or as a "Send-&-Return": sending from a Mix bus (mono or stereo), and returning to an input channel (again, mono or stereo).

Each WSG-Y16 card can provide 16 inputs and outputs, meaning that up to 16 channels of inserts can be patched for example. An example of insert patching on PM5D is shown below, where WSG-Y16 is positioned in Slot 4.



PM5D Input Insert Patch

Remember to set the required insert position, and to switch it on:



PM5D Input Insert Point

5.1 MIDI Setup on the Mixer

To allow control of the MultiRack SoundGrid software from the mixer, some MIDI setup is required. This process varies depending on the model of mixer, so each type will be described in turn.

Using PM5D, DM2000, DM1000, 02R96, 01V96 6.0

On these consoles, the MIDI REMOTE layer allows the input channel faders, ON switches and encoders to be used as controllers for the Waves plug-ins. Additionally, their USER DEFINED keys can be used to guickly view specific plug-ins and to recall specific Snapshots in the MultiRack SoundGrid software.

6.1 MIDI Port Setup

Firstly, in the MIDI SETUP page (found in the MIDI/REMOTE menu of PM5D, or the MIDI menu of DM/0 consoles) switch on the Tx for PROGRAM CHANGE. This will allow a console Scene Recall to trigger a Snapshot Recall in MultiRack SoundGrid.



PM5D MIDI SETUP

<u>JP A PGM ASGN A CTL ASGN A B</u>

Other Tx and Rx settings are not needed in this case. PM5D's MODE for PROGRAM CHANGE can be set to SINGLE for simplicity, when no more than the first 128 Scene Memories are used (because SINGLE mode handles MIDI values [0-127] for Program Change). On DM/0 consoles mode selection is not available, because they don't have more than 100 Scenes anyway. Keep the MIDI channel set to "1" unless there is good reason to change it (to avoid conflict with other connected MIDI equipment).

6.2 PM5D MIDI Port

For PM5D, the MIDI PORTS are also set in this page. The required selection will depend on whether a MIDI or a USB cable is used:

- a) If MIDI is used, set the Tx MIDI PORT to MIDI, and set MIDI REMOTE port for BANK A also to MIDI (as shown above).
- b) If USB is used, set PM5D EDITOR to USB-1, set MIDI REMOTE port for BANK A to USB-2, and set Tx MIDI PORT to USB-3 (as shown below).

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MIDI SETUP					MMC
	MODE	Tx	R×	ECHO	OUTPUT
MIDI PORT		USB 3	USB 3		
SINGLE MODE MIDI CH		1	1		MIDI REMOTE
	OMNI OFF				OUTPUT PORT
PROGRAM	BANK OFF	ON	OFF	OFF	BANK A USB 2
GINNUL	MULTI				BANK B
	LIDDY				BANK C
Control Change	TABLE [SINGLE]	OFF	OFF	OFF	BANK D
	TABLE [MULTI]				
PARAMETER		OFF	OFF	OFF	PM5D EDITOR
OTHER				OFF	PORT USB 1
MIDI THRU					ID 1

PM5D MIDI SETUP when using a USB cable.

6.3 DM/0 MIDI Port

On the DM/0 consoles, the MIDI/HOST page is found in the SETUP menu. Select USB-1 ID1 for Studio Manager, USB-2 for a REMOTE LAYER (it doesn't matter which layer), and USB-3 for the GENERAL Tx PORT, as shown below.

SETUP IOO Initial (20 waves cont	trol EOD .	⇔ SETUP	📲 CH24-CH24
		(MIDI/TO HOST	SETUP:		
(MIDI/TO HOST SETUP)	·		SERIAL	SPECIAL P	UNCTIONS
	SPECIAL FUNCTIONS	PC-2	MAC	StudioManager	
R× PORT USB (3)	StudioManage <mark>r USB (1)(1)</mark>	GEN	ERAL	ll	PORT
T× PORT	DAM (DAM	
MIDI THRUJ	REMOTE 1 (USB)(2)	TH DODT		PLUG-IN1	NO ASSIGN
$\square = \square \ominus \rightarrow \square = \square \ominus$	REMOTE 2 []		[:U <u>SB</u> ;(3)	PLUG-1N2	NO ASSIGN
MACHINE CONTROL	CASCADE LINK			PLUG-1N3	NO ASSIGN
TYPE PORT DEVICEID	SYNC TRANSMIT		- (PLUG-IN4	NO ASSIGN
	REQUEST	REMOTE1	USB (2)	PLUG-1N5	NO ASSIGN
P2 Not Work -		REMOTE2	L	PLUG-1N6	NO ASSIGN
		REMOTE3	()(=)(=)	PLUG-1N7	NO ASSIGN
		REMOTE4	U.A.LAYER	PLUG-1N8	NO ASSIGN
PREFER1 🕅 PREFER2	PREFERS A MIDI/HOST	PREFER1	A PREFER2	PREFER3	MIDI/HOST 🖉 🕨
DM1000 MID	I/HOST SETUP	D	M2000 MID	I/HOST SET	TUP

6.4 Program Change: Snapshot Recall

All these consoles can use their initial settings for the MIDI Program Change table. So recalling Scene 1 on the console recalls Snapshot 1 in MultiRack SoundGrid. It can be edited of course, to change the mapping if required.

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GLOBAL	5	CENE MEMORY	EDIT	PRE	SENT TIME	METE	R SECTION	1
MIDI/REMO	DTE 000 In	itial Data	F	5	:47:24	MIX	MAT	RIX
I BACK FORWI	ARD . NEXT . 001 I	nitial Data 🛛 🗖						
(MIDI SETUD MID	I PON CHANGE MIDT	CTRL CHONGE MIDI REI	INTE	GDT F	ONER STORT TRO	NSPORT DHE CO		
							THOL	
MIDI SETUP			PI	RESET	CLEAR ALL	J		
	Tx	Rx	CH	PGM No.	I	LIBRARY NAME		\$
MIDI PORT	MIDI -	MIDI D	_					
SINGLE MODE MIDI CH	1							
PROGRAM CHA	NGE SETUP							
MOD	E Tx	R×						
PINCIE (DWNI OFF							
aindle E	BANK OFF	OFF						
			1	1	ESCENED	001 Initial	Data	
			1	2	[SCENE]	002 Initial	Data	
		FCHO	1	3	ESCENE 3	003 E No	Data!]	
			1	4	[SCENE]	004 E No	Data!]	
		OFF	1	5	[SCENE]	005 E No	Data!]	
			1	6	[SCENE]	006 E No	Data!]	
			1	7	[SCENE]	007 E No	Data!]	
			1	8	ESCENE 3	008 E No	Data!]	- -
			1	9	[SCENE]	009 E No	Data!]	¥
SELECTED CH	MACHINE ID		1				Internet U	SER DEF
ST AL	1 2 3 Mix S	HA GAIN		NPUTCH	FADER STATUS	ST IN / FX RTN	RECALL	EY BANK
STAL	#1	CH LEVEL		H25-4	A	STIN	MUTE MASTER	Α

PM5D MIDI Program Change table.

In the MultiRack software, open the Preferences window (from the Edit menu in Windows, or MultiRack SoundGrid menu in Mac OSX).

MDI In		WILLEY	Misuasa	MIDI # MIDI Ma	Thru	
■ 00:16:01:00:00:66			Microso	nt miDi wa ft GS Wav	pper /etable SV	V Synth
		MIDI Snaps	shot Recall			
Set MIDI channel for :	snapsho	t recall	1			*
Use Contro	ol Chang	e (not Bank	Change) messaj	ges for sr	apshot re	call
Snapshot	CC N	lumber	Snapshot	CC Nu	mber	
129 - 256	None	¥	641 - 768	None	~	
257 - 384	None	~	769 - 896	None	*	
385 - 512	None	~	897 - 1000	None	~	
513 - 640	None	~				
Set MIDI Pickup Mode		Takeover				~
	1	/IDI/Keyboa	rd Setup File			
uments and Settings\acoop	erVApplic	ation Data₩	Vaves Audio\Pre	ferences)	PM5D.mrn	c

MultiRack Control Preferences

In the Control tab, check the required MIDI In port:

a) The MAC address of the WSG-Y16 card is shown, and should be selected if a MIDI cable is used. (00:1c:d1:00:00:66 is the MAC address of this example).

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b) Select "Yamaha PM5D-2" and "Yamaha PM5D-3" if a USB connection is used (or the equivalent selection for DM2000 or DM1000 etc.):

	MIDI Po	rts	
MIDI In		MIDI Thru	
Yamaha PM5D-1	~	Microsoft MIDI Mapper	~
🖌 Yamaha PM5D-2		Microsoft GS Wavetable SW	Synth
🖌 Yamaha PM5D-3	1	Yamaha PM5D-1	
Yamaha PM5D-4	~	Vamaha PM5D-2	~

The selection box for "Set MIDI channel for snapshot recall" should match the number used for MIDI Tx on the console. Number 1 is the default choice. There is no need to check the "Use Control Change" box.

	١	/IDI Snaps	shot Recall		
channel for :	snapshot r	ecall	1		
Use Contr	ol Change	(not Bank	Change) messa	ges for sn	apsh
Snapshot	CC Nu	nber	Snapshot	CC Nur	nber
129 - 256	None	v	641 - 768	None	~
257 - 384	None	4	769 - 896	None	3
385 - 512	None .	~	897 - 1000	None	~
	ZASSAMU				

Click [OK], and a console Scene recall will now be able to trigger a Snapshot recall in the software. Note that MIDI communication is oneway only: from Console to MultiRack. So a Snapshot recall in MultiRack cannot cause a console Scene to recall.

When MultiRack SoundGrid receives a MIDI message, the REMOTE indicator on the status bar will flash green. The recalled Snapshot will be highlighted.



MultiRack SoundGrid during Snapshot Recall

6.5 MIDI Remote Layer

PM5D, DM2000, DM1000, 02R96 and 01V96 all have MIDI Remote Layer options which can be used to edit the parameters of the Waves plug-ins from the console's faders, ON switches and encoders. With PM5D, the Remote Layer is dedicated to MIDI functions, while the other consoles

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offer more options: select "USER DEFINED" as the target for one of the Remote Layers in the REMOTE menu. (With 01V96, the REMOTE page is located in the DIO/SETUP menu).



With PM5D, the MIDI REMOTE page is (naturally) found in the MIDI/REMOTE menu. Press the ASSIGN TO CH STRIP SECTION [INPUT CH] switch to convert the console's faders, on switches and encoders to MIDI REMOTE mode.

GLOBAL SCENE MEMORY EDIT PRESENT TIME	METER SECTION
MIDI/REMOTE 003 waves setup 12:45:12	CH25-48 ST IN
BACK FORWARD NEXT SCENE	· · · ·
(MIDI SETUPÍMIDI PGM CHANGEÍMIDI CTRL CHANGEÍ <mark>midi Remote</mark>) gpi ífader startítrans	SPORT DHE CONTROL
TRANSMIT ENABLED ASSIGN TO CH STRIP SECTION BANK SELECT CLEAR BANK	Haves Plus-ins A B C D
REMOTE CH 1 RM 1	
	LEARN
ENCODER	
B B1 00 ENC END	
CH ON LATCH	
B2 00 SW END	LEARN
FADER	
B3 00 FAD END	
SELECTED CH MACHINE ID MIX SECTION C REMOTE REMOTE REMOTE LADER MODE	

PM5D MIDI REMOTE page

For all the consoles, the MIDI Remote Layer should be setup to transmit Control Change messages in the format as shown above: B0-00-SW-END for example. The DM/0 consoles conveniently have a perfect setup in their initial settings for BANK 4. So no MIDI programming is needed!

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20 waves cont	rol EON	◇REMOTE	48k 5 T CH24-CH24
[REMOTE1]		USER DEFI	NED
	3LED		
	IN CHET M	LUNG	
	1		
		LA	TCH LEARN
DATA → <u>B0</u>	(40) (SW)		
ENCODER			LEARN
DATA → (BØ)	(ØA) (ENC)	(END) (-)	
()	(-)	()()	
FADER			LEARN
DATA → (B0)	(07) (FAD)	(END) (-)	
()	(-)(-)	(-)	
REMOTE1	REMOTE2		3 🗛 REMOTE4

DM2000 Remote Layer: BANK 4.

Note that each channel has a slightly different message number for each control.

The initial settings for the PM5D MIDI Remote are not suitable for controlling MultiRack, so they must be edited. Each control that is required should be converted into the format as shown below. To save programming time, the WAVES-RM.PM5 file (download from http://www.yamahaproaudio.com/training/self_training/index.html) could be loaded via the memory card slot. This contains all the necessary settings for the MIDI Remote Layer, as summarized in the table below:

	Channel 1	Channel 2	•••	Channel 24
ENCODER ON	B0-00-SW-END	B0-01-SW-END		B0-17-SW-END
ENCODER	B1-00-ENC-END	B1-01-ENC-END		B1-17-ENC-END
CH ON	B2-00-SW-END	B2-01-SW-END		B2-17-SW-END
FADER	B3-00-FAD-END	B3-01-FAD-END		B3-17-FAD-END

Additionally, ensure that [LATCH] is enabled for the ON switches of the Remote Layer.

6.6 MultiRack Remote Controller Editor

To prepare the MultiRack software, open the Preferences window again, and select the Control tab. Then set the MIDI Pickup Mode to "Takeover".

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Set MIDI Pickup Mode	Takeover		~
	MIDI/Keyboard Setup File		
C:\Documents and Settings\acooper\Ap	plication DataWVaves Audio	VPreferences\Default	RemoteControlConfig
		Load	Open Editor

This will protect the plug-in parameter values from jumping to a new position unexpectedly. Instead, the values will only change once the controller has passed through the current value of the parameter.

Next, click [Open Editor].

This will open the MultiRack Remote Controller Editor window, where incoming MIDI messages can be mapped to the software functions.



MultiRack Remote Controller Editor

The mapping can either be done manually, or a setup file (*.mrrc) can be loaded. Template files are available for PM5D, M7CL (also use for LS9), DM2000 (also use for 02R96) and DM1000. Download these files from http://www.yamahaproaudio.com/training/self_training/index.html. The above picture shows the settings for PM5D. To use one of the example

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files, click [OPEN] at the bottom of the window, then browse for the file on the computer. This file can then be modified if required, and saved again.

To modify a setting, click on the control so it is highlighted yellow, and then move the required encoder or switch on the console. The MIDI DISPLAY at the top of the window will show the message that is received (such as CC 1/0), and will assign it to the selected control. Do this for as many controls as required.

	DefaultRemoteControlConfig* - X	
MIDI PORT All Ports	MIDI DISPLAY CC 1/0	ENABLE 14bit CC SUPPORT

Once a MIDI message is mapped to a control, it is displayed as shown below.



When editing is completed, save the remote controller setup file and exit the editor window. Now this file needs to be loaded into the MultiRack Preferences:

In the "Control" tab of the preferences window, click [Load...] and browse for the setup file that has just been saved.

Then click [OK] to close the Preferences window.

The 8 Plug-in Control encoders and switches edit the plug-in that is visible on MultiRack SoundGrid. Only one plug-in is visible at any time, so it is always clear which plug-in is being controlled.

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MultiRack SoundGrid: Rack View, with Controller Strip

By selecting the "Show Controller Strip" option in the "View" menu, the mapping of the Plug-In parameters to the 8 control encoders and switches can be seen at the bottom of the screen. As a parameter is adjusted, its value is displayed. Use the "Next Page" and "Prev Page" controls to access extra functions when the plug-in has more than 8 continuous and discrete parameters available.

The mapping of console controls to the MutliRack Plug-In controls for the provided template files of PM5D, DM2000 and DM1000 is shown in the Appendix.

6.7 User Defined Keys

MIDI functions can be assigned to the User Defined Keys of PM5D and the DM/0 consoles (and also CL-series). These can be used for the following functions:

- 1) Recall specific Snapshots (the 8 Hot Snapshots of MultiRack).
- 2) Recall the Next or Previous Snapshot.
- 3) Navigate around the plug-ins.
- 4) View the 8 Hot Plug-ins of MultiRack.

The simplest method is to assign a different MIDI Note On message to each User Defined Key, as seen in the examples below.

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20 waves control	♦ USER DEF 🚰 CH24-CH24
(USER DEFINED KEY ASSIGN)	
INITIALIZE	
TITLE Waves Plus-ins	ABCDEFGH
MIDI NOTE C -2 C) ခ်ီ MIDI NOTE G#-2 8
– (MIDI NOTE C#-2) (1) 🖁 (MIDI NOTE A -2)(9)
³ (MIDI NOTE D −2)(2) ¹¹ (MIDI NOTE A≢-2)(10)
∯ (MIDI NOTE D#-2) (3) ¹² (MIDI NOTE B −2)(11)
≜ MIDI NOTE E -2 (4) ¹³ MIDI NOTE C −1)(12)
Å MIDI NOTE F −2) 5) 🎽 (MIDI NOTE C#-1)(13)
MIDI NOTE F#-2) ¹⁵ (MIDI NOTE D −1)(14)
Å MIDI NOTE G -2) (7) UDEF KEYS BANK+1
USER DEF	

DM2000 User Defined Key assignments	DM2000	User Defined	d Key as	ssignments.
-------------------------------------	--------	--------------	----------	-------------

GLOBAL	SCENE MEMORY	EDIT PRESENT TIME	METER SECTION
UTILITY (003 waves setup	14:43:29	CH25-48 ST IN
▲ BACK FORWARD ►			
PREFERENCE 1 PREFERENC	e 2 <mark>user define</mark> save luai	D FADER ASSIGN SECURITY	
BANK SELECT	No. FUNCTION	Pf	RAMETERS
	1 🔁 MIDI DIRECT OUT	MIDI NOTE	C -2
H D C D	2 = MIDI DIRECT OUT	MIDI NOTE	<u>C#-2</u>
PLEOD PONK	3 = MIDI DIRECT OUT	MIDI NOTE	D -2
GLEHK BHNK	4 E MIDI DIRECT OUT	MIDI NOTE	D#-2
	5 E MIDI DIRECT OUT	MIDI NOTE	<u>E -2</u>
	6 G HIDI DIREGI UUI	MIDI NUTE	F -2
			F#-2
	8 E MIDI DIRECT OUT	MIDI NUTE	<u>u</u> -2
	9 🗧 MIDI DIRECT OUT	MIDI NOTE	6#-2
	10 🚍 MIDI DIRECT OUT	MIDI NOTE	A -2
	11 🖬 MIDI DIRECT OUT	MIDI NOTE	A#-2
	12 🖬 MIDI DIRECT OUT	MIDI NOTE	B -2
	13 🗧 MIDI DIRECT OUT	MIDI NOTE	C -1
	14 🗧 MIDI DIRECT OUT	MIDI NOTE	C#-1
	15 E MIDI DIRECT OUT	MIDI NOTE	D -1
	16 🖼 MIDI DIRECT OUT	MIDI NOTE	D#-1
	17 🖬		
	18 😫		
	19 🖬		
	20 🗢		
	21 🗢		
	22 🗢		
	23 S PAGE CHANGE	PAGE BOOKMARK	CGBL1 MIDI REMOTE
	24 😂 USER DEFINED KEY BANK	NEXT BANK	
	25 🗧		
SELECTED CH MACHINE			DUPECT USER DEF
CH 1 1 2	3 MIX SECTION Q _ INX 1	A INPUT CH FADER STATU	
		CH25-48 DCA	
Ch 1 #			

PM5D User Defined Key assignments.

To save programming time, templates are available. The "WAVESUDK.PM5" file (download from

http://www.yamahaproaudio.com/training/self_training/index.html) can be loaded into PM5D from the memory card slot, and this assigns layers A and B of User Defined Keys. For DM2000 and DM1000, MIDI Bulk Dump files (syx files) are available for User Defined Key layers A and B.

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The Hot Plug-In and Hot Snapshot settings for the MultiRack Remote Controller Editor are included in the example setup files mentioned previously, so once they are opened, the system is ready to use.

The control assignments for User Defined Keys on PM5D, DM2000 and DM1000 are shown in the Appendix.

Basically the first bank of keys will access the 8 Hot Plug-ins, and the second bank will access the Hot Snapshots. Note that one User Defined key on each bank is assigned to change the bank of User Defined keys, making it easier to access all the functions. And on PM5D, key 23 is used as a "Bookmark" shortcut to access the MIDI Remote Layer of PM5D.

7.0 Using M7CL and LS9

M7CL and LS9 consoles do not have the MIDI REMOTE functionality of the other consoles, but they do have MIDI Program Change and Control Change tables. Some parameters that are not needed for audio can be mapped to MIDI Control Change messages and used to control the Plug-ins. For example, use some spare Mix Sends or Matrix Sends. In this example, the sends to Mix 16 from Input Channels 1-8 are used, but a different Mix or even Matrix send could be used.

7.1 MIDI Setup

In the MIDI SETUP menu of M7CL (or LS9), make the following settings:

- 1) Set the Tx port to MIDI CH1.
- 2) Switch on Tx for PROGRAM CHANGE and CONTROL CHANGE.
- 3) Set PROGRAM CHANGE MODE to SINGLE.
- 4) Set the CONTROL CHANGE MODE to TABLE.

MIDI						×	, MIX 1 , MX 1
	MIDI SETUP						12:42:17 ACCESS ?
		Тх	Rx	ECHO			[]
	PORT/CH	• STGNAL	• STGNAL				CH JOB
		- сн1	- CH1		MODE	j	
	PROGRAM CHANGE	Тх	Rx	ЕСНО	SINGLE MULTI		RACK MONITOR
	CONTROL CHANGE	Тх	Rx	ЕСНО	NRPN TABLE		-6 9 12 15 18
	PARAMETER CHANGE	Тх	Rx	ЕСНО			-24 -39 -49 -59
	OTHER COMMAND			ЕСНО			
			-				J SETUP
	MIDI SETUP	PROGRAM	CHANGE	CONTROL CH	ANGE		<u>SCENE 004</u>
							scene 4

M7CL MIDI SETUP

7.2 Program Change

Both M7CL and LS9 can use their initial settings for the MIDI Program Change table. So recalling Scene 1 on the console recalls Snapshot 1 in MultiRack SoundGrid. It can be edited of course, to change the mapping if required.

Waves MultiRack SoundGrid with Yamaha Mixers

MIDI				×	, MIX 1 , MX 1 ,
PF	ROGRA	м	Tx Rx ECHO		12:43:28 ? ACCESS ?
					SENDS ON FADER
	BANK	NO.	PROGRAM CHANGE EVENT		CH JOB
					RACK MONITOR
	1	1	▼ [SCENE] 001 scene 1		-6 -9 — -12
	1	2	▼ [SCENE] 002 scene 2		-15
	1	3	▼ [SCENE] 003 scene 3		-24 -30
	1	4	▼ [SCEHE] 004 scene 4		-40 -50
	1	5	▼ [SCENE] 005 scene 5	INITIALIZE	
	<u> </u>	6	▼ [SCEHE] 006		🗹 SETUP
MI	DI SETU		PROGRAM CHANGE CONTROL CHANGE		<u>SCENE 004</u> scene 4

M7CL MIDI PROGRAM CHANGE

7.3 MIDI Control Change

In the MIDI CONTROL CHANGE table, assign the chosen parameters for controlling the plug-ins to some Control Change numbers. In this example, to fit with the supplied MultiRack templates, Control Change numbers 103 to 110 are used for the Discrete switches and numbers 111 to 118 are used for the Continuous controls.

To edit a Control Change assignment, scroll through the list, select number 103 on the screen, and a green edit window will appear.

- 1) Select "MIX/MATRIX SEND" as the MODE.
- 2) For PARAMETER 1 select:
 - a. "MIX 16 ON" for Control Change numbers 103 to 110.
 - b. "MIX16 H" for numbers 111 to 118 (don't choose "MIX16 L", which is low value data).
- 3) Then choose from "CH 1" to "CH 8" for PARAMETER 2.

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MIDI CONTROL CHANGE	[#111]		CH ch 13:0 ACC	1 2 0:20 ESS ?
Select Control Cl	PARAMETER1	PARAMETER2		CH JOB
BALANCE	MIX12 H			
TO STEREO	MIX13 H			
to mono	MIX14 H		T T	
LCR	MIX15 H			Σ
MIX/MATRIX SEND	MIX16 H	СН 1		-3
MIX TO STEREO	MATRIX1 H	СН 2		-9
MIX TO MATRIX	MATRIX2 H	СН 3		-12
STEREO TO MATRIX	MATRIX3 H	СН 4		-18 -24
INPUT EQ	MATRIX4 H	СН 5		-30 -40
t +			J L	-50 M
	CANCEL	к		SETUP
nini Anton. Tuxo			SCE scer	<u>NE 004 [</u> 1e 4

M7CL MIDI Control Change Edit

When all the parameters are assigned, the Control Change table will look like this:

1						CH 1 🔎
MIDI					×	`ch 1 🍊 '
						13:08:01 ?
	DNTROL	Tx Rx	ЕСНО	NRPN	TABLE	HUGESS
						SENDS ON FADER
	NO.	CONTR	OL CHANGE	EVENT		CH JOB
	106	- MIX/MATRIX SEND	MIX16 ON	CH 4		
	107	- MIX/MATRIX SEND	MIX16 ON	CH 5		
	108	- MIX/MATRIX SEND	MIX16 ON	CH 6		RACK MONITOR
	109	- MIX/MATRIX SEND	MIX16 ON	CH 7		METER Σ
	110	- MIX/MATRIX SEND	MIX16 ON	CH 8		OVER - 3
	111	→ MIX/MATRIX SEND	MIX16 H	CH 1		-6 -9
	112	- MIX/MATRIX SEND	MIX16 H	CH 2		-12 -15 -18
	113	- MIX/MATRIX SEND	MIX16 H	CH 3		-24
	114	- MIX/MATRIX SEND	MIX16 H	CH 4	CLEAR ALL	-40 -50
	115	- MIX/MATRIX SEND	MIX16 H	CH 5		
	116	- MIX/MATRIX SEND	MIX16 H	CH 6	ALL	🗹 SETUP
MIC	I SETUP	PROGRAM CHANGE	CONTROL C	HANGE		
						SCENE 004 E
						SCELIC 4

M7CL MIDI Control Change assignments.

Waves MultiRack SoundGrid with Yamaha Mixers

CH 1 ch 1	L	000	lnitia R <mark>E</mark>	1 Da	ata ADMIN		
MIDE							×
	rrol Nge	Тх	RX		ECHO		RPN TABLE
No.		CONTROL	CHANGE	EVI	ENT)
107	MIX	SEND	MIX16	DN	СН	5	
108	MIX	SEND	MIX16	DN	CH	6	
109	MIX	SEND	MIX16	DN	CH	7	
110	MIX	SEND	MIX16	DN	CH	8	
111	∀ MIX	SEND	MIX16 I	LVL	H CH	1	
112	MIX	SEND	MIX16 I	LVL	н сн	2	
113	MIX	SEND	MIX16 I	LVL	н сн	3	ALL
114	MIX	SEND	MIX16 I	LVL	н сн	4	INITIALIZE
115	MIX	SEND	MIX16 I	LVL	н сн	5	ALL
			CLOS	E			

LS9 MIDI Control Change assignments

In addition, Control Change messages 102 and 119 can be assigned to Mix16 ON for channels 9 and 10 respectively. These will then control the "Prev Page" and "Next Page" functions of MultiRack.

7.4 MultiRack Preferences

Open the Preferences window of MultiRack SoundGrid (in the Edit menu in Windows, or MultiRack SoundGrid menu in Mac OSX), and select the "Control" tab.

		MIDI F	orts		
MIDI In				MIDI	Thru
Ø0:1c:d1:00:00:66			Microso	ft MIDIMaj ft GS Wa∖	oper /etable SVV Synth
		MIDI Snaps	hot Recall		
Set MIDI channel for s	napshot	t recall	1		~
Spanshot	CC N	e (not Bank '	Change) messaj	ges for sh CC Nu	apsnot recall
129 - 256	None		641 - 768	None	
257 - 384	None	~	769 - 896	None	~
385 - 512	None		897 - 1000	None	
513 - 640	None	~			
Set MIDI Pickup Mode		Takeover			~
			10.1 51		
	N	AIDI/Keyboar	d Setup File		
cuments and Settings\acoope	rVApplic	ation DataW	/aves Audio\Pre	ferences\	DefaultRemoteCont

MultiRack SoundGrid Preferences

Make the following settings:

- 1) Select the MAC address shown in the MIDI In list. This is the Mac address of the WSG-Y16 card used in the mixer.
- 2) Set MIDI Channel "1" for snapshot recall.
- 3) Set MIDI Pickup Mode to "Takeover".
- 4) Click the [Load...] button and browse for the M7CL.mrrc template file that accompanies this document (download from http://www.yamahaproaudio.com/training/self_training/index.html).
- 5) Click [OK] to save the preferences.

Now the system is ready for remote control!

If the MultiRack Remote Control Editor window is opened, the Plug-in Controls for M7CL/LS9 will look like this:



Plug-in Controls for M7CL / LS9.

7.5 Control from M7CL

The controls for channels 1-8 sending to Mix 16 have been selected in this example. On the M7CL, they can be accessed in a couple of ways.

- 1) Firstly, from the Centralogic section of the console:
 - a. Select to view channels 1-8 on the central faders.
 - b. Press one of the Mix16 Send controls on the screen to assign them to the row of 8 encoders below the screen.
 - c. Now these encoders will edit the Waves Plug-ins.

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M7CL Centralogic view for channels 1-8

- d. Press a Mix16 control again to open the MIX SEND window. This gives access to the ON switches which can be used to control other Plug-in functions.
- Alternatively, use SENDS ON FADERS to assign MIX16 to the faders. Then the faders and the ON switches of channel 1-8 will control the plug-in parameters.

7.6 Control from LS9

Once again, the controls for channels 1-8 sending to Mix16 are the ones chosen to control the Waves Plug-ins. Because of the reduced number of encoders on this console, SENDS ON FADERS mode should be used, so the faders and ON switches control the Plug-ins when MIX16 is selected.



When there are more than 8 parameters for a Plug-in, the extra parameters can be accessed by using the "Prev Page" and "Next Page" controls. In this example, they are mapped to the MIX16 ON switch for channels 9 and 10 respectively. So they are easily accessed during SENDS ON FADER mode.

7.7 Control Map

To conclude, below is the control map for this example of using M7CL or LS9 to control the MultiRack Plug-ins. Note that there are no controls on the console for the Hot Plug-in and Hot Snapshot selections this time. As an alternative, some keys on the host computer keyboard can be assigned to Hot Plug-ins and Hot Snapshots (see the MultiRack SoundGrid manual for further details).

Discrete Plug-in Controls	1	2	3	4	5	6	7	8
Control Change Number	103	104	105	106	107	108	109	110
M7CL Send On to Mix16	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
LS9 Send On to Mix16	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8

Continuous Plug-in Controls	1	2	3	4	5	6	7	8
Control Change Number	111	112	113	114	115	116	117	118
M7CL Send Level to Mix16	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
LS9 Send Level to Mix16	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8

Other Plug-in Controls	Prev Page	Next Page
Control Change Number	102	119
M7CL Send On to Mix16	Ch9	Ch10
LS9 Send On to Mix16	Ch9	Ch10

Now the control and creative freedom that the mixers and the plug-ins provide can be enjoyed more fully.

8.0 Using CL-series Consoles

CL5, CL3 and CL1 consoles all have 4 User Defined Knobs that can be used for MIDI Control Change. Also the 16 User Defined Keys can be used to transmit MIDI Control, Program and Note messages. These can be used to control various parameters in MultiRack SoundGrid.

8.1 MIDI & User Setup

As shown in section 7.1 for M7CL, enable the MIDI TX for Control Change and Program Change.

Assign some MIDI Control Change functions to the User Defined Knobs, as found in the User Setup menu. These can be used to control certain plug-in parameters.

USER SETUP	×
USER DEFINED KNOBS and ASSIGNABLE EN	ICODER <u>for Administrator</u>
USER DEFINED KNOBS	ASSIGNABLE ENCODER
A MIDI CONTROL CHANGE CTRL 1	SELECTED SEND
B MIDI CONTROL CHANGE CTRL 2	
C MIDI CONTROL CHANGE CTRL 3	
D MIDI CONTROL CHANGE CTRL 4	
PREFERENCE USER DEFINED USER DEFINIKKOBS	ED CUSTOM FADER USER LEVEL FOR GUEST

For the same Ctrl numbers, it is best to un-assign them in the MIDI Control Change table, to stop the plug-ins being edited from other console parameters by accident.

In addition, assign some MIDI Note parameters to the User Defined Keys. These could be used for "Hot Plug-in Keys", Navigation or Snapshot Recall for example.

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USER	SETUP		×
USER	DEFINED KEYS <u>for Administrator</u>		
	1 MIDI NOTE ON C -2 (0)	2 MIDI NOTE ON C# -2 (1)	
	3 MIDI NOTE ON D -2 (2)	4 MIDI NOTE ON D# -2 (3)	
	5 HIDI NOTE ON E -2 (4)	6 MIDI NOTE ON F -2 (5)	
	7 MIDI NOTE ON F# -2 (6)	8 MIDI NOTE ON G -2 (7)	
	9 MIDI NOTE ON G# -2 (8)	10 MIDI NOTE ON A -2 (9)	
	11 MIDI HOTE ON A# -2 (10)	12 MIDI NOTE ON B -2 (11)	
	13 HIDI NOTE ON C -1 (12)	14 HIDI NOTE ON C# -1 (13)	
	15 MIDI NOTE ON D -1 (14)	16 MIDI NOTE ON D# -1 (15)	
PREFE	ERENCE USER DEFINED USER DEFIN KEYS KNOBS	ED CUSTOM FADER USER LEVEL	FOR GUEST

Next, follow the instructions in section 6.6 to assign the keys and knobs to specific functions in MultiRack.

Now enjoy the creativity that these convenient controls can bring!

APPENDIX

a. Remote Layer control assignments of PM5D, DM2000, DM1000

Continuous Plug-In Control	1	2	3	4	5	6	7	8
PM5D MIDI Remote Encoders	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
DM2000 Remote Layer Bank 4	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
Encoders								
DM1000 Remote Layer Bank 4	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
Encoders								

Discrete Plug-In Control	1	2	3	4	5	6	7	8
PM5D MIDI Remote Encoder	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
On Switches								
DM2000 Remote Layer Bank 4	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
On Switches								
DM1000 Remote Layer Bank 4	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
On Switches								

Other Plug-In Controls	Prev Page	Next Page
PM5D MIDI Remote Channel On Switches	Ch7	Ch8
DM2000 Remote Layer Bank 4 On Switches	Ch9	Ch10
DM1000 Remote Layer Bank 4 On Switches	Ch9	Ch10

Rack Controls	Input Gain	Output Gain	On / Off	In / Out	Mute
PM5D MIDI Remote	Ch1	Ch2	Ch1	Ch2	Ch3
	Fader	Fader	Ch On	Ch On	Ch On
DM2000 Remote Layer	Ch15	Ch16	Ch14	Ch15	Ch16
Bank 4	Fader	Fader	On	On	On
DM1000 Remote Layer	Ch15	Ch16	Ch14	Ch15	Ch16
Bank 4	Fader	Fader	On	On	On

APPENDIX

b. User Defined Key assignments of PM5D, DM2000, DM1000

Hot Plug-Ins	#1	#2	#3	#4	#5	#6	#7	#8
PM5D User Defined Bank A	1	2	3	4	5	6	7	8
DM2000 User Defined Bank A	1	2	3	4	5	6	7	8
DM1000 User Defined Bank A	1	2	3	4	5	6	7	8

	Plug-	n Navig	ation	Console function			
	Up	Down	Prev	Next	Bookmark	Access Next	
	Rack	Rack	Plug-in	Plug-in	MIDI	User Defined	
					REMOTE	Bank	
PM5D User Defined	9	10	11	12	23	24	
Bank A							
DM2000 User Defined	9	10	11	12	-	16	
Bank A							
DM1000 User Defined	9	10	-	11	-	12	
Bank A							

Hot Snapshots	#1	#2	#3	#4	#5	#6	#7	#8
PM5D User Defined Bank B	1	2	3	4	5	6	7	8
DM2000 User Defined Bank B	1	2	3	4	5	6	7	8
DM1000 User Defined Bank B	1	2	3	4	5	6	7	8

	Snapshot Recall		Console function				
	Prev	Next	Bookmark MIDI REMOTE	Access Prev User Defined Bank			
PM5D User Defined Bank B	9	10	23	24			
DM2000 User Defined Bank B	9	10	-	16			
DM1000 User Defined Bank B	9	10	-	12			