SONY

DIGITAL AUDIO MIXER
DMX-R100

Quick Reference

Revision 2.0
Applies to version 2.21 software

Introduction

Welcome to the Sony DMX-R100 Quick Reference! This guidebook is designed to supplement the DMX-R100 Operating Instructions provided with your console, not to replace it. In these pages are presented detailed operating procedures for most common operations, along with basic tutorials for tracking and mixing (both manual and automated). Also covered will be instructions for signal routing, metering and machine control, surround applications, MADI applications, use of the offline Automation Editor, and a discussion of operation at double-speed (2fs) sample rates of 88.2 and 96 kHz.

If this is your first digital mixing console, we suggest you begin by reading Appendix A, which provides a basic overview of the differences between digital and analog mixing.

For specific questions regarding the operation of your DMX-R100, call the Sony DMX-R100 Technical Support Hotline (1-800-883-6817), available Monday - Friday from 8 AM - 8 PM EST.

Table of Contents

Table of Contents

Installing Expansion Cards

This section details the required procedures when first using the DMX-R100.

The first step is to install the expansion cards.

Note: Expansion cards must be installed in the upper slots (Slots 1 and 3) before slots immediately below them (Slots 2 and 4) because the lower cover plate overlaps the upper cover plate. Expansion cards can be placed in any slots, with the exception of the DMBK-R109 MADI card, which must be placed in Slot 4.

1   Set the POWER switch to OFF.

2   Remove the screws in the cover plates for Slots 1 and 3 (or Slots 2 and 4) and remove the cover plates.

3   After first grounding yourself by touching a piece of metal, carefully remove the expansion card from packaging, holding it by its handles.

4   Align the card with the slot and gently insert it fully into the slot until fully seated; the outer screw holes should align.

5   Insert the screws to secure the card.

6   Repeat as required for other slots.

The second step is to make all required analog and digital audio interconnections to the DMX-R100 rear panel and expansion cards. (See Chapter 1 of the Operating Instructions.) All interconnections should be made with the POWER switch set to OFF. Also, determine whether you will be using the DMX-R100 as master clock or synchronizing it to an external word clock or video source and make the appropriate connections. Finally, if you are using a keyboard, mouse, and/or VGA monitor, connect them to the appropriate rear panel connectors.

First Bootup

Set the POWER switch to ON. After about a minute, the DMX-R100 will complete its boot-up process, and the first screen that appears is the Channel Window. (See Figure 1)

Figure 1

This Window shows all parameters for input channel 1 (note that the ACCESS button for channel 1 is lit). You can view the parameters for any channel (including the Program master bus) by pressing that channel's ACCESS button, or you can use the CHANNEL - / + buttons in the Parameter Setting Panel to increment or decrement the channel being viewed. (See Figure 2)

Figure 2
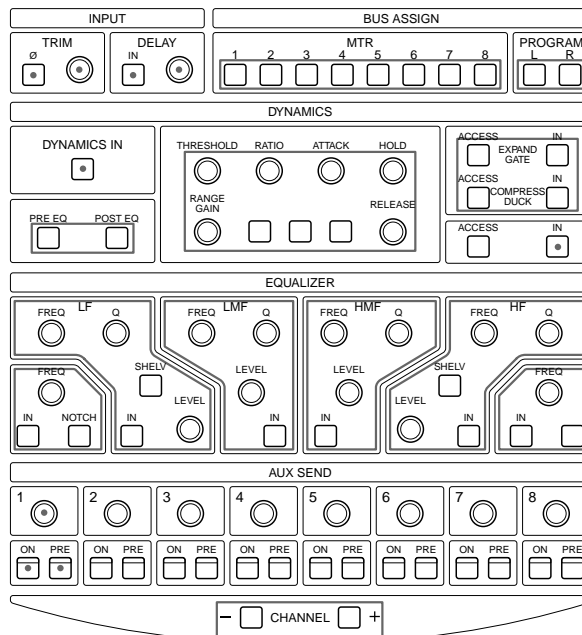
Setting The Sample Rate and Master Clock Source

Before operating the DMX-R100, you need to set certain basic parameters, including the desired sample rate and master clock source. These parameters are set in the Sync/Time Code Window.

1 Press the SYSTEM tab at the bottom of the touchscreen. From the pop-up menu select SYNC/TIME CODE; the window appears. (See Figure 3)

Figure 3

2 In the upper right-hand corner, select the master Sync Clock for your system. Options are: INTERNAL, VIDEO, and WORD DI. If using WORD DI (Digital Input), press the REF WORD IN button in order to select the reference source from the pull-down menu. (See Figure 4) The DMX-R100 is able to derive master clock from its word clock input (REF WORD IN), or from AES/EBU signal arriving at its 2TR IN2 or AUX RETURNS 5 - 8, or from digital signal arriving at any two channels of any expansion card slot providing digital audio input.

Figure 4

3 The current sample rate is shown in the upper left-hand corner. If you wish to use a sample rate other than the current one, select it (options are: 44.1, 48, 88.2, and 96 kHz) and then press the CHANGE button. (NOTE: the CHANGE button only becomes active when a new sample rate is selected, and the DMX-R100 does not actually change its sample rate until the CHANGE button is pressed). If you select a double-speed sample rate (88.2 or 96 kHz), the 2FS SURROUND button becomes active. Press it so that it lights green if you wish to do surround mixing at these higher sample rates. For more information, see Appendix D in this guidebook.

4 If you have not changed the sample rate from its current setting, skip ahead to the next exercise.

5 If you have changed the sample rate by selecting a new one and then pressing the CHANGE button, the following dialog will appear: (See Figure 5)
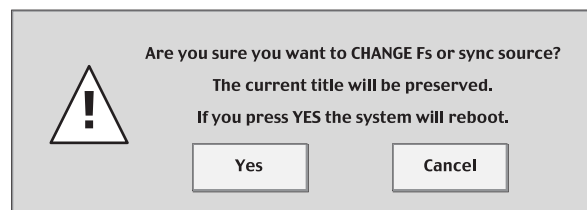
Figure 5

6 Press YES to accept the new sample rate (in which case the DMX-R100 will go through a complete new power-up cycle and reboot) or press CANCEL to return to the previous sample rate.

The Title Manager

The next step in setting up your DMX-R100 for initial usage is to save the current settings as a Title. The DMX-R100 can store up to ten Titles in its Flash Memory* (up to a total of 4 megabytes); each Title is a collection of system settings (including the SYNC/TIME CODE Window parameters), as well as Snapshots (up to 99 per Title) and mix automation and cue list data. No one Title can exceed 2 megabytes in size, and, as an example, 99 Snapshots occupy approximately 800 k of memory; typical automated mixes occupy approximately 1 megabyte.

Titles are saved and loaded in the Title Manager Window.

IMPORTANT NOTE: The currently selected Title is automatically reloaded whenever the DMX-R100 is powered on or rebooted, so be sure to always save your work in a Title before powering down.

Saving A Title To Flash Memory

1 Press the SYSTEM tab in the touchscreen. From the pop-up menu select TITLE MANAGER; the window appears. (See Figure 6)

Figure 6

* However, with the use of the Automation Editor, an infinite number of Titles can be stored in any Windows-based computer. See Appendix F in this guide for more information.

The Title Manager

2 Begin by creating a new Title as follows: select one of the ten Title slots on the touchscreen and press the SAVE button in the upper central area of the Window. A Title with the default name "UNTITLED" will appear in the selected slot.

3 To name the title, first select the name by pressing it on the touchscreen until it turns light yellow and a flashing cursor appears to the right of the last letter; the Keyboard Window will appear. (See Figure 7) Enter the desired name by pressing the onscreen "keys," then press the onscreen ENTER key to complete the operation. You can type in any name of up to 23 characters in length, though only the first 16 characters will appear in the Title Manager Window. Alternatively, if you have an external keyboard connected to the DMX-R100, it can be used instead. Press the Enter key on your keyboard to complete the operation.

Figure 7

4 To protect the Title from being overwritten, press the LOCK button in the Information section in the center of the touchscreen. To unlock it, simply press the LOCK button a second time.

Titles stored in Flash Memory can be instantly recalled at any time from the Title Manager by selecting the Title number or name and then pressing the LOAD button (see below). However, when loading a Title with a sample rate or clock source other than the currently selected one, the DMX-R100 will first reboot. The Title Manager also allows you to delete Titles from memory, clear the contents of the current Title (the currently selected sample rate and clock source is retained, but all other data is replaced with default values — see Chapter 4 in the DMX-R100 Operating Instructions for a listing), and to store the currently loaded Title to floppy disk.

Saving A Title To Floppy Disk

The DMX-R100 is capable of saving one Title per floppy disk. It can read and write to standard DOS-formatted disks, allowing you to archive data to an external PC (either with or without the use of the Automation Editor — see Appendix F for more information). It is also capable of formatting blank (unformatted) disks; however, because this is done in QNX Operating System format, these disks would then be unreadable by most computers. For that reason, we recommend that only preformatted DOS disks be used.

1   Insert a preformatted DOS floppy disk into the DMX-R100 disk drive and press the FLOPPY DISK touchscreen button in the Title Manager Window. If the disk has been correctly formatted, the DOS button will light green. If it is not correctly formatted, the following dialog will appear. (See Figure 8)
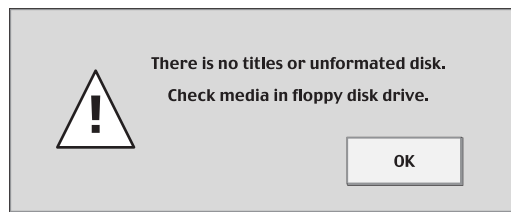
Figure 8

2   Press the SAVE button. After a few moments, the currently loaded Title is stored on floppy disk and appears as Title 1 in the list.

IMPORTANT NOTE: Because only one Title can be saved per floppy disk, if a Title has been previously stored on that disk, the SAVE procedure will overwrite it with the Title currently loaded in Flash Memory. Be sure to keep multiple backups of your work (easily accomplished in the Automation Editor — see Appendix F in this guide) in order to avoid inadvertantly overwriting important data!

If you do not have preformatted DOS disks available, you can format a blank (unformatted) disk by inserting it in the drive and pressing the FORMAT button. The disk will be formatted in QNX-OS format and can then only be read by the DMX-R100.

The contents of previously written floppy disks can be displayed by inserting the disk and pressing the SCAN button.

Loading A Title

To load (recall) a previously stored Title, follow this procedure.

1   If loading from floppy disk, insert it into the DMX-R100 disk drive, and then, press the FLOPPY DISK touchscreen button in the Title Manager Window. If loading from Flash Memory, press the FLASH MEMORY touchscreen button.

2   Select the Title to be loaded by touching its number (only one Title will be displayed if loading from floppy disk; up to ten will be displayed if loading from Flash Memory). Information about the Title, including its file size, date and time created, and sample rate, is displayed in the INFORMATION section of the Title Manager Window.

3   Press the LOAD button. The following dialog will appear: (See Figure 9)

Figure 9

4   Press YES to load the selected Title, or press CANCEL to abort the operation. Note that the DMX-R100 will reboot if the Title being loaded utilizes a different sample rate or clock source than the currently selected Title.

TIP: Because each Title is time- and date-stamped, you can identify the latest version saved even if you neglect to give each Title a distinct name.
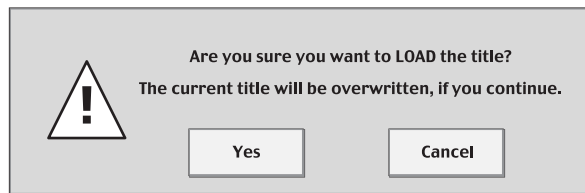
SNAPSHOTS

Creating A Snapshot

Once a Title has been created and stored, the next step is to create a Snapshot. A Snapshot contains all the information for all channels, buses, and Aux sends and returns, including bus assignments, fader levels, and pan, equalization and dynamics processing settings. A Title can contain up to 99 Snapshots, each with its own individual settings; however, all Snapshots must use the same sample rate and clock source. Snapshots also can be used for mix or live sound automation and can be recalled in various ways, including via a Cue List or MIDI.

Since you have 99 of them at your disposal, it's a good idea to get in the habit of creating a Snapshot every time you set up a new DMX-R100 configuration. The procedure for creating a Snapshot is similar to that of creating a Title, only it is done in the Snapshot Window instead of the Title Manager.

1   Press the SNAPSHOT tab at the bottom of the touchscreen. The Snapshot Window appears. (See Figure 10)

Figure 10

2   Press the NEW button at the top of the Snapshot Window. A new Snapshot — containing all of the current settings in all DMX-R100 channels, buses and Aux sends and returns — is created and stored in the first available slot, and given the default name "#n" (where n is the number of the slot).

3   To rename the Snapshot, first select the name by pressing it on the touchscreen until the Keyboard Window appears. (See Figure 7) Enter the desired name (up to 23 characters in length, though only the first 16 characters will appear in the Snapshot Window) by pressing the onscreen "keys", then press the onscreen ENTER key to complete the operation. If you have an external keyboard connected to the DMX-R100, you can use it instead; press the Enter key on your keyboard to complete the operation.

If you alter any settings on the DMX-R100 and wish to update the currently highlighted Snapshot with those settings (thus overwriting the previously stored data), simply press the STORE button in the Snapshot Window.

The DELETE button in the Snapshot Window allows you to delete unneeded Snapshots.

Recalling A Snapshot

To load (recall) all data from a previously stored Snapshot, simply select the number of the Snapshot to be recalled and press the RECALL button.

The DMX-R100 also allows you to selectively recall only certain data from a previously stored Snapshot, through the use of a comprehensive series of Function (local) and Isolate Channel buttons. For example, to recall all data from a stored Snapshot *except* all channel fader positions, select the number of the Snapshot you wish to recall the data into, then press the FADER button in the Function section at the bottom of the touchscreen so that it lights green (see Figure 11), then press RECALL. (See "Snapshot Window" in Chapter 3 of the Operating Instructions for a full explanation of all the Function (local) buttons.)

Figure 11

Note that the Snapshot Window provides a single level of undo in case you inadvertantly overwrite, delete or recall a Snapshot incorrectly. To undo your last action, simply press the UNDO button at the top of the screen.

SNAPSHOTS

Alternatively, the Isolate buttons allow you to *not* recall the Snapshot data for a specific channel or channels. For example, to recall all data from a stored Snapshot except the data for channel 1, press the CH 1 button in the Isolate Channel section at the right of the touchscreen so that it lights green (see Figure 12) and then press RECALL. (See "Snapshot Window" in Chapter 3 of the Operating Instructions for a full explanation of all the Isolate Channel buttons.)

Figure 12

Matrixing System

The two most important screens for configuring your DMX-R100 are the Input Routing and Output Routing windows. These allow you access to the console's comprehensive matrixing system, which enables you to determine the signal flow for literally all input or output connections on the rear panel. Using these windows, any of the DMX-R100 physical inputs and outputs can be reutilized in any way you like.

The Audio Input Routing Window

The following input signals are available in the Audio Input Routing window:

> 24 AD inputs (the connections to the 24 analog head amplifiers)
> All card slot inputs (up to 32 digital and/or analog inputs, if cards are installed in all four slots*)
> Aux Returns 1 - 8 (4 analog and 4 digital)
> In the "MISC" (Miscellaneous) block:
>> 2 analog 2-track inputs (2TR 1)and 2 digital 2-track inputs (2TR 2)
>> The onboard talkback microphone
>> NC (No Connection) - used to disable an input channel

Any of these can be assigned to:

> Any of the 48 fader channels
> Any of the 8 Aux Return channels
> Any of the 8 "floating" bus Insert returns**
> Any of the 6 External monitor inputs***

Note that the same input can be multed without restriction; that is, the same physical input signal can be assigned to multiple channels and/or Insert returns and External monitor inputs. Audio input routing settings are saved with the Snapshot.

If a DMBK-R109 MADI card is installed,48 inputs are displayed for that one slot, and you can select any of them. For more information, see Appendix E in this guidebook.

*** For more about setting up "floating" bus inserts, see page 1-20 in this guidebook.*

**** For more about using the External monitors, see page D-3 in this guidebook.*

Matrixing System

The basic procedure for using the Audio Input Routing Window is as follows:

1   Press the AUDIO tab at the bottom of the touchscreen, then select INPUT ROUTING. The Audio Input Routing Window appears. (See Figure 13)

Figure 13

A menu of possible sources (in groups of 8) is presented on the left side of the screen. The first three (A-D 1-8, A-D 9 - 16, and A-D 17 - 24) are always available because they indicate the head amp connectors. (for example, the AD 1-8 button indicates the first 8 AD inputs). Similarly, the bottom two boxes (AUX RET 1 - 8 and MISC) are always available. However, depending on the number and types of expansion cards installed in your DMX-R100, some of the other boxes may be grayed out and unavailable.

2   To complete the patching in blocks of eight, press a Channel button at the right of the screen to assign the selected inputs to that channel and the seven adjacent channels. For example, press the AD 1 -8 input, and then press Channel 25. The signal connected to the first eight head amps will now appear on input channels 25 - 32. (See Figure 14)

Figure 14

3   You can also, of course, do input patching on an individual basis. If you press a SOURCE selection a second time, a second drop-down menu will appear. This menu lists all of the independent sources within that group of 8. For example, press the AD 1-8 button and you will see a listing of each of the first 8 AD inputs (the head amp connectors). (See Figure 15)
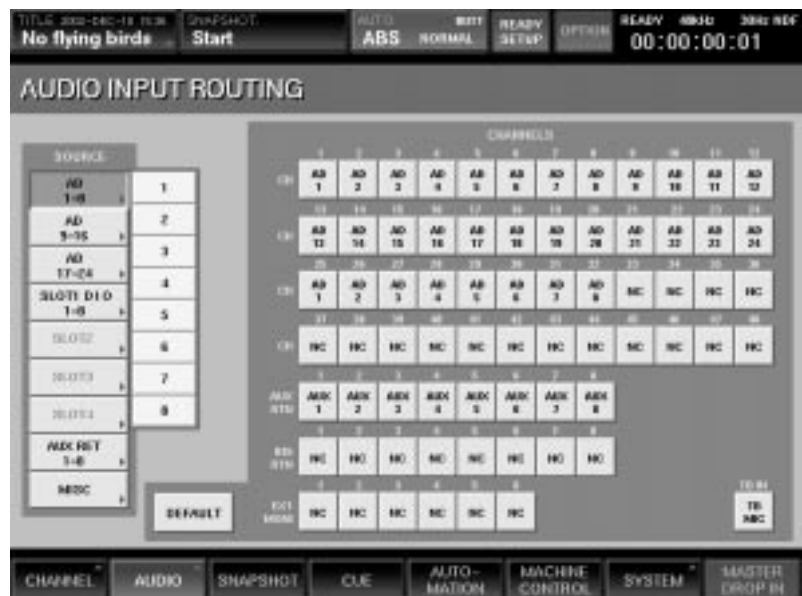
Figure 15

4 To complete the patch, select the individual source, then select the channel. For example, to patch AD input 1 (the signal connected to the first head amplifier) to input channel 48, press the AD 1-8 box a second time and then press the box labeled "1." Finally, press Channel 48. (See Figure 16)
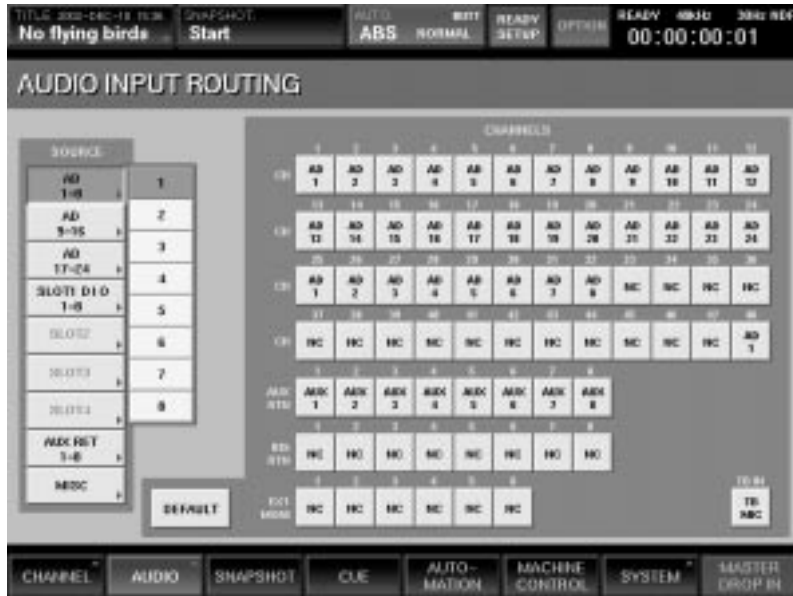
Figure 16

5 To mult that signal to channel 47 as well, simply press the Channel 47 button. The signal connected to the first head amp will now appear on both input channels 47 and 48. (See Figure 17)
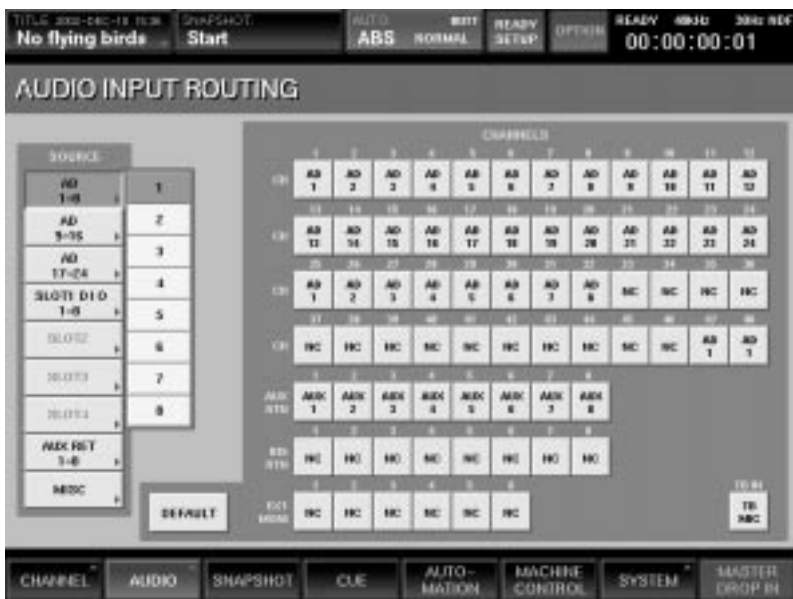
Figure 17

Note that all default settings (AD 1 to Channel 1, AD 2 to Channel 2, etc.) can be instantly restored simply by touching the DEFAULT button on the lower left-hand area of the screen.

Using An External Talkback Microphone

Because the internal Talkback mic appears as both a Source and a Channel (lower right-hand corner of the screen), you can easily route its signal to any Channel(s), or, conversely, can use any input as the Talkback mic source. Here's how to do so:

1 Connect any external microphone to any channel head amp input. If using a condenser microphone, use one of inputs 1 - 12 and turn on +48V phantom power for that channel if required.

2 In the Audio Input Routing window, select that channel in the Source menu.

3 Press the TB IN button (lower right-hand corner of the screen) to complete the routing assignment.

The Audio Output Routing Window

The Audio Output Routing window plays the inverse role, allowing you to route a variety of signals to any of the physical output connectors on the DMX-R100 rear panel. The following signals are available in this window for routing:

> The PGM Left/Right bus
> Aux Sends 1 - 8
> MTR buses 1 - 8
> Insert Sends 1 - 8*
> Direct Outs 1 - 48**
> Control Room outputs 1 - 6
> Studio Monitor outputs Left/Right
> PFL (Pre-Fader Listen) bus outputs Left/Right
> Oscillator outputs Left/Right
> NC (No Connection) - used to disable an output

Any of these signals can be freely routed to any of the following physical rear-panel connectors:

> Any of the slot outputs (provided cards are installed)***
> Any of the 8 Aux Sends (8 analog or 4 analog and 4 digital)
> PGM Left/Right outputs

Note that the same signals can be multed without restriction; that is, they can be routed to multiple output connectors simultaneously if required. Audio output routing settings are saved with the Title. The Audio Output Routing window also provides the means for dithering the output of the PGM bus (see Appendix A) and for creating up to 8 "floating" bus inserts (see page 1-20 in this guidebook for detailed instructions on how to do so).

For more about setting up "floating" bus inserts, see page 1-20 in this guidebook

*** A pre-fader, post-fader, or post-EQ send from each of the 48 input channels, as set in the Input/Pan/Assign window. See "Appendix C: Channel Strip Block Diagram" on page C-1 in this guidebook for more information.*

**** If a DMBK-R109 MADI card is installed,an additional "MADI" tab appears in the Audio Output Routing window. For more information, see Appendix E in this guidebook.*

Matrixing System

The basic procedure for using the Output Routing Window is as follows:

1   Press the AUDIO tab at the bottom of the touchscreen, then select OUTPUT ROUTING. The Audio Output Routing Window appears. (See Figure 18)
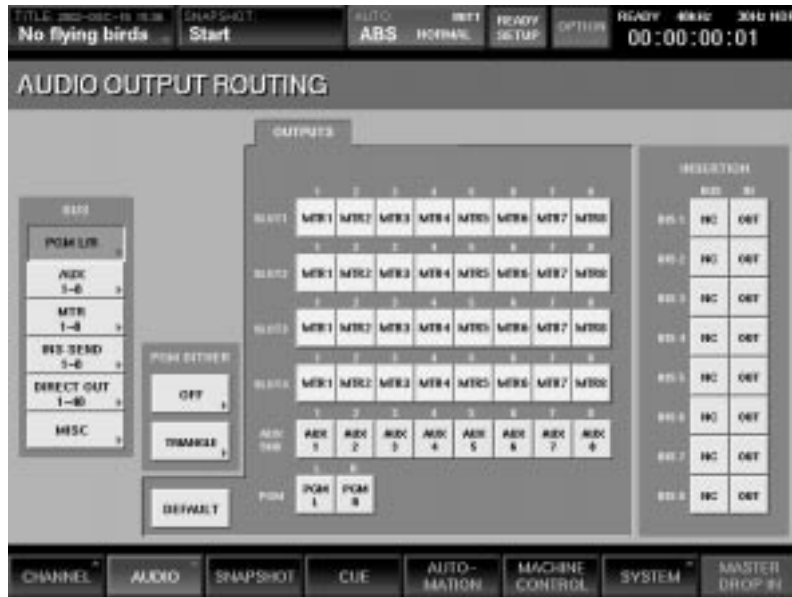
Figure 18

2   The BUS section on the left of the screen displays a menu of all possible buses. If you press one of the BUS buttons a second time, a second drop-down menu will appear. This menu lists all of the independent sources within each group. For example, press the PGM L/R button and you will see each output (L and R) separately. (See Figure 19)
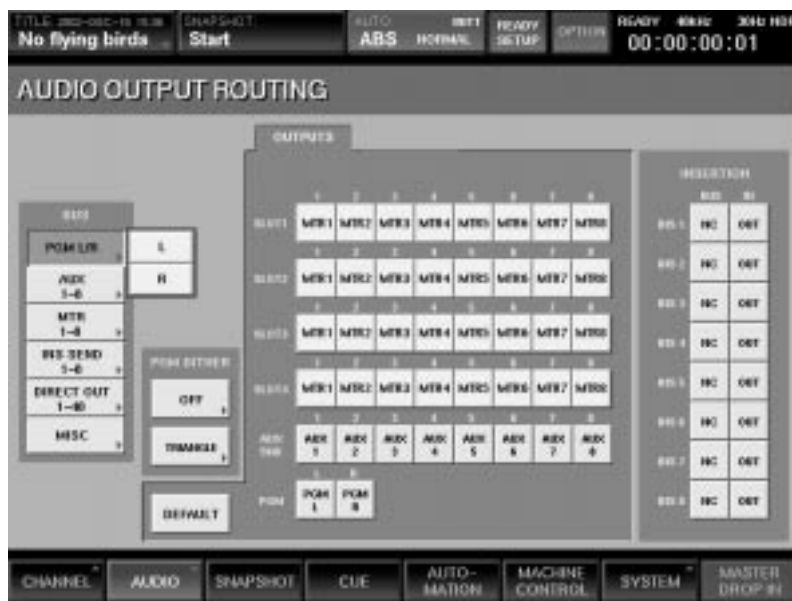
Figure 19

3   To complete the patching, press an OUTPUT button in the center of the screen to assign the selected bus to that physical output connector. For example, press the PGM L button, and then press Aux Send 1. The left PGM bus output will now appear at the physical Aux Send 1 output connector. (See Figure 20)
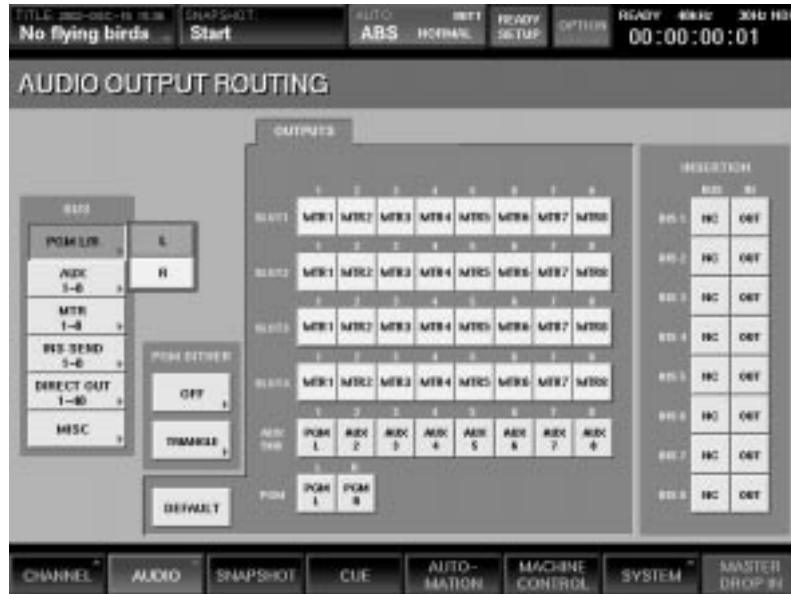
Figure 20

4   To route that bus to Aux Send 2 as well, simply press the Aux Send 2 button. The left PGM bus output will now appear at both the Aux 1 and Aux 2 send output connectors. (See Figure 21)
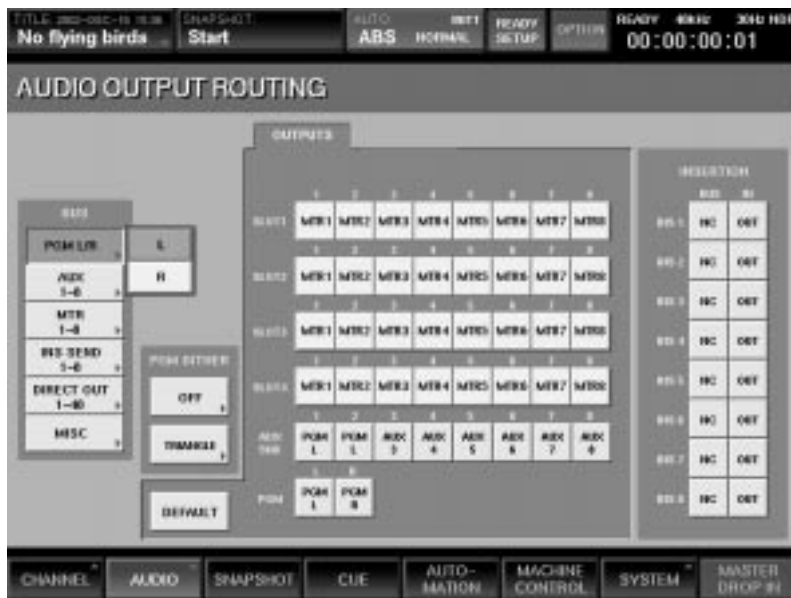
Figure 21

5 You can also make output assignments in blocks. To do so, simply press the desired BUS button once only, then press the OUTPUT button of the first of the contiguous output connectors you wish to make the assignment to. For example, to assign Aux Send Outputs 1 - 8 to Slot 1 outputs 1 - 8, press the AUX 1 - 8 BUS button once, then press the first of the eight Slot 1 outputs. (See Figure 22)
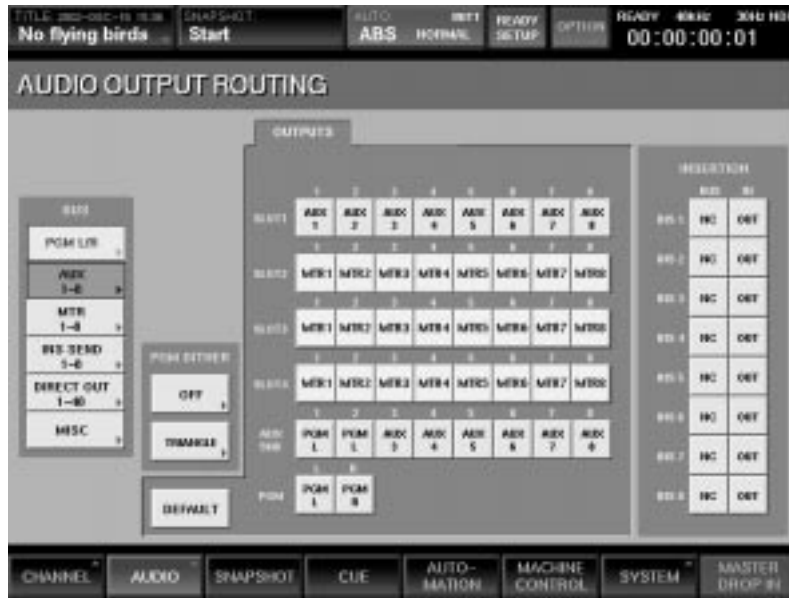
Figure 22

The DIRECT OUT 1 - 48 buses appear as six blocks of 8 outputs. To select a block of 8, press the DIRECT OUT 1 - 48 button once. To select individual Direct outputs within each block of 8, press the desired DIRECT OUT block button a second time. (For example, to select Direct output 35, press the DIRECT OUT 1 - 48 button, then press the DIRECT OUT 33 - 40 button that appears in the resulting drop-down menu, and finally press the button labeled "35").

Note that all default settings (MTR bus outputs to the equivalent slot outputs, Aux Sends to Aux Send connectors, PGM bus to PGM bus output connectors) can be instantly restored simply by touching the DEFAULT button on the lower left-hand area of the screen.

Creating Bus Inserts

As noted previously, the Output Routing window also allows you to set up 8 "floating" bus inserts in the DMX-R100. These are independent of the analog channel inserts available on input channels 1 - 12. The concept is to allow any physical inputs and outputs to be used as unity gain insert sends and returns for any of the buses available in the Audio Output Routing window. This could be used, for example, to strap an outboard compressor/limiter across the PGM stereo bus, or across any of the 8 MTR multitrack buses.

Setting up a bus Insert is a three-step process:

- The first step is setting the Insert(s).
- The second step is selecting the physical output connector(s) to use as the send(s).
- The third step is setting the physical input connector(s) to use as the return(s).

The example below shows how to strap an external compressor/limiter across the PGM stereo bus, using the Aux 1/2 sends and returns:

1   In the Audio Output Routing Window, press PGM L/R in the Bus section twice so that the drop-down menu (L and R) appears.

2   From the drop-down menu, press L, then press INS 1 in the Insertion section (right-hand side of the screen). PGM L will be selected for Insert 1, which will also be set to IN. (See Figure 23)
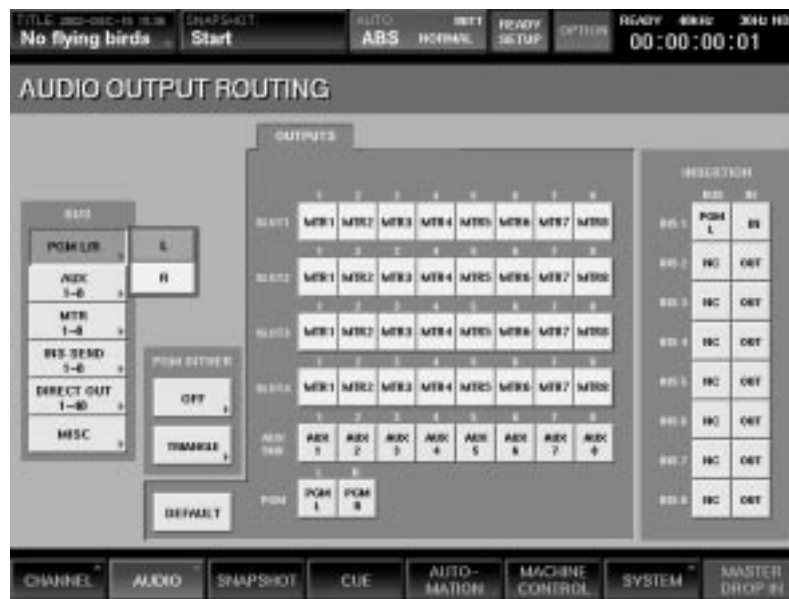
Figure 23

3   Now press R in the Bus drop-down menu, and press INS 2 in the Insertion section. PGM R will be selected for Insert 2, which will be set IN. (See Figure 24)
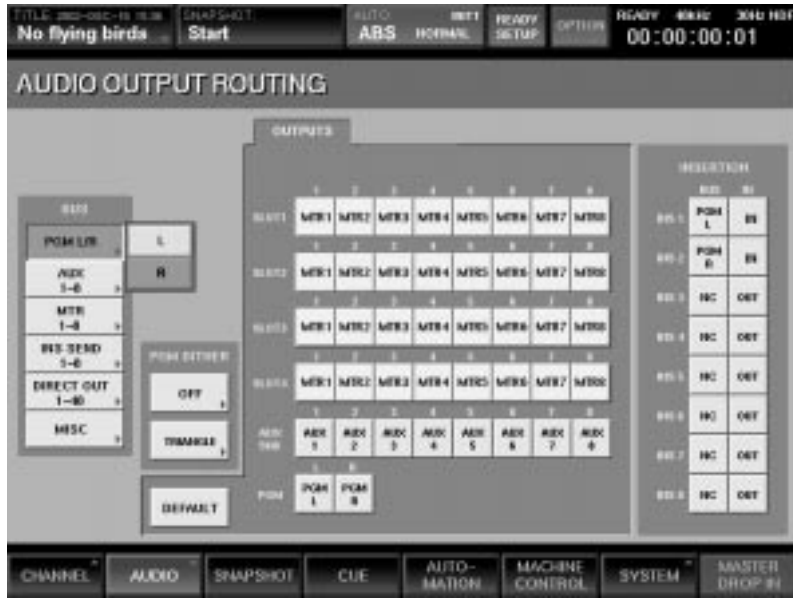
Figure 24

4   Now that the Inserts are set, the next step is to select the physical output connectors to use as the Insert sends. To set Aux 1 as the Insert 1 send, press INS SEND 1-8 in the Bus section twice so that the drop-down menu (1 - 8) appears. (See Figure 25)

Figure 25

Creating Bus Inserts

5 From the INS SEND 1-8 Bus drop-down menu, press 1, then press AUX SEND 1 in the Outputs section (center of the screen). INS SND1 will be selected for Aux Send 1. (See Figure 26)
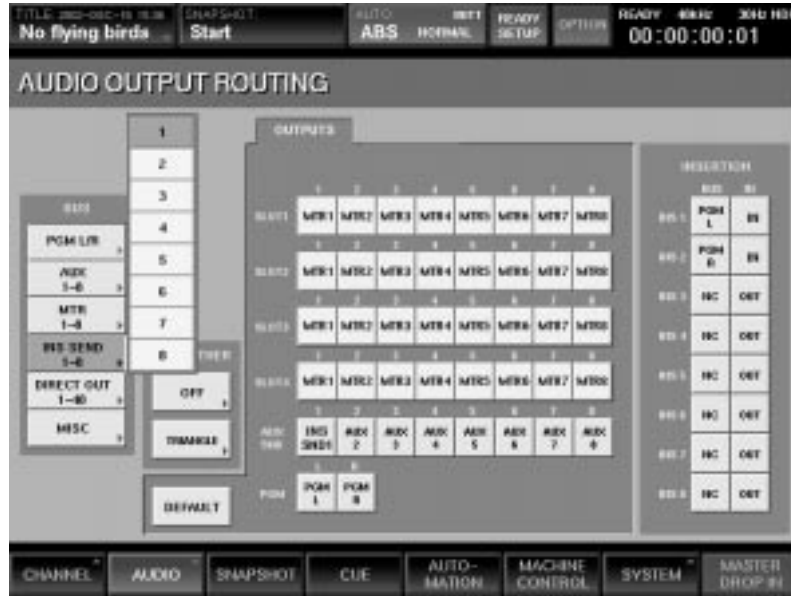
Figure 26

6 Now press 2 in the INS SEND 1-8 Bus drop-down menu, and press AUX SEND 2 in the Outputs section. INS SND2 will be selected for Aux Send 2. (See Figure 27)
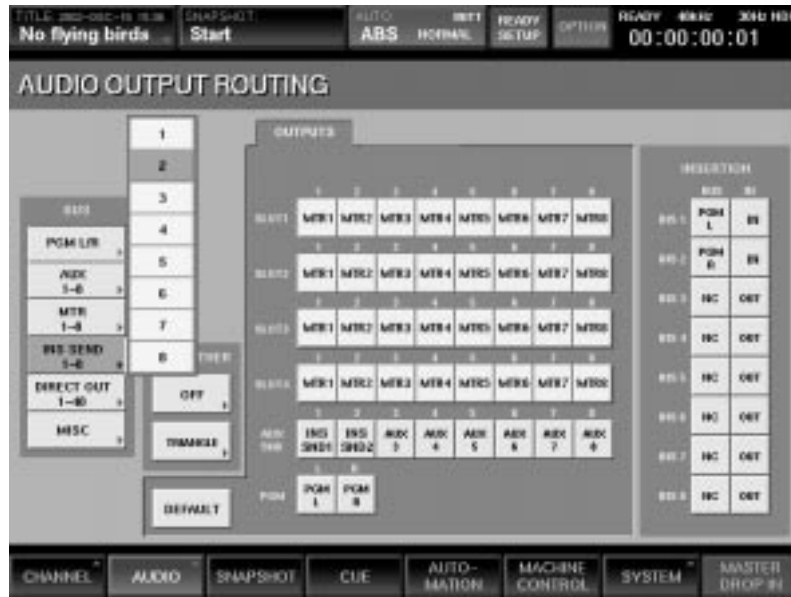
Figure 27

7 The final step is to select the physical input connectors to use as the Insert returns. Press the AUDIO tab at the bottom of the touchscreen, then select INPUT ROUTING. The Audio Input Routing Window appears. Press AUX RET 1-8 in the Source section twice so that the drop-down menu (1 - 8) appears.

8 From the drop-down menu, press 1, then press the INS RTN 1 button in the Channels section (right-hand side of the screen). Aux 1 will be selected for Insert Return 1. (See Figure 28)
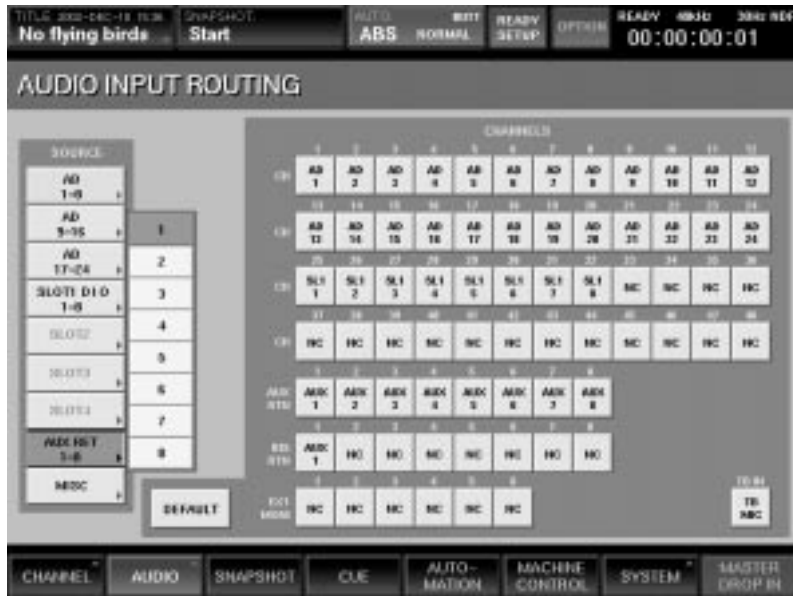
Figure 28

9 Now press 2 in the AUX RET 1-8 Source drop-down menu, then press the INS RTN 2 button in the Channels section. Aux 2 will be selected for Insert Return 2. (See Figure 29)

Figure 29

Creating Bus Inserts

Important Note: If a bus insert is IN, signal must physically get from return to send; otherwise, you won't hear any sound. In this exercise, Aux Sends 1 and 2 were designated as Insert sends for the PGM bus, and Aux Returns 1 and 2 were designated as Insert returns, so you must make a physical connection from send to return (with any desired outboard gear patched in-between) in order for audio to appear in the PGM bus. (See Figure 30)
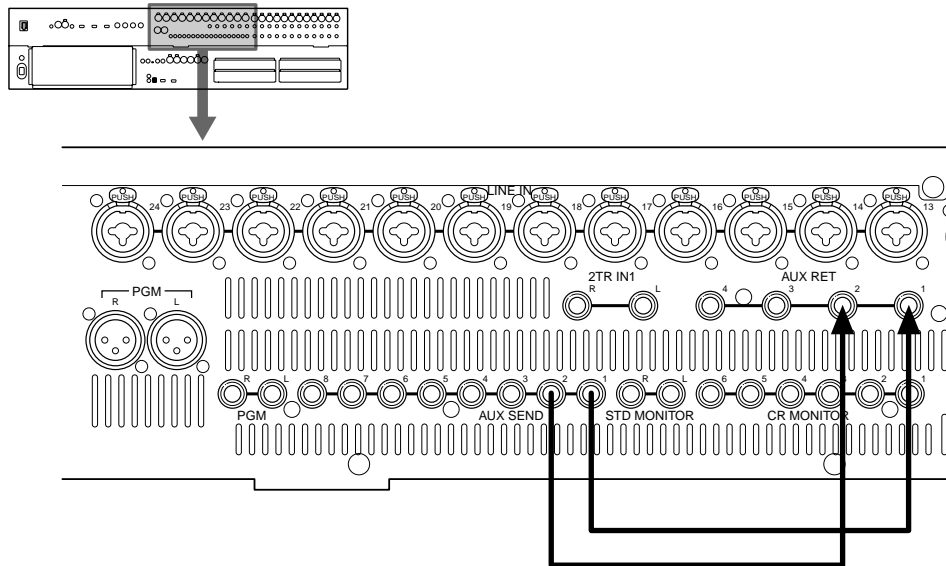
Figure 30

Channel Windows

As you work on the DMX-R100, you will probably find yourself most often working in the main Channel window; this is the window that comes up by default following every power-up or reboot. (See Figure 31)

Figure 31

This window shows a wealth of information about each channel, including fader position, solo/cut status, mono/stereo/surround status, pan position*, bus assignments, Aux send levels, and trim, delay, equalization and dynamics processing settings. In addition, channels can be named (with up to seven characters); to do so, simply touch the black rectangle in the upper right-hand corner of the window and the Keyboard Window will appear (or you can use any external computer keyboard connected to the DMX-R100).

Other information in this window include a series of Isolate buttons (in the lower right-hand corner) that show you at a glance which functions are active or isolated from snapshot recall and/or dynamic automation.** An ACCESS button in each channel strip allows you to specify which channel this window is viewing, or you can use the CHANNEL +/- buttons in the Parameter Setting panel to increment or decrement the number of the channel being viewed. Note that the Parameter Setting panel provides a full set of dedicated physical controls — knobs and switches — that duplicate all the functions of the touchscreen controls, allowing you tactile control over altering all parameters displayed in the Channel window.

* Note that if Broad Pan is turned ON in the Misc Setup window for the current Title, the panning ballistics change for all panners (Channel, MTR, and stereo Aux panning) so that there is greater resolution in the middle "10 o'clock" to "2 o'clock" range. For more information, see the Sony document entitled "About The DMX-R100 Software Version 2.21."

** When writing dynamic automation, the Automation Isolate display in the Channel window changes to a Ready Setup display. For more information, see page T3-8 in this guide.

Touching each section in the main Channel window brings up a secondary Channel window that shows that function in greater detail. For example, touching any area in the bus assignment section (top center of the screen) takes you to the Input/Pan/Assign window (which can also be accessed by pressing the CHANNEL tab at the bottom of the touchscreen, then selecting INPUT/PAN/ASSIGN. (See Figure 32)

Figure 32

Similarly, touching any area in the equalizer section takes you to the EQ / FILTER window (also accessed by pressing the CHANNEL tab at the bottom of the touchscreen, then selecting EQ/FIL). (See Figure 33)

Figure 33

Note that, if Auto Zoom is turned on in the Misc Setup window, the Equalizer/Filter window will automatically be called up any time any of the IN buttons in the hardware Equalizer section of the front panel are pressed.

The Equalizer/Filter section also offers a library, in which up to 99 custom user settings can be stored per Title. To access this window, press the LIBRARY button in the upper right-hand corner. (See Figure 34)

Figure 34

The actions of this window are very much like those of the SNAPSHOT window (see pages 1 - 9 to 1 - 11 in this guidebook). To store the current channel's EQ and Filter settings, press the NEW button at the top of the screen; the current settings will be stored in the first available slot. To overwrite stored settings, select the number of the EQ Library slot you wish to overwrite, then press the STORE button. To recall previously stored EQ/Filter settings into the currently selected channel (as shown in the CURRENT CHANNEL box in the center of the screen), select the number of the slot you wish to recall and then press the RECALL button. EQ Libraries can also be named; simply touch the name of the Library and the Keyboard Window will appear (an external computer keyboard connected to the DMX-R100 can also be used. As with the SNAPSHOT window, there is a single level of UNDO available in case you inadvertantly overwrite, delete or recall settings. To undo your last action, simply press the UNDO button at the top of the screen. To return to the main EQ/FILTER window, press the RETURN button in the upper right-hand corner of the screen. For more information on the use of the EQ Library, see Chapter 3 in the DMX-R100 Operating Instructions.

Note that if two adjacent channels are stereo-linked, recalling a stored EQ Library setting into one channel will automatically place that same setting into the other one.

Touching any area in the dynamics section of the Channel window takes you to the Dynamics window (also accessed by pressing the CHANNEL tab at the bottom of the touchscreen, then selecting DYNAMICS). (See Figure 35)

Figure 35

If Auto Zoom is turned on in the Misc Setup window, the Dynamics window will automatically be called up any time any of the IN buttons in the hardware Dynamics section of the front panel are pressed. Like the Equalizer/Filter window, the Dynamics section offers a library in which up to 99 custom user settings can be stored per Title. To access this window, press the LIBRARY button in the upper right-hand corner. (See Figure 36)

Figure 36

Again, the actions of this window are very much like those of the SNAPSHOT window (see pages 1 - 9 to 1 - 11 in this guidebook). To store the current channel's Dynamics settings, press the NEW button at the top of the screen; the current settings will be stored in the first available slot. To overwrite stored settings, select the number of the Dynamics Library slot you wish to overwrite, then press the STORE button. To recall previously stored Dynamics settings into the currently selected channel (as shown in the CURRENT CHANNEL box in the center of the screen), select the number of the slot you wish to recall and then press the RECALL button. Dynamics Libraries can also be named; simply touch the name of the Library and the Keyboard Window will appear (an external computer keyboard connected to the DMX-R100 can also be used. As with the SNAPSHOT window, there is a single level of UNDO available in case you inadvertantly overwrite, delete or recall settings. To undo your last action, simply press the UNDO button at the top of the screen. To return to the main DYNAMICS window, press the RETURN button in the upper right-hand corner of the screen. For more information on the use of the Dynamics Library, see Chapter 3 in the DMX-R100 Operating Instructions.

Note that if two adjacent channels are stereo-linked, recalling a stored Dynamics Library setting into one channel will automatically place that same setting into the other one.

Lastly, touching any area in the Aux sends section takes you to the Aux Send window (also accessed by pressing the CHANNEL tab at the bottom of the touchscreen, then selecting AUX SEND). (See Figure 37)

Figure 37

A handy RETURN button at the upper right-hand corner of each of these Channel sub-screens allows you to return to the main Channel window instantly. More information about the use of these windows will be presented in the tutorials in this guidebook.

Channel Windows

Other handy windows include the Audio Overview window (accessed by pressing the AUDIO tab at the bottom of the touchscreen, then selecting OVERVIEW). (See Figure 38) Note that, if Auto Zoom is turned on in the Misc Setup window, the Audio Overview window will automatically be called up any time any of the PAGES buttons are pressed.

Figure 38

The Audio Fader window is accessed by pressing the AUDIO tab at the bottom of the touchscreen, then selecting FADER. (See Figure 39)
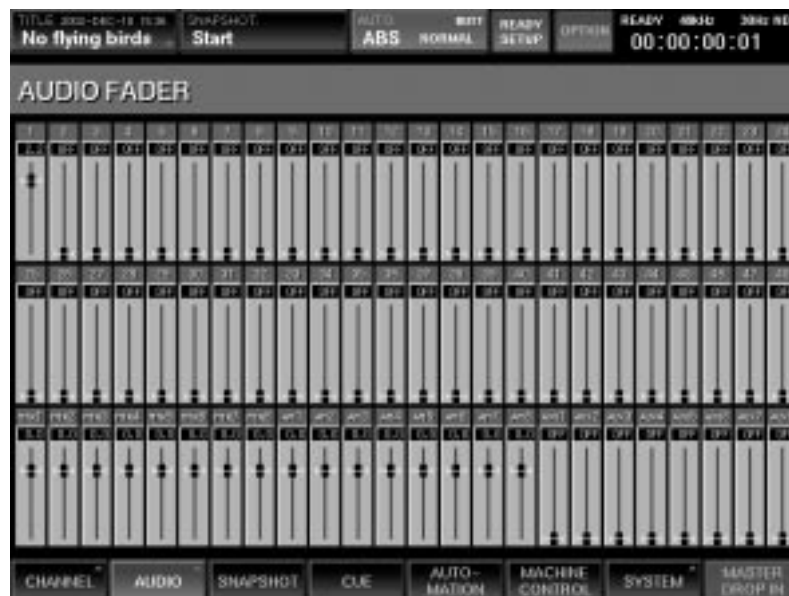
Figure 39

Copying / Linking

Copy Function

Copying all data from a channel to any other channel(s) is a very simple process on the DMX-R100. To do so, just press and hold down the source channel's ACCESS button until it begins blinking, then press the ACCESS button of whatever destination channel(s) you want to copy the data to (if the destination channel is on a different page — for example, if you want to copy data from Channel 1 to Channel 48), be sure to press the PAGES button first. To disable the Copy function, you must press the ACCESS button of the source channel a second time so that it stops blinking. (Be sure to do so or the source channel's data will continue to be written to every new channel you Access!).

Normally, this procedure copies all channel data, including the channel's name, fader position, pan position, Trim/Delay settings, bus assignments, Cut/Fader group assignments, EQ/Dynamics settings, and Aux send settings. However, initiating the Copy function (by pressing and holding down a channel's ACCESS button until it starts blinking) calls up the Copy/Link window (see Figure 40). This window can also be accessed by pressing the AUDIO tab at the bottom of the touchscreen, then selecting COPY/LINK).
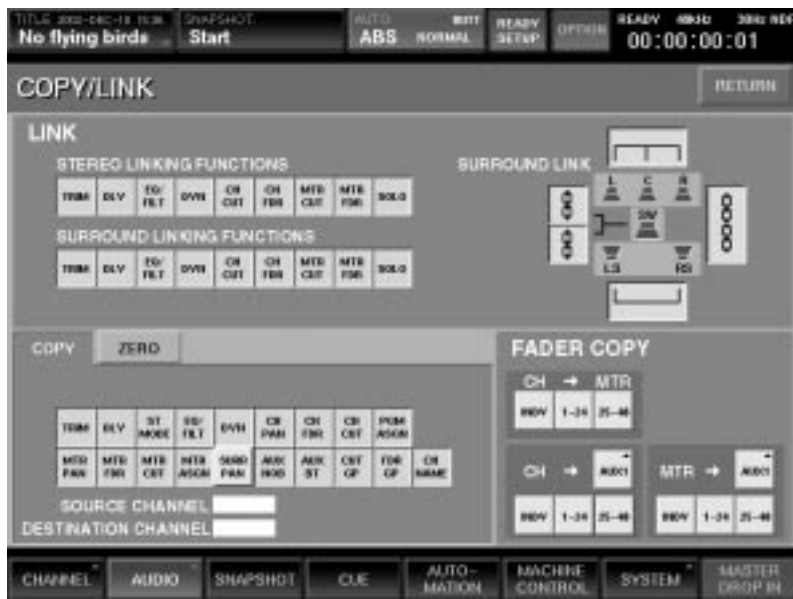
Figure 40

The Copy functions in the bottom half of this window allow you to specify channel parameters that you do *not* wish to copy. The bottom left-hand corner of the window also presents a very useful display, showing the currently selected Source channel as well as the most recent Destination channel the data was copied to. The Source channel box will be blank if the Copy function is currently inactive (that is, if no ACCESS buttons are blinking). If you see a number in that box, it means that you are in potential danger of inadvertantly overwriting data in one or more channels (if you press their ACCESS buttons)! Note that pressing the ZERO tab to access Zeroing functions (see next page for more information) automatically deselects the Copy source channel and blanks out the box.

The Copy function is a powerful one in that it allows you to set up templates for your DMX-R100 in advance of your recording or mixing sessions. If you know that you always like to use certain EQs or Dynamics settings for certain instruments, for example, simply copy the data to the appropriate channels in a layout that is comfortable for you, then save your setup as a Snapshot within a Title.

Note that the Copy function does not copy mix automation data. To do so, the use of the Automation Editor is required. See Appendix F in this Guidebook. for more information.

Fader Copy Function

The Copy/Link window also provides a Fader Copy function, located in the bottom right-hand corner of the screen. (See Figure 40) This function allows you to copy fader position, pan position, and cut on/off status only from multiple channels to selected MTR or AUX sends. In practice, this is useful for quickly setting up headphone mixes based upon the main mix, for example, or for setting up "mix minus" or "clean feed" scenarios for broadcast applications.

The "CH -> MTR" area allows you to copy main channel fader positions to the secondary MTR faders for those same channels.* The "CH -> AUX" area allows you to copy main channel fader positions to the selected AUX send (accessed from a drop-down box) for those same channels. Finally, the "MTR -> AUX" area allows you to copy the secondary MTR fader positions to the selected AUX send for those same channels.

To copy blocks of 24 faders at a time (1 - 24 or 25 - 48), simply press the corresponding button, and press YES when the dialog appears.

The procedure for copying data from individual channels requires a few extra steps. For example, to copy the fader positions for channels 1 - 8, 10, 16, and 41 - 48 to Aux send 7 (as you might do when setting up a headphone mix that contains only those channels, or to create a "mix minus" that does not contain any other channels), the procedure would be as follows:

1 In the Copy/Link window, press the INDV button in the "CH -> AUX" section so that it lights green.

2 Press the AUX button in the "CH -> AUX" section so that the drop-down menu appears, then select AUX7.

3 Press the ACCESS buttons for channels 1 - 8, 10, and16, then press the "25-48" PAGES button and press the ACCESS button for channels 41 - 48. As you do so, note that the DESTINATION CHANNEL box in the lower left-hand corner is constantly updated.

4 Press the INDV button in the "CH -> AUX" section once again so that it returns to white.

5 To check that the copying has been done successfully, press the AUX7 button in the FADERS section (immediately to the right of the 24 physical faders). The exact fader positions of channels 1 - 8, 10, 16, and 41 - 48 only should be the same for Aux send 7 as they are for the main mix output.

Note that pan position is not copied when copying to a mono Aux send. If, however, the Aux send has been stereo-linked (see the next page in this guidebook), pan position is copied, along with fader position and cut on-off status. Note also that there is no means for copying from Aux send to Aux send; to create a series of "mix minus" setups, simply copy the same channels to a number of Aux sends and then individually cut those channels you want to remove from each Aux send.

When the MTR Send Fader option is set to "PRE EQ" or "PRE FDR" in the Input/Pan/Assign window, the DMX-R100 provides two discrete signal paths from each channel fader. In broadcast applications, this would allow one signal path (i.e., the main channel fader) to be used for on-air transmission while the other (i.e. the MTR Send fader) to be used for recording purposes. For more information, refer to the Channel Strip Block Diagram in Appendix C of this guidebook.

Zeroing Function

The Copy/Link window also provides a means for zeroing out selected functions for any channel. The Zeroing function is accessed by pressing the ZERO tab at the bottom of the screen. All the same parameters available for Copying (see page 1 - 31 in this guidebook) are available for zeroing, except for Cut and Fader Group.

To use the Zeroing function, simply select the parameter or parameters you wish to zero out (for example, selecting CH FDR will set the fader for that channel to 0 dB; selecting CH PAN will set the panning to Center, etc.) so that their box lights green, and then press the ACCESS button for the channel(s) you wish to affect. Note that as you press the ACCESS button for different channels, the DESTINATION CHANNEL box in the lower left-hand corner is constantly updated.

To end your zeroing, simply deselect the previously selected parameters by pressing their buttons so that the boxes return to their original white color.

Note that the Zeroing function is only active if you are actively viewing the ZERO tab in the Copy/Link window; even if parameters are selected to be zeroed, pressing various channel ACCESS buttons will not cause them to change unless the tab is actively on "top" of the window or if you are viewing any other window. The ZERO tab is automatically placed "under" the COPY tab whenever you leave the Copy/Link window and later return to it; this is done deliberately to prevent inadvertant zeroing of parameters.

The MISC SETUP window (accessed by pressing the SYSTEM tab at the bottom of the touchscreen, then selecting MISC SETUP) provides a separate "MASTER FADERS LOCKED TO 0 dB" function. This allows you to lock the master faders for the PGM, AUX, and/or MTR buses so that they cannot be moved from their unity gain "0 dB" position.

Linking Functions

The main Channel window allows odd-even pairs of channels, MTR masters, Aux sends, or Aux returns to be linked together in stereo. It also allows contiguous groups of six channels, MTR masters, Aux sends, or Aux returns to be linked together in "surround" mode. This is accomplished by touching the box directly underneath the channel name and then selecting MONO, STEREO, or SURROUND from the drop-down menu. Stereo and surround links can also be created within the Mode section of the Input/Pan/Assign window.

If an odd-numbered channel is changed from MONO to STEREO mode, it will always be linked to the channel to its immediate right: for example, changing Channel 11 from MONO to STEREO will cause it to be linked to Channel 12. If an even-numbered channel is changed from MONO to STEREO mode, it will always be linked to the channel to its immediate left: for example, changing Channel 14 from MONO to STEREO will cause it to be linked to Channel 13. When stereo-linked, the faders of both channels automatically go to the position of the left (odd-numbered channel); moving either fader will then change the level of both channels. If you plan on linking pairs of channels together in stereo, make sure your input routing assignments (in the Audio Input Routing window) correctly reflect that; for example, the left side returns from stereo devices should always be connected to odd-numbered channels.

Setting up stereo links in Aux sends allows you to send signal to outboard devices that have discrete stereo inputs, and also enables you to set up additional Program sends and/or stereo headphone mixes. When two Aux sends are stereo-linked, the Aux Send window changes its display to reflect that fact (see Figure 41). Here, the left knob sets the Aux send level for both sends, and the right knob sets the panning position of the two sends (the "balance" between the two). However, for this to work, the PAN button (what was the PRE button for the even-numbered Aux send) must be on (colored green). Note that pressing the ON button for either Aux send turns them both on or off.

Copying / Linking

Figure 41

Surround linking is accomplished within contiguous groups of six channels. The possible surround link assignments on the DMX-R100 are therefore: Channels 1 - 6, 7 - 12, 13 - 18, 19 - 24, 25 - 30, 31 - 36, 37 - 42, and 43 - 48; MTR masters 1 - 6; AUX sends 1 - 6; and AUX returns 1 - 6. Selecting any channel within these groups automatically places other channels in that group into a surround link. MTR masters 7 and 8, AUX sends 7 and 8, and AUX returns 7 and 8 cannot be surround-linked (the option is grayed out in the pull-down menu for those channels).

The Link area in the Copy/Link window allows you to specify which parameters are to be linked when channels are stereo- or surround-linked. For example, you can opt to have only channel fader levels linked (by pressing the CH FDR box so that it lights green) while maintaining independent EQ, Dynamics, Trim, Delay, and MTR fader positions for each channel. By pressing the CH CUT, MTR CUT, or SOLO boxes, you can opt to have both channels in a stereo link (or all channels in a surround link) cut or solo when either channel's CUT or SOLO button is pressed. When an element is stereo-linked, changing the parameter for one channel automatically changes that same parameters for all other stereo-linked channels (for example, if EQ/FILT is enabled, changing any EQ parameters in any channel causes the same change to be made in all other linked channels). Note that enabling Dynamics in the Link section only links the knobs together; to actually do stereo (or surround) dynamics processing, you have to press the LINK button in the Dynamics window.

The graphics display in the SURROUND LINK section on the right-hand side of the screen allows you to selectively link together specific channels within a surround link. For example, you can opt to link together only the front LCR channels, or only the rear LS/RS channels. The subwoofer channel can be left independent, or can be linked to the front channels, rear channels, or all five main channels. You can even set up two linked groups within a single surround link: for example, the LCR channels can be linked together, and the LS/RS and subwoofer channels linked together. For more information, see Chapter 3 in the DMX-R100 Operating Instructions. Note that you don't have to be operating the DMX-R100 in surround mode (as set in the MISC SETUP window) to use surround links; you can simply think of it as a way to have controls (such as Cuts) linked across several channels.

If you are doing surround mixing, you may find it very helpful to create a Surround link for MTR masters 1 - 6 with Channel Fader, EQ and Dynamics enabled; this permits you to do 5.1 fades and apply multichannel processing (5.1 EQ and/or 5.1 compression) to any or all surround buses, all without the use of an expensive external multichannel processor. For more information, see Appendix B in this guidebook.

Monitoring

The DMX-R100 provides comprehensive monitoring of a variety of input signals through dual sets of loudspeakers: control room and studio. The Control Room loudspeakers can operate in stereo, mono, or surround*, and the Studio loudspeakers can operate in stereo or mono. All monitoring operations can be carried out from the front panel of the DMX-R100 (see Figure 42) or from the Monitor window (see Figure 43), accessed by pressing the AUDIO tab at the bottom of the touchscreen, then selecting MONITOR.
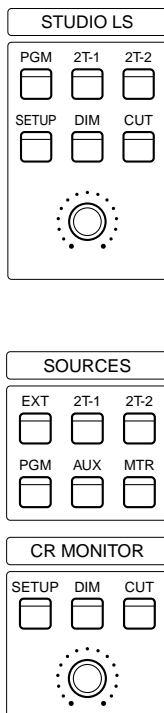
Figure 42

Figure 43

Depending upon the settings of the front panel switches, the Control Room loudspeakers can be set to carry signal from the PGM bus, any single or odd/even pair of Aux sends, any single or odd/even pair of MTR buses, any single or odd/even pair of EXT inputs (as set in the Input Routing window; see page 1-13 in this guidebook), or the (analog) 2TK1 or (digital) 2TK2 signal.

Depending upon the settings of the front panel switches, the Studio loudspeakers can be set to carry signal from the PGM bus or the 2TK1 or 2TK2 signal. However, pressing the front panel SETUP switch in the Studio LS section not only calls up the Monitor window but also allows you to monitor signal over the Studio loudspeakers from any single or odd/even pair of Aux sends, any MTR buses, or any EXT inputs.

Other options in the Monitor window allow you to set various Solo functions. For more information, see Chapter 3 in the DMX-R100 Operating Instructions.

* *For more information about surround applications, see Appendix B on page B-1 in this guidebook.*

Metering

The metering of the DMX-R100 is also quite flexible. The 8 main meters on the right-hand side of the console can be assigned to show PGM stereo bus output, Aux send 1 - 8 output, or MTR multitrack bus output, depending upon the setting of the Meter switches. (See Figure 44)
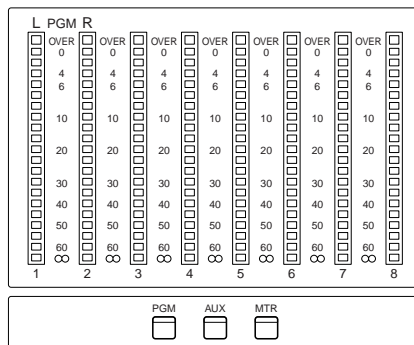
Figure 44

At first glance, this may seem to preclude the simultaneous use of these meters to show all three master outputs simultaneously, but this can in fact be accomplished with the judicious use of the PAGES button, located just to the right of fader 24. (See Figure 45)
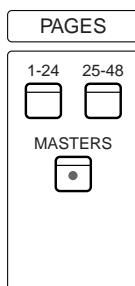
Figure 45

By pressing the MASTERS page button, faders 1 - 16 control the output levels for MTR buses 1 - 8 and Aux Sends 1 - 8, respectively. At the same time, their associated meters show the master levels for the MTR buses and Aux Sends, so by simply setting PAGES to MASTERS and setting the main Meter switch to PGM, you can actually meter all master outputs simultaneously.

TIP: If Peak Hold is set to MANUAL (in the MISC SETUP page), peak levels will always be displayed in all main and channel meters. To instantly clear all peaks and reset all DMX-R100 meters, simply press the currently lit Meter switch (PGM, AUX, or MTR).

Machine Control and MIDI Functions

One of the most important features offered by the DMX-R100 is machine control, which enables the remote control of a wide range of connected devices, including tape and hard disk recorders, computer software, and video decks. Although the use of machine control is optional for general use, it is required for automated mixing functions, where both the DMX-R100 and any connected audio devices must be locked to the same time code. For more information, see Tutorial 3 on page T3-1 in this guidebook.

All machine control functions are accessed from the Machine Control window. (See Figure 1)
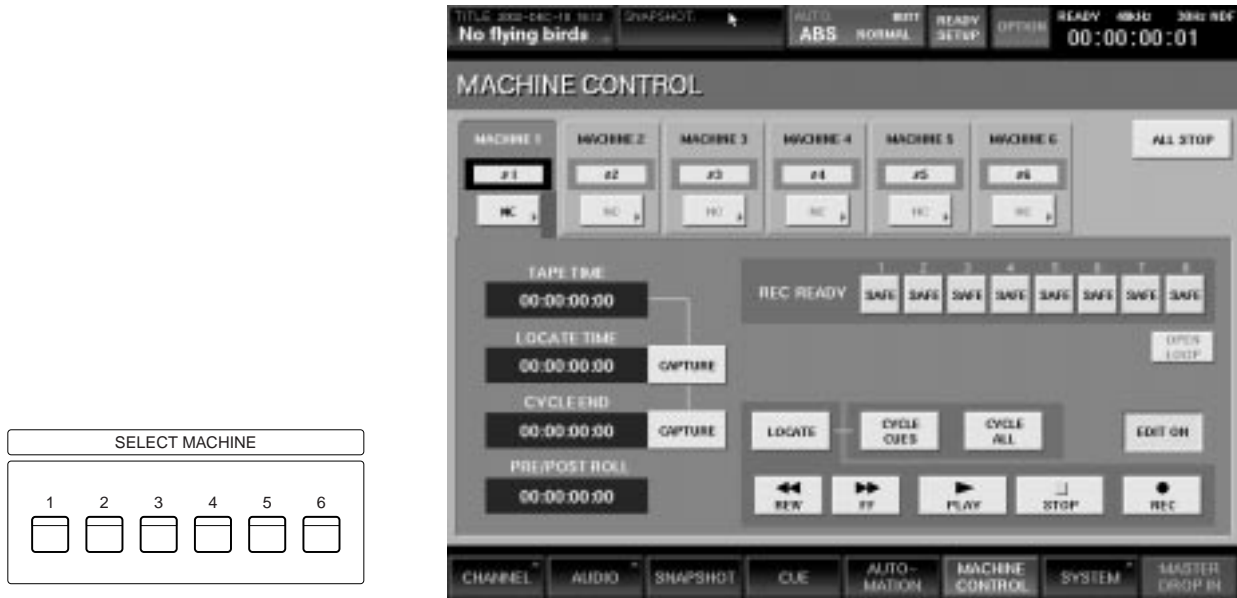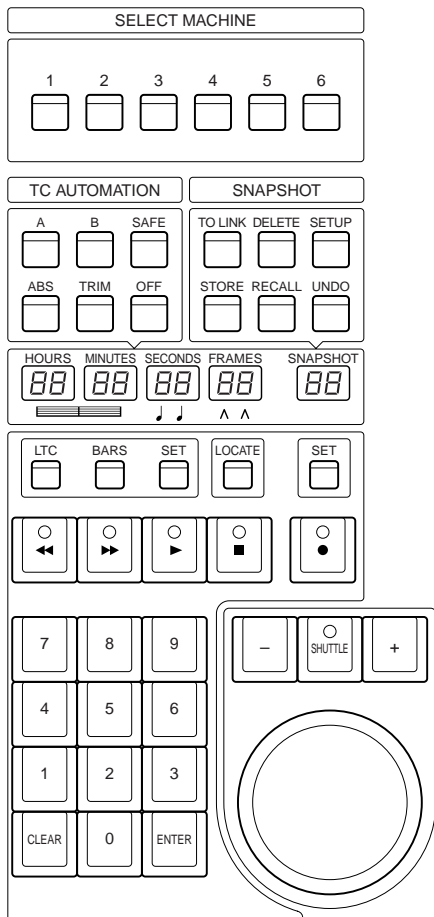
Figure 1

For detailed information about the functions provided by this window, see Chapter 3 in the DMX-R100 Operating Instructions.

Up to six machines can be controlled by the DMX-R100 transport and locate buttons, one at a time. These are labeled 1 - 6, and you can quickly switch between machines either by touching the corresponding button in the Machine Control window or by pressing one of the hardware Select Machine buttons in the DMX-R100 Automation Panel. (See Figure 2)

Figure 2

Machine Control and MIDI Functions

There are four different means by which machines can be remotely controlled by the DMX-R100:

- MIDI Machine Control (MMC), transmitted on any of 16 channels
- Via standard 9-pin Sony protocol from either of two ports (REMOTE OUT 1 and REMOTE OUT 2)
- By sending SMPTE time code from the DMX-R100 internal generator

To select which means to use, simply press Port Select button (the box below the machine number) on the touchscreen: a menu will drop down. (See Figure 3)
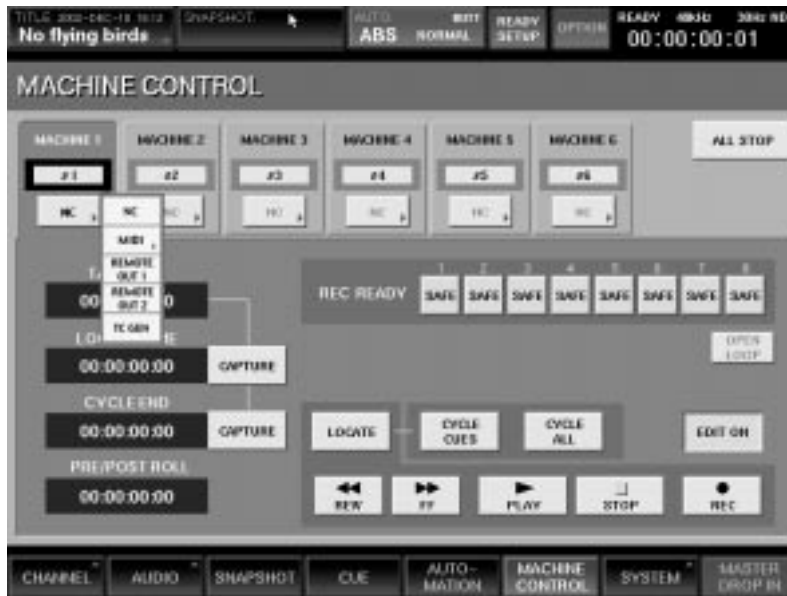
Figure 3

The "NC" option means "No Connection" and is used to disable a selected machine. Individual machines can also be named with up to five characters; simply touch the machine number until the Keyboard Window appears. Alternatively, an external keyboard connected to the DMX-R100 can be used for this purpose.

The REC READY section in the center of the window allows you to remotely arm up to eight tracks on a connected recorder via 9-pin or closed-loop MMC control (see page 2-6 in this guide for more information about MMC). Due to inherent lag times in transmitting and receiving these commands, this is not intended for use when doing tight punch-ins; instead, the intention is to allow you to remotely arm master recorders that are being routed stereo or surround mixes via the PGM or MTR buses. The EDIT ON button is intended for insert recording and should be used only when remotely controlling a video tape recorder (VTR). When on (lit green), the connected VTR will only arm audio, and not video tracks, for recording.

Bear in mind that not all devices implement MMC or the 9-pin protocol fully, so the DMX-R100 may not be able to remotely control every kind of machine. A listing of currently compatible machines, along with the complete MMC and Sony Serial Interface Protocol supported by the DMX-R100 is provided in the DMX-R100 Software Version 2.1 / 2.2 Supplement. When in doubt, the safest course of action is to set the DMX-R100 to transmit SMPTE time code via machine control and to set the remote device to chase-lock.

Controlling Pro Tools® From The DMX-R100

Pro Tools version 5.3 software added remote 9-pin control functionality (see page 2-5 in this guide for more information); however, audio is not played back during shuttling, and linear time code cannot be outputted by Pro Tools when it is under 9-pin control. In Pro Tools version 6.x software, 9-pin control will support SMPTE time code output when the system is configured with a Digidesign Universal Slave Driver (in TDM systems) or SYNC I/O (in HD systems). As an alternative to 9-pin control, we recommend the use of TC Gen mode in the DMX-R100 to control Pro Tools. The procedure for doing so is as follows:

1   Make a physical connection between the DMX-R100 Time Code output and the SMPTE input of the sync or MIDI interface being used by Pro Tools. Consult the users manual of that device to follow the procedure required to route the timecode to Pro Tools.

2   In the Sync / Time Code window, set the time code reader SOURCE to "TC GENERATOR."

3   In the Machine Control window, select a machine and name it "PT".

4   Touch the Port Select button and, from the dropdown menu, select TC GEN (for "Timecode Generator").

5   Follow the appropriate procedure in Pro Tools to activate the receipt of incoming timecode. For example, if using a basic MIDI interface, open the Machine Control tab in the Pro Tools Peripherals menu and make sure the port receiving the time code is activated. Consult the Pro Tools owners manual for more information.

6   Set the appropriate SMPTE offset in Pro Tools in the Session Setup window.

7   Place Pro Tools online by clicking the left-most icon in the Transport Bar or by selecting "Online" from the Operations menu.

8   Start and stop playback of Pro Tools either by pressing the Play switch in the DMX-R100 transport control or by touching the onscreen Play button in the Machine Control window.

When using GEN as the machine port, only the Play and Stop buttons are active. However, you can also perform "roll-back" and "roll-ahead" functions by pressing the Stop and Rewind or Stop and Fast-Forward buttons simultaneously. Pressing Stop and Rewind will cause Pro Tools (or any connected machine) to roll-back five seconds previously (continue pressing Stop and Rewind simultaneously to increment back ten seconds, fifteen seconds, etc.), and pressing Stop and Fast-Forward will cause Pro Tools (or any connected machine) to roll ahead five seconds. (Again, each time you press Stop and Fast-Forward, it will roll ahead an additional five seconds.)

The DMX-R100 Cue list function also allows you to autolocate Pro Tools to up to 99 different points. The procedure on the following page shows you how to do so.

Autolocating Within Pro Tools®

1 With all connections and settings made as per the preceding procedure, press the CUE tab at the bottom of the DMX-R100 touchscreen; the Cue window appears. (See Figure 4)

Figure 4

2 Begin playback of Pro Tools by pressing the Play switch in the DMX-R100 transport control. As you reach different cues in the song (i.e., verse, chorus, bridge, etc.), press the NEW button at the top of the touchscreen; a new cue will be created and saved in the list at the precise timecode point.

3 Stop playback at the conclusion of the song. You can now automatically locate to each cue point in the list by pressing it to highlight it, pressing the LOCATE button on the center left of the touchscreen, and then pressing the Play switch in the transport control.

4 Each cue can be individually named by selecting the name and using either the onscreen keyboard or a connected external keyboard. You can also "fine-tune" the SMPTE time of each cue by selecting it and either using the jog/shuttle wheel or the ten-keypad; be sure to press the ENTER key in order to set and save the new SMPTE time value. Note also that CUE 1 (the initial cue) is automatically given a start time of 00:00:00:01. This should be left as is because CUE 1 serves a special function in automated mixing (for more information, see Tutorial 3 on page T3-1 in this guidebook).

Whether using Pro Tools or other recording media, setting up a cue list before beginning a mix automation session is generally a good organizational thing to do; see page T3-1 in this guidebook for detailed instructions on how to do so.

Using 9-Pin Machine Control

The DMX-R100 provides two separate 9-pin output ports for remote control of devices that support the Sony 9-pin protocol. To activate 9-pin remote control, simply select either REMOTE OUT 1 or REMOTE OUT 2 from the dropdown Port Select menu in the Machine Control window. The DMX-R100 issues commands via these ports, including rewind, fast-forward, tape locate, and shuttle. Bear in mind that not all devices support all 9-pin commands. Refer to the Sony Software Version 2.1 ∕ 2.2 Supplement or to the user manual of the receiving device for more information.

Using MIDI Machine Control

The DMX-R100 outputs the full range of MIDI Machine Control (MMC) commands* via its MIDI output jack when MIDI is selected from the dropdown Port Select menu in the Machine Control window. This menu initiates a submenu, allowing you to specify the MMC device number you wish to use. The receiving machine should be set to the same device number or to F7 (127), which is used to receive all device numbers.

In order for rewind, fast-forward and locate functions to be active via MMC, the DMX-R100 needs to be continuously updated with the current locate point of the device being controlled. This is accomplished with a two-way handshaking ("closed loop") connection between the MIDI Out jack of the DMX and the MIDI In jack of the remote device, and between the MIDI Out jack of the remote device and the MIDI In jack of the DMX. If a connection is not made between the MIDI Out of the remote device and the MIDI In of the DMX, or if the remote device is unable to transmit its location via MMC, the the following error dialog will be displayed: (See Figure 5)

> **!** Switching Midi Machine Control(1) to 'Open Loop'
>
> [OK]

Figure 5

Following this error message, the OPEN LOOP box on the right-hand side of the touchscreen will be lit green in order to reflect the open-loop status. When lit, only the Stop and Play MMC messages will be transmitted.

* A complete listing of all MIDI Machine Control commands supported by the DMX-R100 is provided in the Sony Software Version 2.1 / 2.2 Supplement.

Slaving the DMX-R100

There may be circumstances where you want the DMX-R100 to slave to connected devices instead of controlling them. In such a configuration, either an external SMPTE or MIDI Time Code (MTC) generator can be used as master. These functions are set in the SYNC/TIME CODE Window. To open this window, press the SYSTEM tab at the bottom of the touchscreen, and, from the pop-up menu select SYNC/TIME CODE. (See Figure 6)

Figure 6

The SOURCE button in the Time Code Reader section of the touchscreen is used to select external SMPTE or MTC control. (See Figure 7)
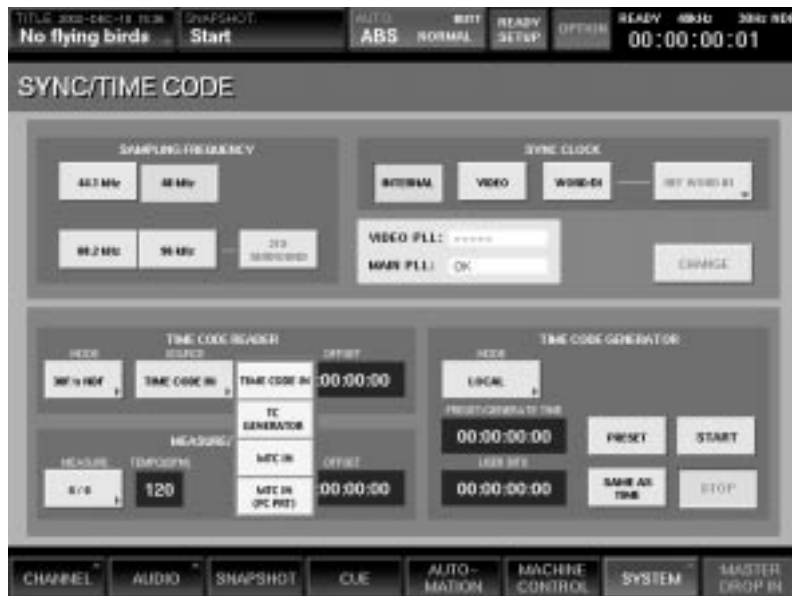
Figure 7

When set to TC GENERATOR, the DMX-R100 acts as master, with its built-in time code generator providing the SMPTE time code to connected devices. When set to TIME CODE IN, SMPTE signal arriving from an external device at the Time Code In connector on the rear panel acts as master. When set to MTC IN, MIDI Time Code signal arriving at the dedicated MTC input connector (not the MIDI input connector) acts as master. When set to MTC IN (PC PORT), MIDI Time Code signal arriving at the PC Port connector acts as master.   If the PC Port is being used for this purpose, it must be set to the proper mode in the MIDI window (see Chapter 3 in the DMX-R100 Operating Instructions for more information).

When slaved to either incoming SMPTE or MTC, the DMX-R100 is capable of regenerating the timecode out of the rear panel Time Code Out connector so that it can be distributed to other devices. To do so, select either SLAVE LOCK or SLAVE LOCK (AUTO RUN) from the dropdown menu of the MODE button in the Time Code Generator section of the touchscreen. (See Figure 8)
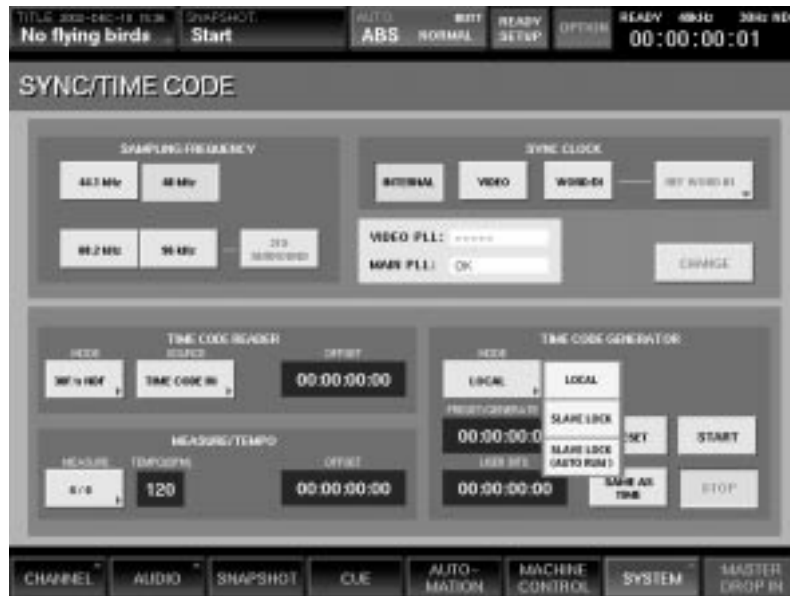
Figure 8

The difference between these two modes is that SLAVE LOCK (AUTO RUN) causes SMPTE to continue to be output (freewheeling) by the DMX-R100 even after incoming signal is stopped. In SLAVE LOCK mode, however, SMPTE is output by the DMX-R100 only when incoming time code is actively being received.

Other MIDI Functions

All DMX-R100 MIDI functions other than MMC machine control and MTC slaving are accessed from the MIDI window. To open this window, press the SYSTEM tab at the bottom of the touchscreen, and, from the pop-up menu, select MIDI. (See Figure 9)
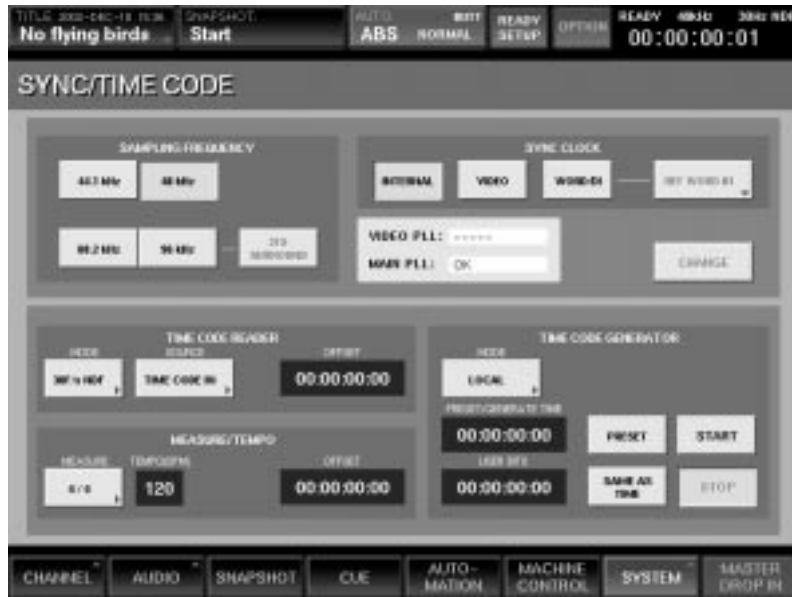
Figure 9

The controls on this page allow you to specify the MIDI send and receive channels and to turn MIDI program and/or control change transmit and receive on and off. A MIDI Echo function, when on, retransmits data received at the DMX-R100 MIDI In port to the MIDI Out port, which may be useful when daisy-chaining the console to other MIDI devices such as sequencers.

MIDI program change messages can be used to remotely call up different Snapshots on the DMX-R100 from external devices. With the use of external conversion boxes, Snapshot recalls can even be triggered from standard GPI (General Purpose Interface) commands, such as from video switchers, or vice-versa. One example of a suitable unit for accomplishing this is the MIDI Solutions R8 (www.midisolutions.com). These same kinds of conversion boxes can also be used to trigger remote GPI actions when initiatng different control change messages on the DMX-R100; for example, raising a fader above a certain position can create start or stop controls for cart machines or live mic sensing.

When transmitting or receiving control change messages, you can select one of three different MIDI modes. Each of these modes provides a different mapping for incoming and outgoing control change messages, as detailed in the Control Change Table in the MIDI Appendix of the DMX-R100 Operating Instructions. Mode 1 allows access to (and transmission from) all faders and channel pans, while Mode 2 supports channel faders 1 - 24, all master faders, cuts and pans for channels 1 - 24, and faders and cuts for Aux returns; it also enables access to Aux send 1 for channels 1 - 22. Mode 3 is a special MIDI control mode for the five DMX-R100 talkback functions (PGM, AUX, MTR, STUDIO, and SLATE) via control change messages 26 - 30. This enables a simple Producer's talkback control to be set up using any standard MIDI controller. The procedure for doing so is detailed on the following page.

Setup of Producer's Talkback

1   Program a MIDI controller so that it can transmit control change messages 26 - 30 with values of 0 and 127. The best way of doing this is by using five momentary switches.

2   Set the MIDI channel of that controller to any value from 1 - 16, and set the same channel in the RX (RECEIVE) section of the DMX-R100 MIDI window.

3   In the CONTROL CHANGE section of the MIDI window, set MODE to 3 and set RX to ENABLE (touch the button once if it currently reads DISABLE).

4   Make a physical connection between the MIDI Out jack of the controller and the MIDI In jack of the DMX-R100.

5   As you now operate the appropriate switches or keys of the MIDI controller so they reach maximum value (127), the five different DMX-R100 talkback operations will be activated. To turn the talkback function off, simply set the control to its minimum value of 0.

One example of a suitable MIDI interface unit for triggering DMX-R100 remote talkback functions is the MIDI Solutions F8 (www.midisolutions.com).

Preparation

This tutorial will take you through the basic procedures for tracking and overdubbing with a DMX-R100. All operations listed here are described in detail in the "Getting Started" section in this guide.

The following peripherals are required for this Tutorial:

- A microphone
- A line-level stereo source such as a CD player, synthesizer or sampler
- A signal processor with either digital or analog inputs and outputs
- A multitrack tape or hard disk recorder
- A set of standard stereo headphones

1 Make all required connections between the Control Room and Studio monitor outputs of your DMX-R100 and your loudspeakers.

2 In the Misc Setup window (under the SYSTEM menu tab), make sure MTR Bus Mode is not set to Surround (the button should be white and not green). Then go to the Sync/Time Code window and set the desired sample rate and master clock source. Finally, go to the Title Manager and create a new Title, then save it to Flash Memory.

3 Connect a microphone to the head amplifier input of channel 12. If the microphone is a condenser type requiring phantom power, press in the +48V switch on channel 12 after the microphone is connected.

4 Connect your line-level stereo source device to the head amplifier inputs of channels 1 and 2.

5 If your signal processor provides AES/EBU digital I/O, connect its inputs to Aux Sends 7/8 (using the DMX-R100 rear panel XLR digital connector) and its outputs to Aux Returns 7/8. If your signal processor provides only analog I/O, connect its inputs to Aux Sends 1/2 and its outputs to Aux Returns 1/2.

6 Connect both the inputs and outputs of the first eight tracks of your multitrack recorder to the expansion card installed in slot 1.

7 Go to the Audio Input Routing window and press the Default button. Then go to the Audio Output Routing window and do the same. Following this procedure, the windows should look like this:
(See Figures 1 and 2)
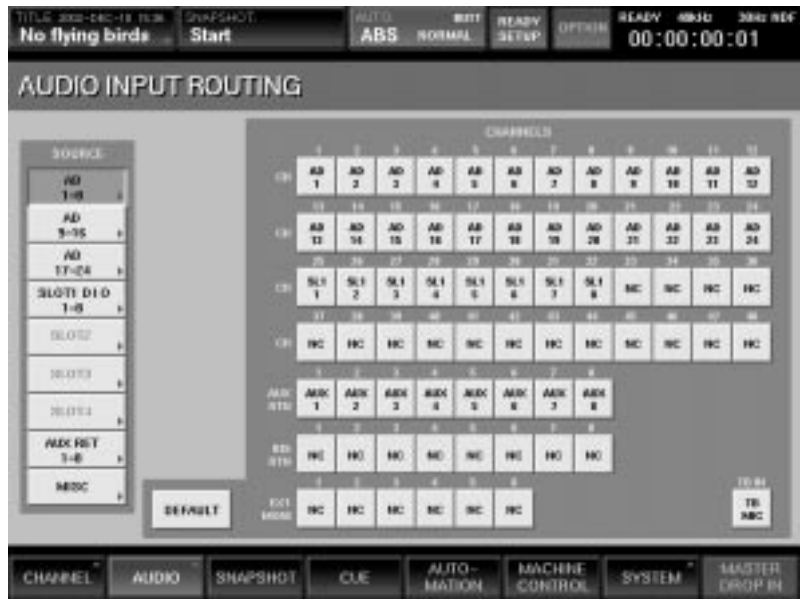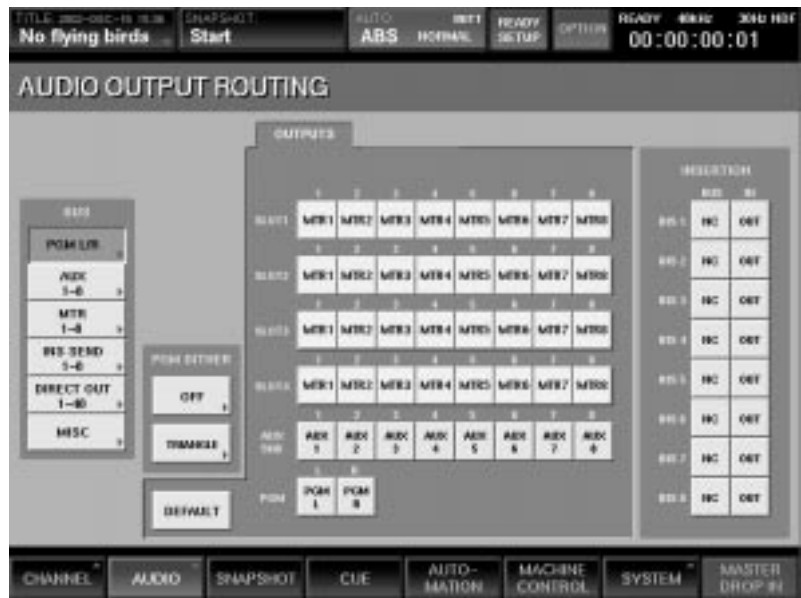
Figure 1

Figure 2

Preparation

8   In the Audio Input Routing window, assign AD12 (the microphone input) to channel 1. Then assign AD1 (the left side of the stereo source signal) to channel 3, and AD2 (the right side of the stereo source signal) to channel 4. Finally, assign Slot 1, tracks 1 - 8, to channels 17 - 24. Finally, assign NC (No Connect) from the MISC Source menu to channel 2 and to channels 25 - 32; this is to eliminate duplicate (multed) routings of AD2 and Slot 1, tracks 1 - 8. The Audio Input Routing window should now look like this: (See Figure 3)

Figure 3

This layout will place the microphone input on fader 1 and the stereo source input on faders 3 and 4. The multitrack returns from Slot 1 will appear on faders 17 - 24.

9   Go to the Snapshot window and press the NEW button in order to create a new snapshot. Using the touchscreen keyboard or an externally connected keyboard, name it "Tutorial 1"

10   Go to the Title Manager window and press the SAVE button in order to save the current Title to Flash Memory.

Setting Monitoring Levels

In this Tutorial, we will be recording signal from the stereo source to tracks 1 and 2 of the multitrack, and then overdubbing the mic signal onto track 3. Accordingly, the next step is to set up the monitoring section (in this case, Channels 17 - 24) so that we hear tracks 1 and 2 in stereo, and track 3 in mono.

1   Make sure the OFF switch is lit in the TC Automation section of the console.

2   In the Monitor window, make sure the Monitor Mode is set to Stereo. Then set the Control Room monitor source to PGM, and set the CR monitor knob to a moderate listening level. Set the main meters to PGM.

3   Go to the Channel window and press the ACCESS button for channel 17. In the upper right-hand corner of the touchscreen, press the mode selector box. From the drop-down menu, select STEREO. (See Figure 4)

Figure 4

4   Slowly raise the fader of channel 17 until it reaches unity gain (0.0 dB) in the Channel window. Note that the fader for channel 18 moves at the same time; this is because the two channels are now stereo linked.

5   In the Channel window, verify that channels 17 and 18 are both routed to the PGM (L/R) bus only — the bus being used for monitoring. Set the panpot for channel 17 to hard left and the panpot for channel 18 to hard right. Alternatively, you can simply assign channel 17 to the Left PGM bus only and channel 18 to the Right PGM bus only.

6   Press the ACCESS button for channel 19 (or simply use the Channel + button in the Parameter Setting panel to advance it to channel 19) and, in the Channel window, verify that it is routed to both the left and right outputs of the PGM bus (for monitoring only; again, make sure it is not routed to any of the eight MTR buses, which are being used to send signal to your multitrack recorder), and that its panpot is centered. Slowly raise the fader of channel 19 until it reaches unity gain (0.0 dB)

7   Go to the Snapshot window, highlight the current "Tutorial 1" snapshot, and press the STORE button to update it with these changes.

8   Go to the Title Manager window and press the SAVE button in order to save the current Title to Flash Memory.

Initial Recording

We're now ready to begin recording the first pass — the stereo line-level source — onto tracks 1 and 2 of the multitrack.

1 Press the ACCESS button for channel 3 (the left-hand side of the stereo input signal) and, in the mode selector box in the Channel window (which automatically appears whenever the ACCESS button is pressed or a new channel is selected for access), set channel 3 to STEREO.

2 Touch the Assign section (upper center) to call up the Input/Pan/Assign window (this can also be accessed by selecting INPUT/PAN/ASSIGN from the CHANNEL tab). Since we want the signal from this channel to be routed to MTR buses and **not** the stereo PGM bus (which is being used solely for monitoring), deselect PROGRAM L and R and instead select MTR bus 1. (See Figure 5)

Figure 5

3 Press the ACCESS button for channel 4 (the right-hand side of the stereo input signal). Assign it to MTR bus 2, and de-assign it from PROGRAM L and R.

Note: If, instead of working with a simple stereo signal, you had multiple input signals that you wanted to pan in various ways to a pair of odd-even MTR buses, you could instead use the MTR Pan function in the INPUT/PAN/ASSIGN window. To access the Multitrack panners, simply put the faders in MTR mode (by pressing the MTR button in the Assignment Panel immediately to the right of channel 24). In this mode, the channel rotary controls act as Multitrack panners; signal panned left is routed more to the odd-numbered MTR buses, and signal panned right is routed more to the even-numbered MTR buses.

4 Set tracks 1 and 2 of your multitrack recorder to monitor input signal.

5 Begin playing signal from the stereo line-level source and watch the master meters while slowly raising the channel 3 fader (because it is stereo linked to channel 4, that fader will move with it) to approximately unity (0.0 dB) gain. Use the Pad and/or Gain controls of head amplifiers 1 and 2 as required until you have a strong, but not overloaded signal reaching MTR buses 1 and 2.

6 After correctly adjusting the levels, apply equalization and/or dynamics processing as desired to source channels 3 and 4 (not the monitoring channels), using the controls in the Parameter Setting panel and/or touchscreen EQ/Filter and Dynamics windows. When you are satisfied with the signal, record-enable tracks 1 and 2 of your multitrack recorder and begin recording the stereo line-level signal.

7 After recording, tracks 1 and 2 can be played back; they appear on faders 17 and 18. Monitoring levels can be adjusted either by moving those faders or with the use of the CR Monitor knob.

Overdubbing

1   Press the Cut switch in the CR Monitor section or turn the CR Monitor knob all the way down to avoid feedback and signal bleeding problems. Connect a pair of headphones to the front-panel headphone jack and raise the Headphone level knob to a comfortable listening level*.

2   Set track 3 of your multitrack recorder to monitor input signal.

3   Begin playback of the multitrack while singing or speaking into the connected microphone. Again, watch the master meters while slowly raising the channel 1 fader to approximately unity gain. Use the Pad and/or Gain controls of head amplifier 12 as required until you have a strong, but not overloaded signal reaching MTR bus 3.

4   After correctly adjusting the level, apply equalization and/or dynamics processing as desired to channel 1, using the controls in the Parameter Setting panel and/or touchscreen EQ/Filter and Dyanmics windows.

5   To send signal to the connected outboard effects processor, press the ACCESS button for channel 1 and touch the Aux send area at the bottom of the Channel window (or select AUX SEND from the CHANNEL tab).* Then use the knobs in the Parameter Setting panel and/or touchscreen controls to turn on either Aux sends 1 and 2 (if the connected processor provides analog I/O) or Aux sends 7 and 8 (if the connected processor provides digital I/O).

Note: Pairs of adjacent odd/even Aux sends can be ganged together in stereo if desired: To do so, press the MASTERS button in the faders section and press ACCESS for the odd Aux send (for example, Aux send 1 if you want to gang Aux sends 1 and 2), and then, in the Channel window, set that Aux send to STEREO mode. The level knob for the odd-numbered Aux send then becomes a stereo master send level, and the level knob for the even-numbered Aux send then becomes a pan control. (See Figure 6) For more information, see page 1 - 33 in this guide.

Figure 6

* You can also use Aux sends to set up headphone (cue) mixes. Up to eight individual mono or four stereo headphone mixes can be created simultaneously, thus allowing each musician to receive a customized mix. In addition, if Aux sends are designated as pre-fader (if their PRE button is lit green), these headphone mixes will be completely independent of the main PGM bus mix being monitored through the Control Room outputs..

Tutorial 1

Overdubbing

Set the Aux send levels to approximately unity gain (0.0 dB) and adjust the input controls of your outboard processor to get a strong input signal without clipping. You can switch the master meters to AUX to view the Aux send levels, or by pressing the MASTERS button in the faders section (in which case the Aux send levels appear in the associated channel meters).

6 To set up the Aux returns, press the MASTERS button in the faders section and press ACCESS for Aux return 1 (if the connected processor provides analog I/O) or Aux return 7 (if the connected processor provides digital I/O). Then, in the Channel window, set that Aux return to STEREO mode.

Effects from the connected outboard signal processor can be either applied to the monitor signal only, or recorded. To apply the outboard effects to the monitor signal only, assign the odd-numbered Aux return to PGM bus L, and the even-numbered Aux return to PGM bus R (do not assign either to any of the MTR buses). To record the effects with the microphone signal, assign both Aux returns to MTR bus 3 instead of the PGM bus. Use the two Aux return faders (since they are stereo-linked, they will move together) to blend in the desired amount of effects to taste.

7 When you are satisfied with the signal, record-enable track 3 of your multitrack recorder and record the overdub.

8 Continue the overdub process as above, using MTR buses 4 - 8 to route signal to the remaining tracks on your multitrack, and using channels 20 - 24 (assigned to the PGM bus) to monitor the tape returns. If your multitrack offers more than 8 tracks (or if you are using multiple 8-track recorders), the signal is routed through additional expansion cards using the processes described above.

Note that you can also use the Audio Output Routing window to freely reassign any or all MTR buses (or any or all of the 48 Direct outputs) to any or all fader slots (and thus to any tracks of your multitrack recorder), and that the MTR buses themselves can be equalized and/or have dynamics processing applied. To access the MTR buses, press the MASTERS button in the fader section and then press the ACCESS button for any of faders 1 - 8.

Important Note: As you continue through the overdubbing process, be sure to periodically create new Snapshots — up to 99 can be contained within each Title, so there's no reason to skimp. Also be sure to save the current Title (using the SAVE button in the Title Manager) to Flash Memory (as well as archiving to floppy disk) before powering down; if you don't save your Title, your Snapshots will not be saved!

Tutorial 1

Preparation

This tutorial will take you through the basic procedures for non-automated mixing with a DMX-R100.

The following peripherals are required for this Tutorial:

- A multitrack tape or hard disk recorder with signal recorded on at least 8 tracks
- A digital or analog two-track recorder
- A signal processor that provides either digital or analog inputs and outputs
- (Optional) A SMPTE time code source

1 Make all required connections between the Control Room and Studio monitor outputs of your DMX-R100 and your loudspeakers

2 Connect both the inputs and outputs of the first eight tracks of your multitrack recorder to the expansion card installed in slot 1.

3 Connect the inputs of your two-track recorder to the PGM outputs (digital or analog) of the DMX-R100, and connect the outputs of your two-track recorder either to the 2 TK1 input (if it provides only analog outputs) or the 2 TK2 input (if it provides AES/EBU digital outputs).

4 If your signal processor provides AES/EBU digital I/O, connect its inputs to Aux Sends 7/8 (using the DMX-R100 rear panel XLR digital connector) and its outputs to Aux Returns 7/8. If your signal processor provides only analog I/O, connect its inputs to Aux Sends 1/2 and its outputs to Aux Returns 1/2.

5 Go to the Audio Input Routing window and press the Default button. Then go to the Audio Output Routing window and do the same. (See Figures 1 and 2 in Tutorial #1)

6 In the Audio Input Routing window, assign Slot 1, tracks 1 - 8, to Channels 1 - 8 and also assign Slot 1, track 8 to Channel 9 (this will set up a mult of track 8). Then assign NC (No Connect) from the MISC Source menu to Channels 25 - 32; this is to eliminate duplicate (multed) routings of Slot 1, tracks 1 - 8. The Audio Input Routing window should now look like this: (See Figure 1)

Figure 1

Preparation

7 Go to the Snapshot window and press the NEW button in order to create a new snapshot. Using the touchscreen keyboard or an externally connected keyboard, name it "Tutorial 2"

8 Go to the Title Manager window and press the SAVE button in order to save the current Title to Flash Memory.
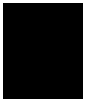
Setting Monitoring Levels

In this Tutorial, we will be mixing signal from 8 tracks of the multitrack to the 2-track, using various DMX-R100 features other than mix automation.

1   Make sure the OFF switch is lit in the TC Automation section of the console.

2   In the Monitor window, make sure the Monitor Mode is set to Stereo. Then set the Control Room monitor source to PGM, and set the CR monitor knob to a moderate listening level. Set the main meters to PGM.

3   Go to the Input/Pan/Assign window and press the ACCESS button for Channel 1. Make sure that it is routed to both the L and R outputs of the PGM bus (make sure it is not routed to any of the eight MTR buses), and that its panpot is centered. Use the Channel + button in the Parameter Setting panel to advance Access to Channels 2 - 9 and make sure that they are all set up the same way.

4   Start your multitrack machine and begin slowly raising the faders of Channels 1 - 8 until they are at or around unity gain (0.0 dB). Set up a rough static mix so that signals are approximately balanced correctly.

5   Apply equalization and/or dynamics processing as desired to the various tracks, using the controls in the Parameter Setting panel and/or touchscreen EQ/Filter and Dynamics windows.

6   Add effects from your outboard processor as desired, using Aux sends 1/2 or 7/8 to route signal from specific Channels. Press the MASTERS button in the faders section and press ACCESS for Aux return 1 (if the connected processor provides analog I/O) or Aux return 7 (if the connected processor provides digital I/O). Then, in the Channel window, set that Aux return to STEREO mode and assign the odd-numbered Aux return to PGM bus L, and the even-numbered Aux return to PGM bus R. Adjust the fader levels of Aux returns 1/2 or 7/8 to taste.

NOTE: Signal arriving at the DMX-R100 Aux Return connectors can in fact be routed to any standard input Channel or Channels in the Audio Input Routing window, in which case they can have equalization and/or dynamics processing applied as well as being routed to other Aux sends. However, there is an advantage to leaving them routed to their default Aux Return channels in that it frees up standard input Channels. (The disadvantage is that Aux Return channels can only send post-fader signal to Aux sends at unity gain.)

7   Go to the Snapshot window, highlight the current "Tutorial 2" snapshot, and press the STORE button to update it with these changes.

8   Go to the Title Manager window and press the SAVE button in order to save the current Title to Flash Memory.

Tutorial 2

Cue List Operation

Organization is important with any digital mixer. The DMX-R100 provides a powerful Cue function that should be part of every session setup. It allows you to name, and quickly autolocate to, sections of the audio that you are mixing. In postproduction applications, this allows you to identify scene changes; in music mixing, it allows you to instantly jump to each verse, chorus, or bridge. Flexible Cycle functions in the Cue window also allow you to loop playback between two or more cues continuously so that you can make audio adjustments in context. For more information, see Chapter 3 in the DMX-R100 Operating Instructions and the Sony DMX-R100 Automation Operation document.

In addition, as you go through a mix, levels will inevitably change. A mix may often have one set of fader levels in verses and a different set in choruses, for example. Also, it is common to start a mix with all channels cut (or all faders down) in order to silence any spurious noise (i.e., countoffs, lips smacking, chairs creaking) that occur before the song begins. The DMX-R100 Cue function allows you to call up different Snapshots, or even recall EQ or Dynamics library presets into specified channels, at the touch of a single button. These different "cues" can even be called up automatically by incoming SMPTE or MTC time code.

 Following is an exercise in setting up a Cue list:

1   Recall the "Tutorial 2" snapshot and press the Cut switch for Channels 1 - 8 (or pull faders 1 - 8 completely down).

2   Go to the Snapshot window and press NEW. Rename the new snapshot "SILENCE" and press the STORE button.

3   Call up the Cue window by pressing the CUE menu tab. Cue 1 should be left as is because it serves an important purpose in automated mixing (see Tutorial 3 in this guide for more information). Therefore, press the NEW button, rename the new CUE 2 "START OF MIX." Touch the EVENT box for Cue 2, and from the drop-down menu, assign the "SILENCE" snapshot. Set TC LINK to OFF. (See Figure 2)

Figure 2

4   Press the NEW button again and assign the "Tutorial 2" snapshot to CUE 3, then rename the cue "VERSE". Again, set TC LINK to OFF. (See Figure 3)

Figure 3

5   Highlight CUE 3 by touching "3" or the cue name, then press the RECALL button at the top of the touchscreen. The "Tutorial 2" snapshot will be recalled and Channels 1 - 8 will no longer be cut (or their faders will return to their previous levels).

6   Bring the fader for Channel 8 all the way down and raise the fader for Channel 9. Because of the mult set up earlier in this Tutorial, it will be carrying the same signal, from track 8 of your multitrack. Equalize Channel 9 significantly differently than you did Channel 8 (enough so you can hear a difference) and set its fader to a significantly lower level, then go to the Snapshot window and create and store a new Snapshot named "track 8 different."

Tutorial 2

7 Return to the CUE window and create a new, fourth Cue (CUE 4), naming it "CHORUS". Assign it the "track 8 different" snapshot and once again set TC LINK to OFF. (See Figure 4)

Figure 4

8 Experiment with RECALLing the three different stored Cues as the multitrack plays. Using the Cue List this way provides an easy way to switch between different mix scenarios at the touch of a button.

9 The procedure for creating Cues that call up EQ and/or Dynamics libraries is similar: create a new Cue, but in the EVENT box, select EQ LIB or DYN LIB instead of SNAPSHOT. The NUMBER box to the right of the EVENT box provides a drop-down menu that shows a list of stored Libraries and allows you to specify which one you wish to recall. Finally, go to the EFFECTIVE CHANNEL box (to the right of the NUMBER box) and in the drop-down menu, specify which channel you wish to recall the Library setting into.

10 Like snapshots, cues are stored in temporary memory (and lost following power-down) unless they are saved as part of the current Title. Accordingly, go to the Title Manager window and press the SAVE button in order to save the current Title to Flash Memory.

The Cue list you create can also be linked to incoming SMPTE time code. **Important Note: If incoming timecode crosses the 00:00:00:00 point, errors may occur. Accordingly, it is good practice to set external timecode generators to a start time of 01:00:00:00.** If you have a SMPTE generator available (or if your multitrack recorder is capable of generating SMPTE time code), try the following:

1 Make a connection between the SMPTE (LTC) output of your time code generator or multitrack recorder* and the Time Code input of the DMX-R100.

* If you are using an analog multitrack, you can use the analog output of a track striped with SMPTE.

2 Go to the Sync/Time Code window (under the SYSTEM tab) and set TIME CODE READER Source to TIME CODE IN. (See Figure 5)

Figure 5

3 In the CUE window, set TC LINK for Cues 2, 3, and 4 to ON, then highlight the TIME CODE value for CUE 3. Using the ten-keypad of the DMX-R100, enter a SMPTE time code value of 01:00:05:00 for CUE 3 (be sure to hit the Enter key on the keypad to complete the input). Then repeat the operation for CUE 4, this time entering a SMPTE time code value of 01:00:10:00. (See Figure 6)

Figure 6

Tutorial 2 Mixing Session (Non-Automated Mixing)   T2-7

Tutorial 2

4 In the Snapshot section of your DMX-R100 (immediately above the SMPTE time code display), press the TC LINK button so that it lights up. **This is required for external triggering of Cue events via SMPTE.**

5 Set your multitrack or SMPTE time generator to begin at 01:00:00:00 and start it going (or play the multitrack if you are using a striped track as your SMPTE source). The SMPTE time code display on the DMX-R100 should increment to reflect the incoming time code value. CUE 3 (the "VERSE" snapshot) will be recalled automatically at 01:00:05:00 (five seconds in), and CUE 4 (the "track8 different" snapshot) will be recalled automatically at 01:00:10:00 (ten seconds in).

TIME CODE values for various cues can also be set "on the fly," as tape is rolling. The following exercise shows how to do so:

1 In the Cue window, set CUE 2's event to NA (Not Available), then select CUE 3 and press the DELETE button to remove it from the list. Next, delete CUE 4 as well.

2 From the Snapshot window, recall the "Tutorial 2" snapshot.

3 Start your multitrack and timecode generator. At the appropriate point in the song where you want the faders to go to the "Tutorial 2" settings, press the STORE button in the Snapshot section (the button immediately below TC LINK). Stop playback.

4 In the Snapshot window, you will see that a new snapshot has been created, and in the Cue window, you will see that a new CUE has been created, calling up that snapshot at precisely the SMPTE time value that occurred when you pressed the STORE button. If required, this SMPTE value can be manually adjusted by selecting it and using the ten-keypad or jog/shuttle wheel (be sure to press the Enter key on the keypad to complete the input). Rename the new snapshot and cue with a descriptive name.

5 Begin playback again and manipulate the faders to create a different balance (or simply recall the "track8 different" snapshot from the Snapshot window). At the point at which you want this new balance to appear in the mix, press the STORE button. Stop playback.

6 Once again, a new snapshot and cue have been created at precisely the SMPTE time value that occurred when you pressed the STORE button. Adjust the SMPTE value as required and rename the new snapshot and cue with a descriptive name.

7 To complete the process and restore silence to the start of the mix (all faders down or Channels 1 - 8 cut), go to the Cue window and change the Event for CUE 2 from NA to SNAPSHOT, then select the "silence" snapshot.

8 Start your multitrack and time code generator once again. The song will begin with the "silence" snapshot, then the succeeding two snapshots will be recalled at precisely the SMPTE times that occurred when you pressed the STORE button.

9 Since Cue lists are stored in temporary memory (and lost following power-down), be sure to go to the Title Manager window and save your data.

Other functions in the Cue window allow you to store, delete, and recall individual cues. An undo button also allows you to undo your last operation in this window. Note that the RECALL and UNDO touchscreen buttons in the Cue window are duplicated by the equivalent hardware buttons in the Snapshot section of the DMX-R100.

Control Groups

Another important mixing feature offered by the DMX-R100 is the ability to organize its 48 input channels (as well as all 8 Aux returns and sends, the 8 multitrack [MTR] buses, and the stereo Program [PGM] bus) into cut and fader control groups. There are eight control control groups available — all accessed from the Audio Fader/Cut Grouping window (under the AUDIO tab) — and each channel or Aux return can belong to one cut control group and one fader control group (since they cannot be cut, MTR buses and Aux sends can belong to one fader control group only).

Cut control groups allow you to cut (mute) or switch on (unmute) multiple channels simultaneously; by pressing the Cut button of any channel in that control group, all other channels in that control group cut or switch on at the same time. Fader control groups allow you to adjust the level of several channels simultaneously by moving the fader of a channel within that control group. The DMX-R100 provides two different kinds of fader control groups: Gang and VCA. In Gang control groups, any fader can act as master and all faders move simultaneously; in VCA control groups, one fader is designated as master and moving it does not cause the other faders to physically move, although their levels change accordingly.*

The exercise below demonstrates how to create all three kinds of control groups.

1   Make sure that the TC LINK button in the Snapshot section of your DMX-R100 is unlit (this will deactivate the Cue list created in the exercise above).

2   From the Snapshot window, recall the "Tutorial 2" snapshot.

3   Press the AUDIO tab at the bottom of the touchscreen. From the pop-up menu select FADER GROUP; the Audio Fader/Cut Grouping window appears. (See Figure 7)

Figure 7

* This occurs even if various channels in a Gang or VCA control group are on different Pages; for example, if Channels 1, 45, 46, 47, and 48 are all placed in the same fader control group. This kind of arrangement allows you to control a "submix" signal of multiple channels from a single fader, with all "sub" channels tucked away, out of sight. If multiple channels on different Pages are in a Gang group, you can even view the movement of all faders in the Audio Fader window.

4   We'll begin by placing channels 1 and 2 into a cut control group. Accordingly, press the Mode button for GROUP1 repeatedly until it reads CUT. Then press the ON/OFF button for GROUP1 so that it reads ON. The right side of the screen contains buttons for all 48 input channels, all 8 Aux returns and sends, the 8 multitrack (MTR) buses, and the stereo Program (PGM) bus.* Touch the buttons for Channels 1 and 2: the words "CUT1" appear in each, indicating that both of these channels have now been placed in Group 1, which has been designated as a cut control group. (See Figure 8)

Figure 8

5   Press the Cut button for either Channel 1 or Channel 2; note that both channels now cut and un-cut simultaneously.

* *Aux sends and MTR buses cannot be placed in cut control groups.*

Control Groups

6 Next, we'll place channels 1, 2, 3, and 4 into a gang fader control group. Press the Mode button for GROUP2 repeatedly until it reads GANG. Then press the ON/OFF button for GROUP2 so that it reads ON. Touch the buttons for Channels 1, 2, 3 and 4: the words "GP2" appear in each, indicating that each of these channels have now been placed in Group 2, which has been designated as a gang fader control group. (See Figure 9)

Figure 9

7 Move the Channel 1 fader; note that the faders for Channels 2, 3, and 4 also move, but with their relative levels intact. Now try moving the faders for Channels 2, 3, and 4 in turn; note that any of these faders can act as "master," affecting the level of all four channels. Note that the offsets within a gang fader control group are logarithmic and not linear; this means that the distance between the faders decreases relatively as they are lowered and increases relatively as they are raised, in order to reflect the logarithmic nature of the fader path itself. At any time, you can easily change the relationship between the faders in a gang fader control group; simply touch and hold one or more of them (be sure to make skin contact) and rearrange them as desired, then let go. One potential problem with this procedure, however, is that if you bring all faders fully up or fully down and then let go, the relationship between them will change — they will all now be at equal level. To maintain the stored offsets, engage the MANUAL GROUP button in the lower right-hand corner (so that it is lit green).

Note that when channels are assigned to a gang fader control group with MANUAL GROUP on (lit green), their fader movements are no longer written as dynamic automation data (after all, that's why it's called a "Manual" group!). Even if previous automation data has been written for those channels, if they are later placed into a Manual gang control group, the fader automation data for those channels will no longer be played back and the audio levels for those channels will be determined solely by the "live" fader position. For more information, see the DMX-R100 Software Version 2.1/2.2 Supplement and Tutorial 3 in this guide.

8   Next, we'll place channels 5, 6, 7, and 8 into a VCA fader control group. Press the Mode button for GROUP3 repeatedly until it reads VCA. Then press the ON/OFF button for GROUP3 so that it reads ON. Touch the buttons for Channels 5, 6, 7, and 8: the words "GP3" appear in each, indicating that each of these channels have now been placed in Group 3, which has been designated as a VCA fader control group. (See Figure 10)
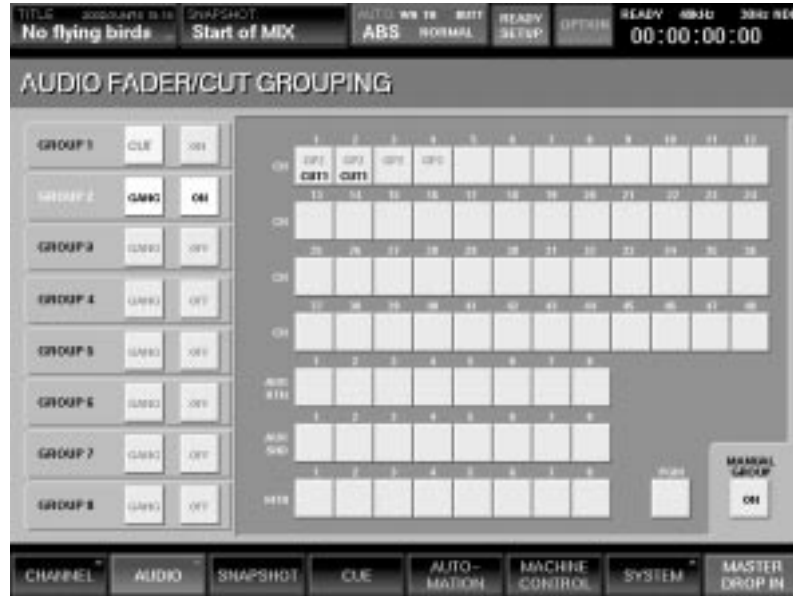

Figure 10

9   Move the Channel 5 fader; note that the faders for Channels 6, 7, and 8 do not move. Because Channel 5 was the first channel selected, it has been designated as the Master fader for the VCA control group; note the heading "GP3M" (for "Group 3 Master") in the Channel 5 box. Start your multitrack playing, however, and note that the levels of channels 6, 7, and 8 change as you move the fader for Channel 5. Now try moving the faders for Channels 6, 7, and 8 in turn; note that doing so only changes the level for that channel and not for the entire control group.

10   Finally, we'll change the Master fader in this VCA control group from Channel 5 to Channel 8. To do so, simply select GROUP3, then touch the Channel 5 button: the "M" suffix disappears (Channel 5 is now designated as "GP3," same as Channels 6, 7, and 8). At this point, there is no master fader. Next, press the Channel 8 button twice. The first time you press it, it is removed from the control group altogether; the second time you press it, it is designated as the new Master fader (with the heading "GP3M"). Start your multitrack playing to confirm that this is the case.

Note that cut and fader control group assignments are saved along with titles, so be sure to overwrite the current title (or create a new one) after making control group assignments.

Tutorial 2

Final Output

In this Tutorial, we have focused entirely on standard stereo mixing, using the PGM bus for final output (surround mixing applications are covered in Appendix B in this guidebook). As such, the level of the final signal is controlled by the Program master fader. The Program bus also has stereo equalization and dynamics processing available, so you can apply EQ and compression or gating to the overall signal before sending it on to a connected 2-track recorder. The presence of dedicated 2TK inputs (one analog, one digital) means that you can easily monitor the playback of your final mix at the touch of a single button, without having to sacrifice any input channels or disturb your mix configuration in any way.

The Concept of Automated Mixing

This tutorial will take you through the basic procedures for dynamic automated mixing with a DMX-R100.*

The following peripherals are required for this Tutorial:

- A multitrack tape or hard disk recorder with signal recorded on at least 8 tracks and the capability to either chase SMPTE time code (recommended) or to output it (either directly or from a striped track); alternatively, a device that outputs stable MTC (MIDI Time Code) can be used
- A digital or analog two-track recorder
- A signal processor with either digital or analog inputs and outputs

The concept behind automated mixing is to allow a computer to memorize your all your moves as you mix and then replay them perfectly, in precise synchronization to incoming time code. Being a digital mixer, the DMX-R100 can be thought of as a highly specialized computer, optimized for the task of routing, summing, and processing audio, but another very important function is its ability to record and play back automated mixes. Virtually every DMX-R100 parameter can be incorporated into an automated mix — not just fader levels, channel cuts and pan positions, but even things like alterations to equalization and dynamics processing, as well as changes to Aux send and return levels.

The DMX-R100 automated mix system is designed to be flexible, often offering several different ways to accomplish the same end result, in recognition of the fact that there are many different ways to approach automated mixing — all of them valid. It is entirely possible, for example, to use an automated mixing system in ways that it was never intended to be used! The Tutorial presented here is simply intended to guide you through an example of how the DMX-R100 system can be used; depending upon your individual working style, you may find that you use it in an entirely different way.

One common approach to creating an automated mix is to build a complex series of moves through a series of "passes," each time adding some data that helps refine the mix further. An automated mix begins with a static rough mix of the overall sound, which can, of course, be changed and modified freely as the song develops. The first "pass" will typically consist simply of writing these basic fader levels. In the second pass, the engineer will often write cuts — muting tracks when signal isn't playing or when he doesn't want to hear a recorded part. Successive passes will usually consist of level riding, as the engineer raises and lowers faders in order to shape the sound dynamically as the song plays. For instance, a vocal might be slightly boosted during choruses, or a guitar part lowered in volume during verses. These early passes are usually done in what is termed Absolute mode, where the mix moves are written exactly as they are performed. Later passes often involve fine-tuning — a piano part might need to be just shaved down a dB or two for the first few bars of the bridge, for example — and this is where Trim mode comes in. In this mode, the fader moves themselves are not written; instead, they are used to create offsets, so, in the case of the example just given, the engineer would simply "punch in" just before the bridge and lower the level of the fader controlling the piano track by a dB or two. The overall level of succeeding events would then decrease by that amount (although all relative movements would remain), while all previous moves (a rapid boost in level, for example, on the opening chord) would still be retained.

Non-dynamic, or "scene"-based automation using timecode-triggered cues is covered in detail in Tutorial 2 in this guide.

The Concept of Automated Mixing

The DMX-R100 contains two automated mix buffers, labeled "A" and "B," allowing the engineer to access the two most recent passes and compare between them. This also provides a single level of undo: if you're not happy with the mix you have in the "B" buffer, simply go back to the "A" buffer and try again. The two buffers can switch automatically back and forth, or you can opt to simply keep them separate and manually decide which one to use for each pass. For more information, see the "A/B Buffers: Manual vs. Auto Rotation" section on page T3-14.

Automated mixes are held in the same volatile RAM memory as are Snapshots and Cue lists. For this reason, you must save the current Title in order to retain the automated mix in the currently selected buffer. Up to ten Titles can be stored in Flash Memory, allowing you to store up to ten such mixes in memory at once (Titles containing especially important or final mixes can be Locked so as to prevent inadvertant overwriting). The DMX-R100 supports the storage of a single Title to floppy disk, so you'll probably want to have a number of preformatted disks handy before you begin an automated mix.

A number of basic automation procedures are described in detail in Chapter 4 of the DMX-R100 Operating Instructions. The purpose of this Tutorial is not to duplicate those instructions, but to provide you with a number of practical exercises simulating the conditions of an actual automated mix.

Preparation

1   Make all required connections between the Control Room and Studio monitor outputs of your DMX-R100 and your loudspeakers.

2   Connect both the inputs and outputs of the first eight tracks of your multitrack recorder to the expansion card installed in slot 1.

3   Connect the inputs of your two-track recorder to the PGM outputs (digital or analog) of the DMX-R100, and connect the outputs of your two-track recorder either to the 2 TK1 input (if it provides only analog outputs) or the 2 TK2 input (if it provides AES/EBU digital outputs).

4   If your signal processor provides AES/EBU digital I/O, connect its inputs to Aux Sends 7/8 (using the DMX-R100 XLR digital connector) and its outputs to Aux Returns 7/8. If your signal processor provides only analog I/O, connect its inputs to Aux Sends 1/2 and its outputs to Aux Returns 1/2.

5   Go to the Title Manager window and press the CLEAR button in the lower right-hand corner. This sets all parameters in the DMX-R100 to their default status (it does not affect any Titles saved to Flash Memory or floppy disk).*

6a   If your multitrack recorder is capable of chasing (chase-locking) to incoming SMPTE time code, follow the directions in the steps below. If not, jump to step 7 on the following page.

6b   Make a connection between the Time Code output of the DMX-R100 and the SMPTE (LTC) input of your multitrack recorder.

6c   Go to the Sync/Time Code window (under the SYSTEM tab) and set Time Code Reader Source to TC GENERATOR.

6d   Go to the Machine Control window and select Machine 1, then press the Port Select button and set it to TC GEN ("GEN" will be displayed in the box).

6e   If you are using the DMX-R100 machine control to remotely control a multitrack transport, it's good practice to set up a cue list of autolocate points before beginning an automated mix. Accordingly, go to the Cue window and then start your multitrack playing back. At the appropriate points in the song (i.e., verse, chorus, bridge), touch the NEW button; each time you do so, a new CUE will be created with the corresponding SMPTE timecode value. **Note that CUE 1 is used to store the initial static value of all console settings at the start of mix automation. Its default timecode value is 00:00:00:01; if necessary, this value can be changed using the jog/shuttle wheel or ten-keypad, but this must be done before the first automation pass and it must be set to a value at least several seconds earlier than any following cues, or errors will occur.**

6f   Name each cue by selecting its name and then using either the touchscreen keyboard or an external connected keyboard.

* This can also be achieved by calling up Snapshot 0 — which contains default data and cannot be overwritten — by going to the Automation panel and pressing the SET button, entering 00, and then pressing the RECALL button.

6g To locate to each of these cue points, select the cue to highlight it and then touch the LOCATE button in the left center of the touchscreen. The value will be entered in the DMX-R100 LTC display immediately above the transport controls and the multitrack will automatically locate to that point. If necessary, the timecode value for each cue can be fine-tuned by selecting it and then using either the jog/shuttle wheel or the ten-keypad. Be certain to leave sufficient "pre-roll" time for each cue to allow for machine startup times (which will vary according to the specific multitrack you are using). Note that even though TC LINK is turned ON for each of these new cues, it will not have any effect since the TC LINK button is off (as per step 8 above). (To be doubly safe, you can set TC LINK OFF for each of these new cues.) Now jump to step 8 below.

7a If your multitrack recorder is not capable of chasing (chase-locking) to incoming SMPTE time code but can output SMPTE time code (either directly or from a "striped" track), follow the directions here.* Make a connection between the SMPTE (LTC) output of your multitrack recorder (or the analog output of the striped track) and the Time Code input of the DMX-R100.

7b Go to the Sync/Time Code window (under the SYSTEM tab) and set Time Code Reader Source to TIME CODE IN.

8 Make sure that the TC LINK button in the Snapshot section of your DMX-R100 is unlit.

IMPORTANT NOTE: It is inadvisable to use SMPTE-triggered cues along with dynamic automated mixing because unexpected results may occur.

9 Make sure that the abbreviations "WH" (for Write Hold) and/or "TH" (for Touch Hold) do not appear in the AUTO button box on the touchscreen's top menu bar.** If it does appear (indicating that the WRITE HOLD and/or TOUCH HOLD functions are engaged), touch the AUTO button on the top menu bar and select WRITE HOLD and/or TOUCH HOLD from the drop-down menu so that the initials disappear.

10 Make sure that the OFF button in the TC Automation section of your DMX-R100 is lit, indicating that automation control is off; we'll be turning it on soon enough!

11 Go to the Title Manager window and name the current Title "Tutorial 3" and then press the SAVE button in order to save it to Flash Memory.

Alternatively, a device capable of outputting stable MTC (MIDI Time Code) can be used; simply connect its MIDI output to the DMX-R100's dedicated MTC input, then set Time Code Reader Source to MTC IN in the Sync/Time Code window

**These advanced functions allow armed objects (see page T-7 for an explanation) to remain in write-ready mode even when time code is stopped. For more information, see Chapter 4 in the DMX-R100 Operating Instructions.*

Setting Monitoring Levels

In this Tutorial, we will be mixing signal from 8 tracks of the multitrack to the connected 2-track recorder via the PGM bus, using various DMX-R100 dynamic mix automation features.

1   In the Monitor window, make sure the Monitor Mode is set to STEREO. Then set the Control Room monitor source to PGM, and set the CR monitor knob to a moderate listening level. Set the main meters to PGM.

2   Press the 25 - 48 button in the PAGES section in order to activate the faders for Channels 25 - 48. Because the current Title started from a CLEAR command (in step 5 of the Preparation section above), default values have been entered for all channels. Specifically, their Input ∕ Pan Assignments (as can be verified in the window of the same name) have been set so that all channels are routed to both the L and R outputs of the PGM bus (and not to any of the eight MTR buses), with all panpots centered.

3a   If your multitrack machine is chase-locking to SMPTE time code from the DMX-R100, press the SET button in the Timecode Input section (directly above the DMX-R100 transport controls) or the LOCATE TIME touchscreen button in the Machine Control window and use the ten-keypad or jog∕shuttle wheel to enter in the SMPTE start time of the song (be sure to press the Enter key in the ten-keypad). Then press either the physical Locate switch in the Timecode Input section or the touchscreen LOCATE button in the Machine Control window to shuttle your multitrack machine to that point. Jump to step 4 below.

3b   If your multitrack machine is instead providing SMPTE time code (or MTC) to the DMX-R100, locate it to the appropriate point.

4   Start your multitrack machine playing back (either by pressing Play in the DMX-R100 transport section if it is chase-locking, or by using its own transport controls if generating time code) and begin slowly raising the faders of Channels 25 - 32 until they are at or around unity gain (0.0 dB). Set up a rough static mix so that signals are approximately balanced correctly for the start of the song.

5   Apply equalization and∕or dynamics processing as desired to the various tracks, using the controls in the Parameter Setting panel and∕or touchscreen EQ/Filter and Dynamics windows.

6   Add effects from your outboard processor as desired, using Aux sends 1∕2 or 7∕8 to route signal from specific Channels. Press the MASTERS button in the faders section and press Access for Aux return 1 (if the connected processor provides analog I∕O) or Aux return 7 (if the connected processor provides digital I∕O). Then, in the Channel window, set that Aux return to Stereo mode and assign the odd-numbered Aux return to PGM bus L, and the even-numbered Aux return to PGM bus R. Adjust the fader levels of Aux returns 1∕2 or 7∕8 to taste.

7   Go to the Title Manager window and press the SAVE button in order to save the updated "Tutorial 3" Title to Flash Memory.

Tutorial 3

About the Automation Window

Basic DMX-R100 mix automation parameters are set in the Automation window, accessed by pressing the AUTOMATION tab at the bottom of the touchscreen. (See Figure 1)

Figure 1

Parameters in this window allow you to set A/B buffer operation (manual or automatic), automation dropout mode* (Butt, Ramp, Hold To Next, Hold To End, or Top To End), punch in/out mode* and time (when operating in Auto punch), fader return time when using Ramp mode, and settings for Automation Isolate (where specific channels or specific functions within all channels can be temporarily exempted from automation playback) and Make Static (where specific channels or specific functions within all channels can be erased from the currently selected buffer). Additional information about each of the parameters in the Automation window can be found in Chapter 3 of the DMX-R100 Operations Guide; we will also be using many of them in this Tutorial.

Because the current Title started from a CLEAR command (in step 5 of the Preparation section above), both the A and B buffers are empty; there is currently no automation mix in memory. However, if there was data in either buffer (because of previous use by another engineer), it could be easily cleared by using the Make Static function in the Automation window: simply touch the tab to activate, press the ALL ON button (to select all data in all channels, buses, Aux sends and returns), and then press EXECUTE.

CAUTION: Do not use the Make Static function unless you are absolutely certain that you want to erase all automation data in the selected buffer or unless it has already been saved to Flash Memory or floppy disk; this operation is undoable and data erased this way cannot be retrieved.

* The automation dropout mode and punch in/out options (as well as Write Hold and Touch Hold on-off) can also be set from the drop-down menu in the AUTO button on the touchscreen's top menu bar.

Arming and Disarming Channels and Objects

Perhaps the key to understanding the DMX-R100 dynamic automation system is the concept of arming and disarming channels and objects (that is, individual parameters within a channel, such as the fader, cut switch, panpot, bus assignment, etc.).

The Channel window provides the best way of keeping track of which objects are armed or disarmed. **Objects that are green (or switches that are not underlined) are "safe" — that is, they are not armed and their data will not be written into automation. Objects that are yellow (or switches underlined in yellow) are armed and ready to be written when time code is received and they are physically moved. Objects whose data is actively being written change color from yellow to red. It is also possible to specify objects as record-ready so that their current position will be written as soon as time code is received, even if they are not being physically moved.* Record-ready objects are displayed in red** Note that, when any objects in a channel are armed, the appropriate box or boxes in the READY SETUP display in the lower right-hand corner of the Channel window will be turned on (lit orange).

Once objects are armed, altering their position (by touching an armed fader, pressing an armed switch, or moving an armed knob) while SMPTE time code is running (that is, when the word READY in the Timecode display at the upper right-hand corner of the touchscreen turns to the word RUN) causes automated data to be written.* **Note that a stable source of SMPTE must be used: if you see the words "TC ERROR" flashing in red in the Timecode display, this is a visual indication that the incoming time code is unstable or that dropouts may be occurring; in this circumstance, automation data may not be written.**

The use of running timecode allows you to make automated changes to your mix "on the fly." The moves you make are written in accordance with the ABS/TRIM automation modes and BUTT/RAMP/HOLD TO END/HOLD TO NEXT/TOP TO END dropout modes selected in the Automation window.

In ABS (Absolute) automation mode, the exact data is written; in TRIM automation mode, fader moves provide offsets (see the "Fourth Pass: Trim" section on page T3-15 in this guide for more information). In HOLD TO END dropout mode, data is written from the last move to the end of the song; in HOLD TO NEXT dropout mode, data for an object is written from the last move you make (where it remains) until the next move of that same object; in TOP TO END dropout mode, data is written both forward and backward from the last move you make (where it remains) to both the beginning and end of the song. BUTT dropout mode causes the fader to jump instantly from the point at which you drop out of recording to the previously written fader position, while RAMP dropout mode causes the fader to glide to the previously written position at a user-determined return time (higher values result in longer return times). All five dropout modes are functional in both ABS and TRIM. For more information, see Chapter 4 in the DMX-R100 Operating Instructions and the Sony DMX-R100 Automation Operation document.

The DMX-R100 provides several different methods of arming and disarming channels and/or individual objects. Regardless of the method you choose (which will be entirely dependent upon the way you work), the procedure for terminating automation recording is always the same: press the READY SETUP button at the top of the touchscreen so that it lights orange, then press the OPTION button to its immediate right (it will also be lit orange) and select CANCEL ALL from the drop-down menu. Finally, press the READY SETUP button a second time so that it changes from orange back to gray.

* A special WRITE NOW function in the Automation window even allows you to write the data for record-ready objects (objects in red) between specified punch-in and punch-out points without the use of running SMPTE time code. For more information, see Chapter 3 in the DMX-R100 Operating Instructions.

Arming and Disarming Channels and Objects

Try each of these arming/disarming methods out while viewing the Channel window:

• Entire channels (that is, all objects within the channel) can be armed by touching the READY SETUP button at the top of the touchscreen so that it turns orange and then pressing the WRITE button for that channel (it will begin blinking — an indication that one or more objects within that channel are armed).

• Once armed this way, individual objects within the channel can be disarmed either by touching them in the Channel window or by pressing the associated switch or by moving the associated knob counterclockwise.

• Or, all objects within the channel can be disarmed by pressing the WRITE button for that channel a second time (the light will go out). You can then re-arm individual objects either by touching them in the Channel window or by pressing the associated switch or by moving the associated knob clockwise. (Again, as long as one or more objects within a channel are armed, the WRITE button will blink.)

• You can also arm any object within any individual channel by touching the gray READY SETUP button at the top of the touchscreen so that it turns orange and then pressing the associated switch or turning the associated knob clockwise. To arm the fader only, simply touch it (because galvanic skin response is required, be sure your fingertip actually touches the fader — don't use the side of your finger or a fingernail). You can disarm the fader by touching it again, or you can disarm other individual objects by pressing the associated switch a second time or by moving the associated knob counterclockwise.

• Whenever the READY SETUP button is orange instead of gray, the AUTO ISOL display in the lower right-hand corner of the Channel window changes to read "READY SETUP." By pressing any of the boxes in that display, you can arm multiple objects within that channel. For example, with the READY SETUP button orange, access a channel and press the EQ/FILT box in the "READY SETUP" display. The box will change color from white to orange and all EQ and Filter objects in that channel will change from green to yellow, indicating that they are armed. To disarm them, simply press the EQ/FILT box once again (it will revert to white.)

• To begin writing a fader position as soon as timecode is received, simply arm it and then turn off READY SETUP by touching the button so that it changes from orange back to gray. Then hold the fader at the desired position (while holding it, the fader object will change from yellow to red in the Channel window) and start timecode playing back. As soon as timecode begins running, the data will be written. To drop out of recording, simply let go of the fader. If you are in RAMP mode, it will glide to the previously written fader position at the specified return time.

• Alternatively, you can arm a fader by touching it (with the READY SETUP button lit orange); its channel WRITE button will begin blinking. Then turn off READY SETUP by touching the button so that it changes from orange back to gray. Finally, press that channel's WRITE button so that it lights steadily (an indication that armed objects — in this case, the fader, which will change color from yellow to red in the Channel window — are being written). The new fader position will be written from the moment timecode begins running.

• A similar technique allows you to prearm any object or objects in any channel for immediate writing as soon as timecode begins running. Touch the READY SETUP button at the top of the touchscreen so that it turns orange and then press the switch(es) you wish to arm or turn the knob(s) you wish to arm clockwise; the WRITE button will begin blinking. Then turn off READY SETUP by touching the button so that it changes from orange back to gray. If you then press that channel's WRITE button so that it lights steadily (the selected object[s] will change color from yellow to red in the Channel window), their new on-off status or knob position will be written from the moment timecode begins running.

• Another important function allows all faders, pans, bus assignments, cuts, Aux on-off switches, Aux send levels, dynamics processing, or equalization for all channels to be globally armed. To do so, touch the READY SETUP button at the top of the touchscreen so that it turns orange and then touch the OPTION button to its immediate right. A drop-down menu will appear, allowing you to select any of the above; once a selection is made, all WRITE buttons for all channels will begin blinking. (See Figure 2)

Tutorial 3

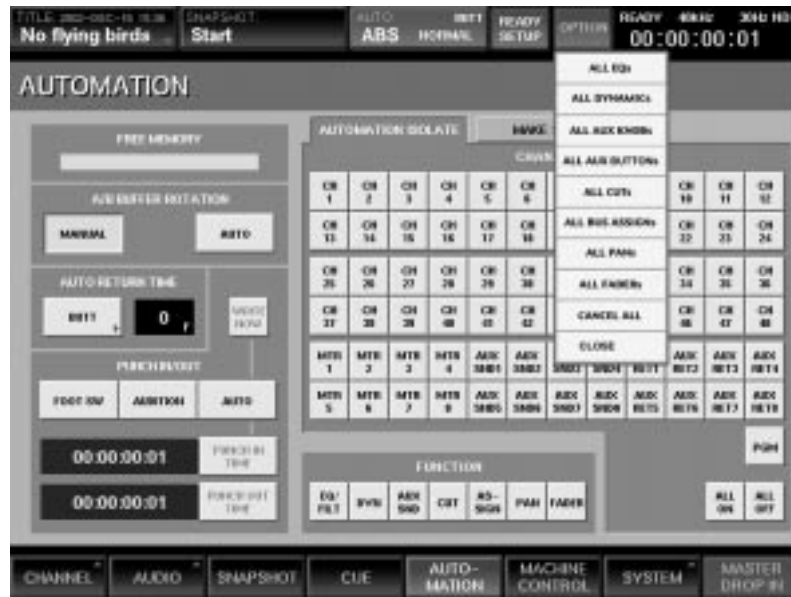## Arming and Disarming Channels and Objects

Figure 2

• You can add other objects for global arming by touching the OPTION button again and selecting additional menu items. For example, you can globally arm all faders and cuts for all channels. Even after global arming, armed objects within individual channels can be disarmed (they will change from yellow back to green) by touching them in the Channel window or by pressing the associated switch or by moving the associated knob counterclockwise. Or additional objects within individual channels can be armed (they will change from green to yellow) either by touching them in the Channel window or by pressing the associated switch or by moving the associated knob clockwise.

• You can also remove individual channels from global arming by pressing their WRITE button; the WRITE light for that channel only will go out. Note that reselecting a channel (by pressing its WRITE button) will cause all objects within that channel to be armed, not just the object(s) selected in the OPTION menu.

You can also drop all armed objects in all channels in and out of writing while timecode is running by touching the MASTER DROP IN button at the bottom right-hand corner of the touchscreen; when colored red, armed objects are being written; when colored gray, they are not being written. To drop all armed objects in a single channel in and out of writing while timecode is running, press that channel's WRITE button (the MASTER DROP IN button will light red). When a channel's WRITE button is steadily lit, the armed objects in that channel are being written; when blinking, they are not being written. Before writing any automation data, it's a good idea to first check the status of objects in the Channel window for any channels that have their WRITE buttons blinking.

In summary: If a channel's WRITE button is unlit, it is an indication that no objects within that channel are armed. If you see a WRITE button blinking, it is an indication that one or more objects within that channel are armed and will be written when altered. If you see a WRITE button lit steadily red, it is an indication that one or more objects within that channel are armed and will be written when (or as long as) timecode is running. To turn off all blinking or steadily lit WRITE buttons, touch READY SETUP so that it changes color to orange, then touch OPTION and select "CANCEL ALL" from the dropdown menu. To close the drop-down menu, either select CLOSE or press the OPTION button again.

Now you're ready to begin your first automated mix!

First Pass: Setting Basic Fader Levels

Creating a first HOLD TO END pass is important because it establishes an underlying set of positions for the automation system. This pass can contain data for any or all objects; in this example, we will set basic fader levels only.

1 In the Automation window, set A/B Buffer Rotation to MANUAL, then set the automation mode (in the Auto Return Time section of the touchscreen*) to HOLD TO END. This will allow data to be written to the end of the song without having to actually play the song all the way through (the same result could be accomplished by using any of the other four modes and playing the song through from start to finish). Finally, make sure that, in the PUNCH IN/OUT section of the touchscreen, both the FOOT SW and AUTO options are deselected (the boxes should be white instead of green, and the AUTO box at the top center of the touchscreen should read "NORMAL")*.

2 Press the READY SETUP button at the top of the touchscreen so that it, and the OPTION button next to it, both turn orange.

3 Press the OPTION button. From the drop-down menu, select ALL FADERS, then select CLOSE. All of the WRITE buttons in all fader channel strips begin blinking, telling you that all channels are readied.

4 Press the ACCESS button for channel 25, then go to the Channel window. Note that the fader object (the dB amount directly above the graphic of the fader position) and the MTR LEVEL (Multitrack fader send level — the "second" fader in each channel strip — are both indicated in yellow, showing that they are armed and ready to be written. Access channels 26 - 32 in turn and note that these same two objects are armed for those channels (and all others) as well.

5 Access channel 25 again, then press the READY SETUP button at the top of the touchscreen so that it (and the OPTION) button both change color from orange back to gray. Then press the WRITE button for channel 25 (it will stop blinking and stay steadily lit red) and note that the fader and MTR LEVEL objects change color from yellow to red (at the same time, the MASTER DROP IN button at the bottom right-hand corner of the touchscreen turns red, indicating that data for all armed objects will be written as soon as valid timecode is received). Press the WRITE button for channels 26 - 32 as well, ACCESS them, and note that their fader and MTR LEVEL objects are now also colored red.

6 Press the ABS switch in the TC Automation section of the DMX-R100 in order to turn dynamic automation on. The AUTO box in the upper center of the touchscreen turns from changes color from dark gray to red, and the word OFF changes to ABS, indicating that dynamic automation is on and that data will be written in Absolute (ABS) mode. The current automation mode (in this case, TO END) is also displayed in that box.

7 Locate your multitrack machine to a point several seconds before the start of the song. This is important because the DMX-R100 system does not begin writing automation data until it is locked to time code (that is, until the word READY in the Timecode display at the upper right-hand corner of the touchscreen changes to the word RUN). Note that, depending on the machine control mode you are using and the specific mechanism used, some devices require significant preroll time. Generally, only minimal preroll time is required if the multitrack machine is chase-locking to SMPTE time code from the DMX-R100, but the key is to be certain that the word READY appears in the upper right-hand corner of the touchscreen (and that the TC ERROR message is not flashing, indicating unstable timecode) before attempting to write any automation data.

The automation dropout mode and punch in/out options can also be set from the drop-down menu in the AUTO button on the touchscreen's top menu bar.

First Pass: Setting Basic Fader Levels

8 Begin playback of your multitrack machine. At any time after READY changes to RUN in the upper right-hand corner of the touchscreen, stop playback. Because we are using Hold To End mode, all current fader positions are now written for the entire song.

9 To disarm all faders, press the READY SETUP button at the top of the touchscreen (it and the OPTION button will once again turn orange) and then press the OPTION button. From the drop-down menu, select CANCEL ALL. All of the WRITE buttons in all fader channel strips go out, telling you that all channels are disarmed (all objects in all channels will change color to green). Select CLOSE (or press the OPTION button a second time) to close the drop-down menu.

10 To disable any further arming, press the READY SETUP button so that it and the OPTIONS button change from orange back to gray.

11 To test that all initial fader positions have been written, manually change the position of the faders for channels 25 - 32 and then rewind your multitrack and begin playback from the beginning. As long as the ABS button is lit (and the upper center box in the touchscreen is red), the faders move back to their written position as soon as the corresponding timecode value is reached. (Note: if Ramp mode is selected, the faders glide back to their written position at the defined Auto Return time).

12 Go to the Title Manager window and press the SAVE button in order to save the updated "Tutorial 3" Title to Flash Memory.

Again, this procedure wrote fader levels only. All other channel parameters (i.e., equalization, dynamics processing, panning, bus assignments, and Aux send levels) are not yet written, allowing you to freely tweak them as your mix progresses. At whatever point you are certain that you want to write any or all of these settings for any or all channels, simply arm the corresponding objects and do a pass. Even dynamic changes (for example, a sweep from one equalization frequency band to another) can be written as part of an automated mix: simply arm the corresponding object, start timecode playback, and make the change at the appropriate point in the song.

Tutorial 3

Second Pass: Cuts

The second pass in a typical automated mixing session will often consist of writing channel cuts (mutes).

1   Whenever creating successive passes of automation data, it's a good idea to set up a level of undo so that you can instantly return to the previous pass if you are dissatisfied with the new data you just added. The first pass was written in buffer A, so we'll begin by copying it into buffer B and then work in that buffer. To do so, press and hold down the "A" button for a couple of seconds until it begins blinking; then, while continuing to hold it down, press the "B" button. The following dialog will appear: (See Figure 3)
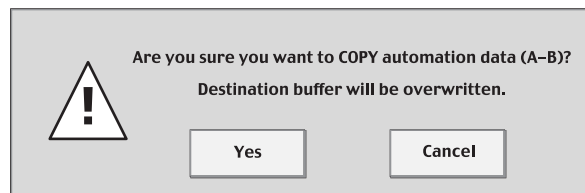

Figure 3

2   Touch YES, and then press the B button. Confirm that the data has been successfully copied by playing your multitrack (make sure that the ABS button in the TC Automation section is still lit and that the AUTO box in the upper center of the touchscreen is still colored red).

3   Change the automation mode to BUTT; this can be accomplished either in the Automation window or from the drop-down menu in the AUTO box.

4   Press the READY SETUP button at the top of the touchscreen so that it, and the OPTION button next to it, both turn orange.

5   Press the OPTION button. From the drop-down menu, select ALL CUTS. All of the WRITE buttons in all fader channel strips begin blinking, telling you that all channels are readied.

6   Access Channel 25 and go to the Channel window. Note that the Cut object (the box directly above and to the right of the graphic of the fader position) is underlined in yellow, showing that it is armed and ready to be written.

7   Rewind your multitrack machine to a point several seconds before the start of the song and then begin playback. At any time after the word READY in the Timecode display at the upper right-hand corner of the touchscreen turns to RUN, you can begin writing your cuts; simply press the CUT button for a channel when it want its signal muted (the CUT button will light), and press it a second time to unmute (the light will go out). If any channels are part of a cut group, cutting one will cause all others to cut; conversely, unmuting one will cause all others in the group to unmute.

8   To disarm all cuts, press the OPTION button, and, from the drop-down menu, select CANCEL ALL. All of the WRITE buttons in all fader channel strips go out, telling you that all channels are disarmed (the underline beneath all cut switch objects in all channels will disappear). To disable any further arming, press the READY SETUP button so that it and the OPTION button change from orange back to gray.

Second Pass: Cuts

9   To test that all cuts have been written, rewind your multitrack to the start of the song and begin playback. As long as the ABS button is lit (and the AUTO box is red), all the cuts you entered should occur at the corresponding SMPTE timecode points.

10   If you are dissatisfied with your pass, simply press the A button in the TC Automation section and recopy the data back to the B buffer as described in steps 1 and 2 above. By following this procedure, you can continue running a new pass (without losing the data in the original first pass) as many times as are required until you are completely satisfied.

11   Go to the Title Manager window and press the SAVE button in order to save the updated "Tutorial 3" Title to Flash Memory. This saves the mix in the currently selected buffer* — in this case, the "B" buffer (which contains basic fader levels and cuts). At this point, it's a good idea to do a save to floppy disk as well, since all succeeding passes will be altering the data in one or both buffers.

To save the mixes in both buffers, select each buffer in turn, then save into two separate Titles.

Tutorial 3

Third Pass: Fader Moves

Now we're ready to do some "fine-tuning" of fader positions.

1   Begin by using the procedure in steps 1 and 2 of the preceding exercise to copy the data from buffer B (containing basic fader levels and cuts) to buffer A in order to provide yourself with a level of undo. Then select buffer A by pressing the A button.

2   Change the automation mode to RAMP and, in the Auto Return Time section of the Automation window, use the Jog/Shuttle wheel to set a Ramp time of 25 frames (be sure to press the Enter key in the ten-keypad to complete the operation).

3   Press the READY SETUP button at the top of the touchscreen so that it, and the OPTION button next to it, both turn orange.

4   Access Channel 25 and go to the Channel window. Touch the fader for channel 25 without moving it (be sure your fingertip actually touches the fader — don't use the side of your finger or a fingernail) and note that the fader object changes color from green to yellow and that the channel 25 WRITE button begins blinking. Do the same for channels 26 through 32 so that the WRITE buttons for all eight channels are blinking and so that all their fader objects are colored yellow.

5   Rewind your multitrack machine to a point several seconds before the start of the song and then begin playback. At any time after the word READY in the Timecode display at the upper right-hand corner of the touchscreen turns to RUN, you can begin writing fader moves by simply touching the fader(s) you want to move and ride them freely. As data for a channel is written, its WRITE button lights steadily red. However, as soon as you let go of a fader, data is no longer written (the WRITE button goes back to blinking) and the fader glides back to its previous position at the selected Ramp time (a time of 25 Frames yields a glide of approximately one second).

6   To disarm all channels, press the OPTION button, and, from the drop-down menu, select CANCEL ALL. Any WRITE buttons that are lit will go off. To disable any further arming, press the READY SETUP button so that it and the OPTION button change from orange back to gray.

7   To test that all fader moves have been written, rewind your multitrack to the start of the song and begin playback. As long as the ABS button is lit (and the AUTO box is red), all the fader moves you made should occur at the corresponding SMPTE timecode points.

8   If you are dissatisfied with your pass, simply press the B button in the TC Automation section and recopy the data back to the A buffer. By following this procedure, you can continue running a new pass (without losing the data in the previous pass) as many times as are required until you are completely satisfied.

9   Go to the Title Manager window and press the SAVE button in order to save the updated "Tutorial 3" Title to Flash Memory. This saves the mix in the currently selected "A" buffer (which contains basic fader levels, cuts and fader moves).

Fourth Pass: Writing Trims

Trim mode allows you to apply offsets to previously written data. When applied to fader moves, they will then occur with a reduced or increased volume. To demonstrate this, we'll write a radical fader move and then apply a Trim to it.

1 Begin by using the procedure in steps 1 and 2 of the preceding exercise to copy the data from buffer A (containing basic fader levels, cuts and fader moves) to buffer B in order to provide yourself with a level of undo, then select buffer B by pressing the B button.

2 In the Automation window or AUTO box, change the automation mode from RAMP to BUTT (the auto-return time is no longer relevant).

3 Press the READY SETUP button at the top of the touchscreen so that it, and the OPTION button next to it, both turn orange.

4 Access Channel 25 and go to the Channel window. Touch the fader for channel 25 without moving it (be sure your fingertip actually touches the fader — don't use the side of your finger or a fingernail) and note that the fader object changes color from green to yellow and that the channel 25 WRITE button begins blinking.

5 Rewind your multitrack machine to a point several seconds before the start of the song and then begin playback. Approximately 20 seconds after the word READY in the Timecode display at the upper right-hand corner of the touchscreen turns to RUN, begin moving the fader for channel 25 up and down between -10 and -30 dB (note that while your finger is on the fader, the fader object in the Channel window changes color from yellow to red and the WRITE button for channel 25 stays lit steadily). Do this for approximately 30 seconds, and then stop your multitrack machine.

6 To disarm the fader for that channel, press READY SETUP, then OPTION, and, from the drop-down menu, select CANCEL ALL. The WRITE button for that channel goes out and the fader object changes back to green. To disable any further arming, press the READY SETUP button so that it and the OPTION button change from orange back to gray.

7 To test that your fader move has been written, rewind your multitrack to the start of the song and begin playback. As long as the ABS button is lit (and the AUTO box is red), all the fader moves you made should occur at the corresponding SMPTE timecode points.

8 Next, we'll write a trim that will raise the level of channel 25 by 10 dB so that the fader moves just written occur between 0 and -20 dB instead of -10 to -30 dB. Accordingly, press the TRIM button in the TC Automation section of the DMX-R100 so that it lights. The light in the ABS button will go out and the AUTO box in the top center of the touchscreen will change color from red to green and will now read TRIM instead of ABS. Most dramatically, every fader on the DMX-R100 snaps to unity gain (0.0 dB).

9 In the Automation window or AUTO box, change the automation mode from BUTT to HOLD TO END.

10 Press the READY SETUP button at the top of the touchscreen so that it, and the OPTION button next to it, both turn orange.

Tutorial 3

Fourth Pass: Writing Trims

11 Access Channel 25 and go to the Channel window. Again, touch the fader for channel 25 without moving it. The fader object will once again change color from green to yellow and the channel 25 WRITE button will begin blinking. Note that the fader level readout display in the Channel window (the number now lit in yellow) still reads the original value even though the fader itself has been moved to unity gain because the DMX-R100 has been placed in Trim mode.

12 Rewind your multitrack machine to a point several seconds before the start of the song and then begin playback. Just before the 20-second mark, move the Channel 25 fader all the way up to the top (to the +10 mark); you can let go of it at any point.

13 To disarm the fader for that channel, press the OPTION button, and, from the drop-down menu, select CANCEL ALL. The WRITE button for that channel goes out and the fader object changes back to green. To disable any further arming, press the READY SETUP button so that it and the OPTION button change from orange back to light gray.

14 To test that your trim has been written, press the ABS button in the TC Automation section so that it lights. The light in the TRIM button will go out and the AUTO box will change color from green back to red and will now read ABS instead of TRIM. All faders on the DMX-R100 will return to their previous positions, correctly indicating the current level for each channel. Rewind your multitrack to the start of the song and begin playback. At the twenty-second point, the fader for channel 25 should begin rapidly moving between 0 and -20 dB instead of -10 to -30 dB. The original move has been preserved — only the relative level has been changed.

15 Go to the Title Manager window and press the SAVE button in order to save the updated "Tutorial 3" Title to Flash Memory. This saves the mix in the currently selected "B" buffer (which contains data from the first three passes plus the newly added trim).

The A/B Buffers / SAFE and AUDITION

When the A/B Buffer Rotation is set to MANUAL in the Automation window, each buffer operates independently, although you can easily copy automation data from one buffer to the other by holding down the source buffer button until it begins blinking, keeping it held down and then pressing the destination buffer button. (For example, to copy data from the "A" buffer to the "B" buffer, press and hold down the A button for a couple of seconds until it begins blinking, then press the B button, then answer YES to the resulting dialog.)

When set to AUTO rotation, the data recorded in one buffer is automatically copied into the other buffer when the STOP button is pressed, or when incoming timecode is no longer received — unless the SAFE button is pressed first, in which case no data is written and the buffers do not rotate.

The SAFE button can also be used prior to automation playback in order to provide a single level of undo. Here's an exercise that shows how this works:

1   Set A/B BUFFER ROTATION to AUTO in the Automation window.

2   Select buffer A and make sure the SAFE button is off (unlit).

3   Arm all faders using the READY SETUP / OPTION menu and do a pass in ABS / BUTT mode. Bring the faders for channels 1 - 4 to unity gain (0.0 dB) and hold them that way for several seconds.

4   If you are controlling an external multitrack recorder from the DMX-R100, press the STOP button in the DMX-R100 transport section; if the DMX-R100 is slaving to incoming timecode, stop the master machine. Note that the buffer light changes to "B" when you do so.

5   Do another pass and this time raise the faders for channels 1 - 4 to maximum and hold them that way for several seconds. Again stop the timecode and note that the buffer light changes to "A" when you do so.

6   Press the SAFE button so that it is lit. Now play back the automated mix stored in the A buffer. It contains the data of faders 1 - 4 held to maximum (that is, the data stored in the last pass, which was automatically rotated from buffer B to buffer A).

7   With the SAFE button still lit, press the B button and play back the automated mix stored in the B buffer. It still contains the data recorded in the first pass — faders 1 - 4 at the unity gain (0.0 dB) position. As long as the SAFE button is lit, you can go back and forth between your last pass and the pass before that one in order to decide which one you prefer. Once you make that decision, you can then continue mixing from that point by selecting the buffer you want to use and then turning off the SAFE switch.

The SAFE button serves another important function, allowing you to rehearse moves while automation data plays back, but without actually writing new data. A similar, enhanced function is provided by AUDITION mode, which actually allows you to punch in and out of recording by turning the SAFE switch on and off. AUDITION mode can be turned on either from the Automation window or from the AUTO box at the top of the touchscreen. When in AUDITION mode, the AUTO box changes color from red or green (depending upon whether you were last working in ABS or TRIM mode) to gray and the SAFE switch is automatically turned on. In addition, both Write Hold and Touch Hold are activated, allowing all armed objects to remain armed even after time code is stopped and faders are released. For more information, see Chapter 4 in the DMX-R100 Operating Instructions and the Sony DMX-R100 Automation Operation document.

Appendix A: If This Is Your First Digital Console

If the DMX-R100 is your first digital console, there are a few important differences between analog and digital mixing you should be aware of. At first glance, both types of consoles may appear to be similar — they both provide multiple input channels, each with a dedicated fader, panpot and input trim controls — and each provide many of the same analog input and output connections.

But the similarity pretty much ends there. For one thing, an analog mixing console has a much simpler job to do: it combines multiple analog (electrical) signals and processes them with various types of conventional analog circuitry (such as equalizers, filters, and compressor/limiting/gating circuitry), and then outputs one or more signals containing the combined, processed information. (See Figure 1)
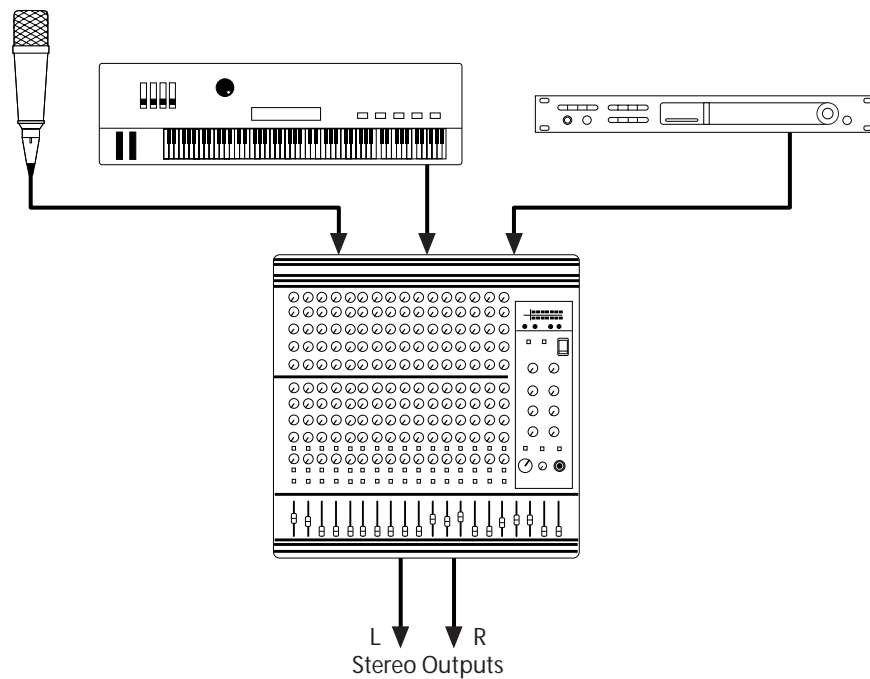

Figure 1

Appendix A: If This Is Your First Digital Console

A digital console's main function is also to combine and process multiple signals, but all of this work is done strictly in the digital domain, meaning that analog input signals must first pass through analog-to-digital converters (ADCs) and all analog output signals must first pass through digital-to-analog converters (DACs). (See Figure 2)
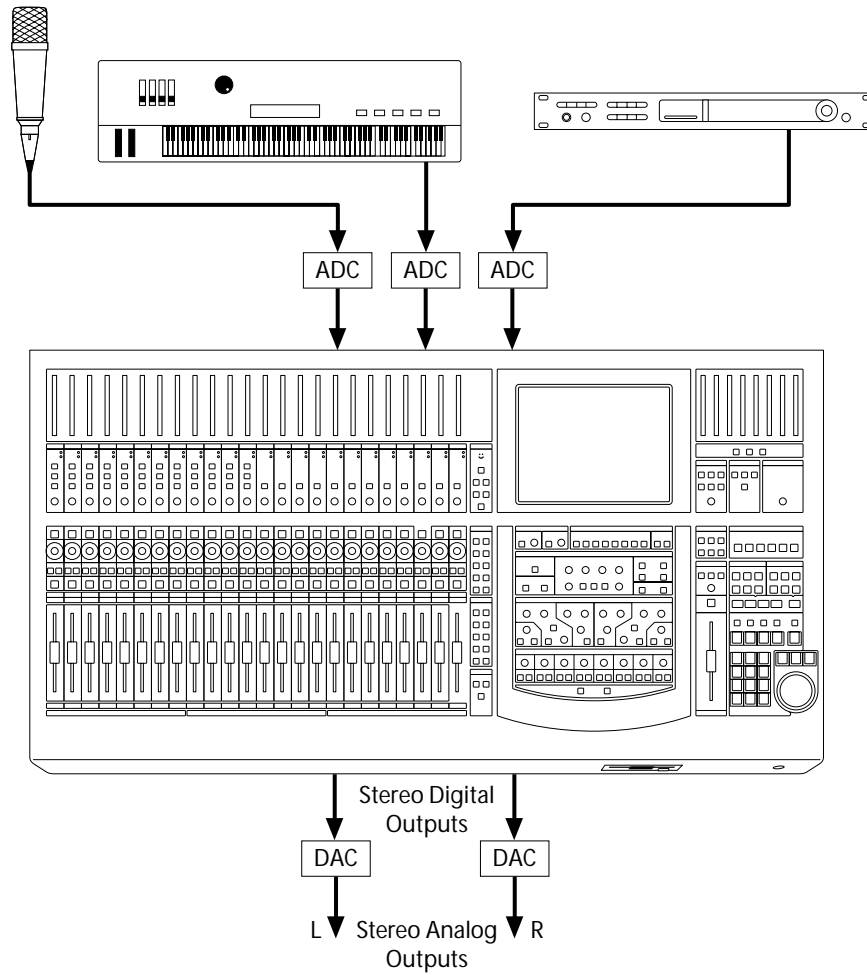
Figure 2

Appendix A: If This Is Your First Digital Console

There are two important considerations when converting analog to digital signal, or vice versa. The first of these is the *sample rate*, which determines how frequently "snapshots" of the signal are stored and reproduced. The standard CD sample rate, for example, is 44.1 kHz, which means that 44,100 samples are stored or played back every second. Another standard sample rate used in DVDs, DATs and other devices is 48 kHz. These sample rates are capable of capturing and reproducing virtually all of the frequency range of human hearing, from about 20 Hz (20 cycles per second) to about 20 kHz (20,000 cycles per second). (See Figure 3)
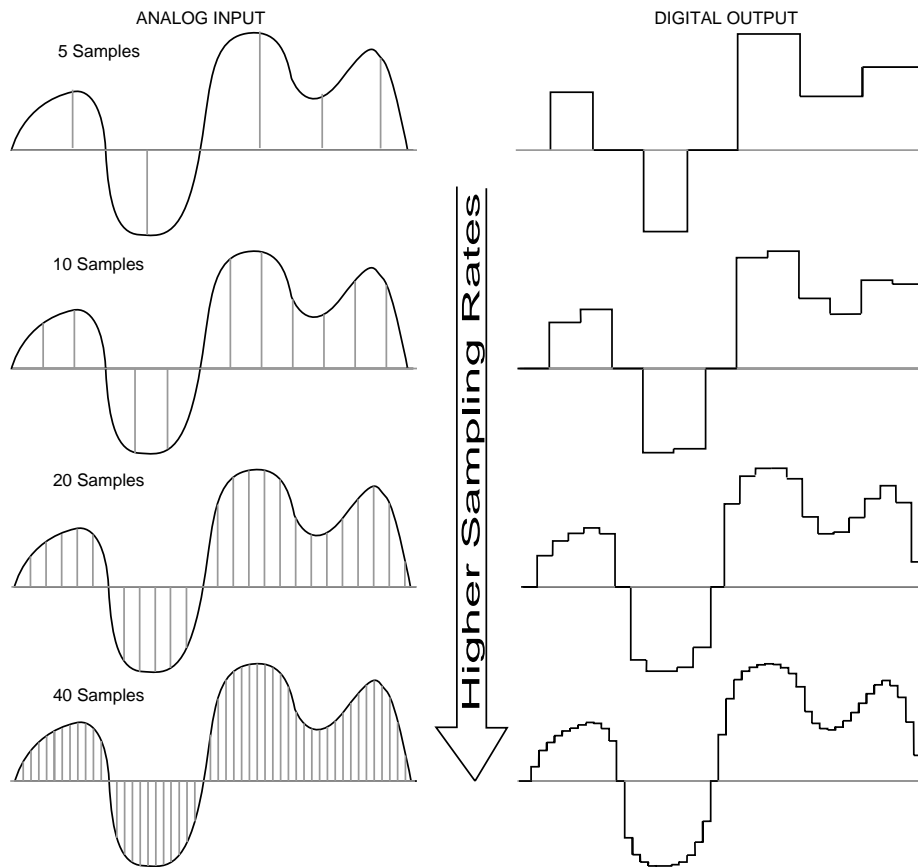

Figure 3

Appendix A: If This Is Your First Digital Console

Technological developments of recent years have allowed the use of double-speed (2fs) sample rates of 88.2 and 96 kHz, thus yielding an even broader frequency response in the final signal. The DMX-R100 is capable of operating at both single- and double-speed sample rates, although some functionality is reduced when using double-speed rates. (See Appendix in this guidebook for more information.)

The second important factor in ADC and DAC conversion is called *bit resolution*. This is a description of how long the digital "words" are that are used to represent the signal. The longer the word, the greater the amount of variation allowed, kind of like the difference between viewing a black-and-white image with greater degrees of gray scales. (See Figure 4)
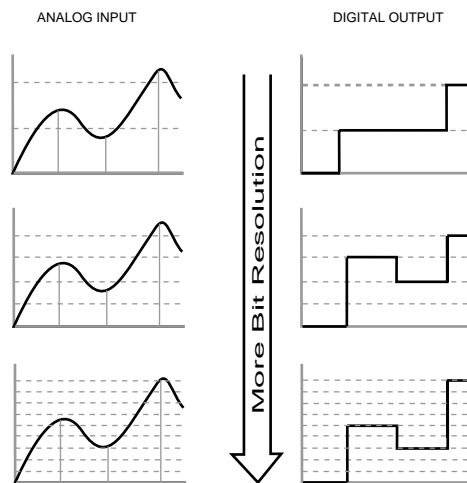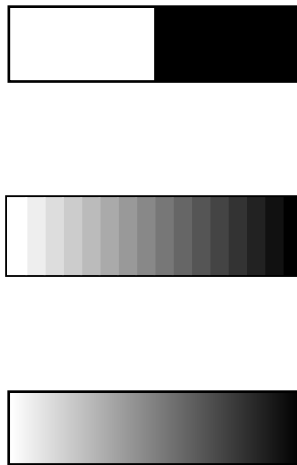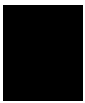

Figure 4

Appendix A: If This Is Your First Digital Console

Higher bit resolutions (that is, longer word lengths) translate into increased dynamic range — the degree of variation between the softest and loudest parts of a signal you hear. CD technology uses 16-bit resolution; this provides the equivalent of approximately 96 dB of dynamic range. Newer technology allows higher-resolution signal of 20- and 24-bit. In theory, the dynamic range of a 24-bit signal is 144 dB, which actually exceeds the capability of human hearing. The DMX-R100 utilizes 24-bit converters throughout and is capable of carrying and passing full 24-bit signal without any compromise in functionality. Even if the final output of a project is destined for 16-bit CD, there is a strong argument for using 24-bit resolution in the production stage so that when the signal is converted downward (usually with the addition of dither, or low-level noise, to reduce audio artifacts), maximum fidelity can be retained. The DMX-R100 allows two different kinds of dither (triangular or rectangular) to be applied to the PGM bus output; this is accomplished in the Audio Output Routing window.

Another difference between a digital console and an analog one is that a digital console has the capability of combining analog inputs with digital input signal, and, conversely, outputting a digital data stream as well as an analog output signal. (See Figure 5)
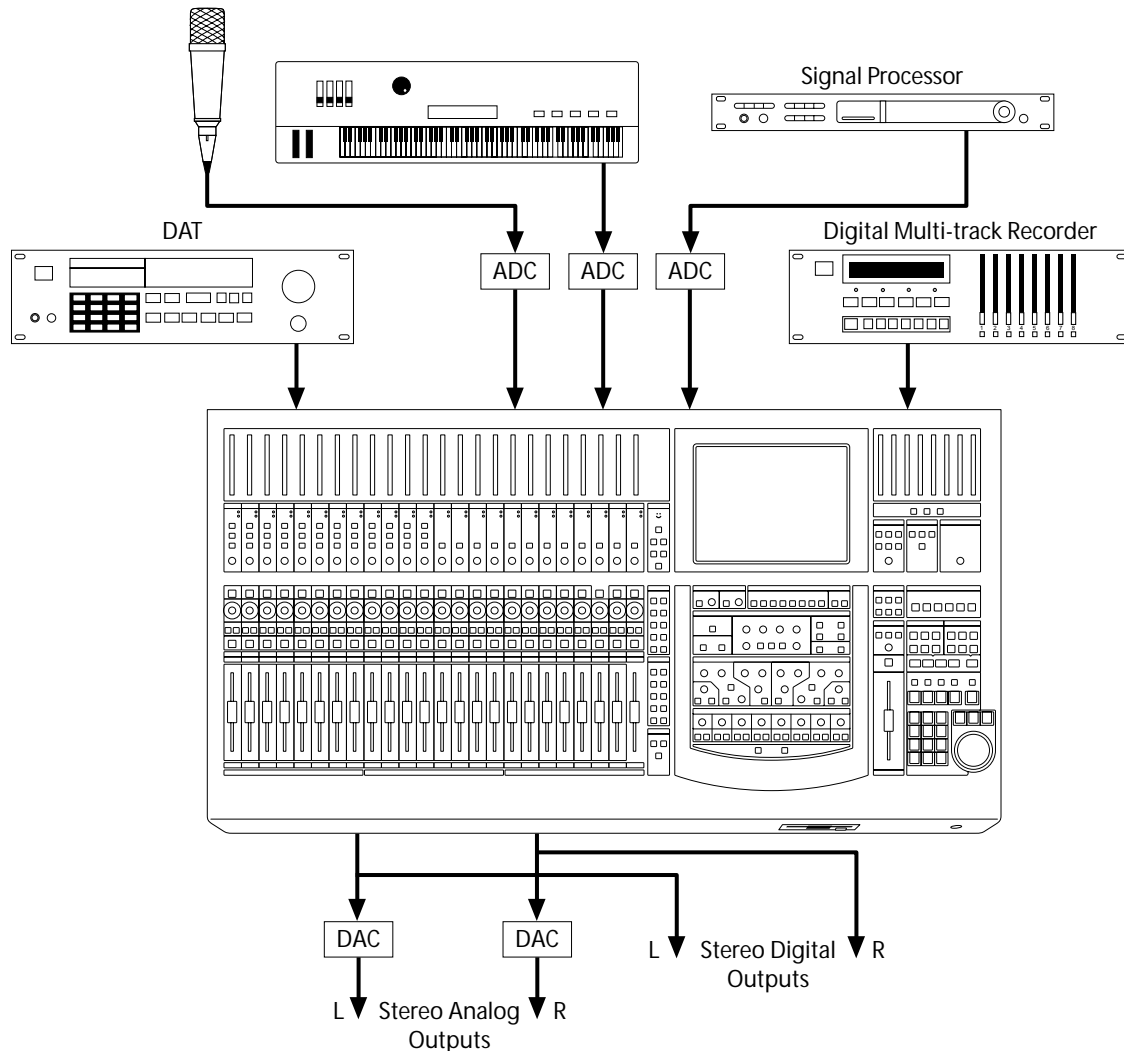

Figure 5

Appendix A: If This Is Your First Digital Console

In effect, a digital console like the DMX-R100 is a highly specialized computer. Like a computer, it has memory (in this case, Flash RAM), a means to output and store data externally (the built-in floppy disk drive), and a high-resolution graphics output (the touchscreen and external VGA display).

A computer also requires a way for the user to input data. To a degree, the DMX-R100 keyboard and mouse input serves this purpose, but it is important to understand that it is the entire surface of the console that is acting as the main input device. Every time you move a fader, press a switch, or turn a knob (with the sole exception of the channel analog head amplifier sections — see Chapter 2 in the DMX-R100 Operating Instructions), you are inputting data to the central processing unit (CPU) — the computer "brain" of the R100. (See Figure 6)
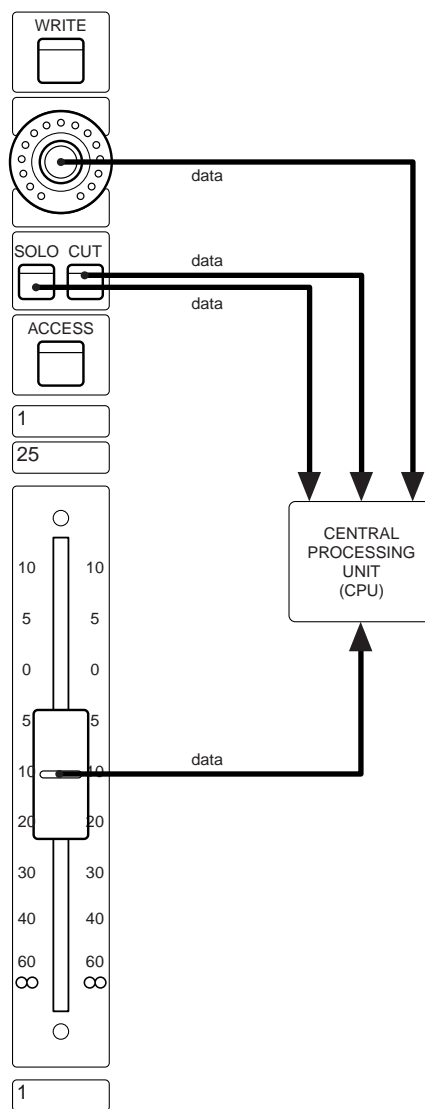

Figure 6

Appendix A: If This Is Your First Digital Console

This is the single most important difference between the two types of consoles: in an analog console, the signal is actually passing through the fader VCAs (voltage control amplifiers) and the switches and knob potentiometers that physically are part of the equalization, filtering and other processing circuitry. In a digital console, the faders, switches and knobs are simply input devices to the CPU, telling it information about the relative levels, pan positions, and processing you want to impart, thus controlling the data stream. For this reason, the front panel of a digital mixer is often called a *control surface*.

Another important advantage to using this kind of system of "virtual" faders, switches and knobs is that they can take on multiple functions, thus saving both space and cost. For example, the 24 main channel faders on the DMX-R100 can actually control up to 56 discrete input signals (48 inputs plus 8 aux returns) as well as the 8 multitrack (MTR) bus outputs and 8 Aux sends. In addition, the DMX-R100's flexible routing matrix allows any channel to carry any input signal (multiple channels can even carry the same input signal) and, conversely, any signal(s) to be routed to any physical jacks on the rear panel. The DMX-R100 faders (and the channel panpot knobs) can also be used for a variety of different functions, including setting trims and individual channel Aux send levels.

Digital and analog interconnections also differ significantly, even though they may use some of the same physical connectors. For example, digital AES/EBU signal (sometimes called the "professional" format) uses XLR connectors, same as mic connectors. But AES/EBU signal is a stream of digital ones and zeroes, and each XLR connector carries a pair of left-right stereo signals. That's why there is only a single "PGM" XLR jack on the rear panel of the DMX-R100; it carries the two-channel Program (PGM) bus signal. Similarly, the two digital Aux sends and two digital Aux returns on the rear panel carry four discrete signals out and four discrete signals in. (See Figure 7)
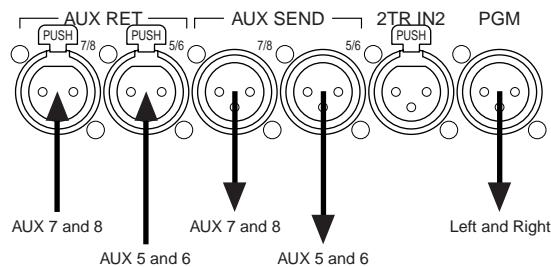
Figure 7

Appendix A

Appendix A: If This Is Your First Digital Console

Another important consideration when using a digital console with other pieces of digital audio gear is clocking. It is vital that all digital devices be referenced to the same master clock so that all samples are synchronized. If this does not occur, there will be audible signal degradation — even clicks and pops in the signal. Master clock can be derived from an incoming AES/EBU signal or, better yet, from a dedicated word clock output. The DMX-R100 provides both word clock input and output, and the clock signal it generates is stable and jitter-free (that is, there is little or no deviation between the timing of clock pulses), making it eminently suitable for use as a master clock source in any studio. (See Figure 8)
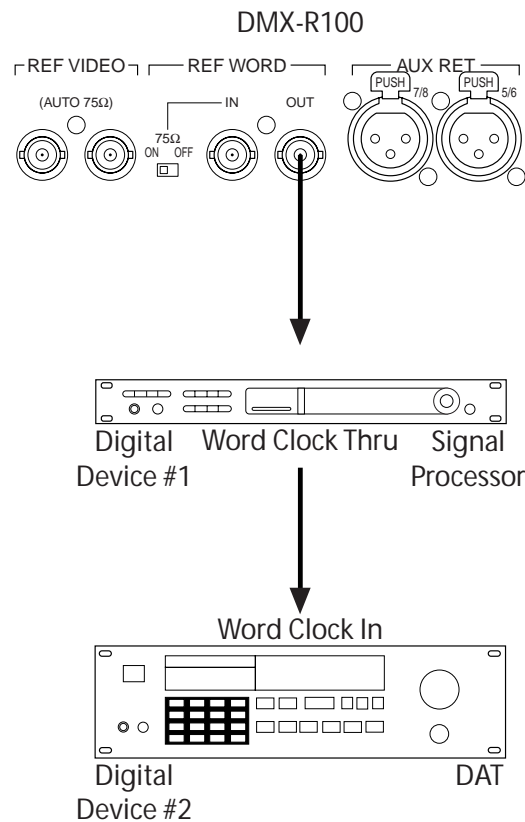
Figure 8

Alternatively, if a standalone clock signal generator or video house sync ("blackburst") system is available, the DMX-R100 (and all other interconnected digital audio devices) can be slaved to it, either via its reference video or word clock input. These settings are determined in the Sync/Time Code Window; for more information, see Chapter 3 in the DMX-R100 Operating Instructions. (See Figure 9))
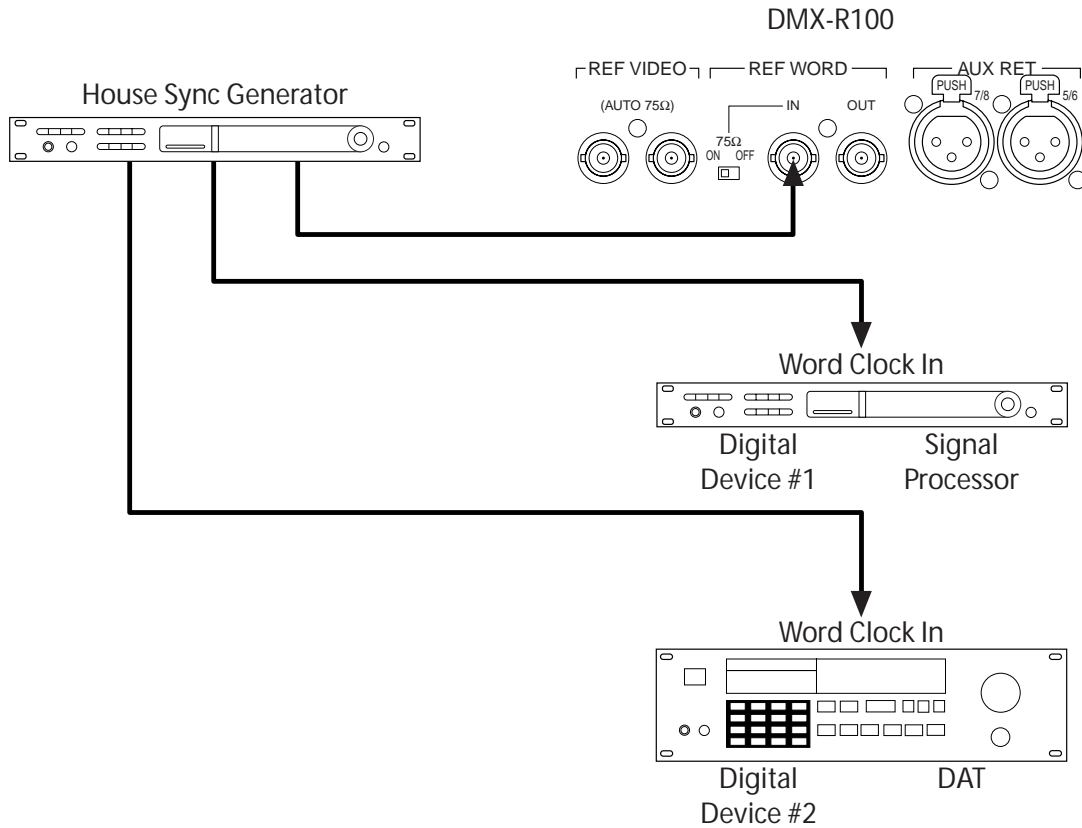
Figure 9

Appendix A: If This Is Your First Digital Console

The DMX-R100 I/O Status Window (see Figure 10) provides an invaluable means for monitoring the ongoing status of synchronization between all interconnected digital equipment; at a glance, you can determine the lock/unlock status of all devices, as well as information pertaining to the format and sample rate. It is worth noting that, even when a device is slipping in synchronization, the DMX-R100 will continue to pass audio, even though the signal may be somewhat degraded in quality. Depending upon the severity of the slippage, the degradation may not even be clearly audible, so the I/O Status Window can actually give you visual feedback of a problem you may not even be hearing. For more information, see Chapter 3 in the DMX-R100 Operating Instructions.

Figure 10

Appendix B: Surround Applications

One of the most unique features of the DMX-R100 is its extensive support for 5.1 surround sound mixing and monitoring, even at double-speed (2 Fs) sample rates of 88.2 or 96 kHz.*

Surround mixing enables you to direct any input signal to any or all of six discrete buses, and to pan freely between any five of those buses (the exception being the subwoofer) using the touchscreen. Through its Linking controls (see page 1-34 in this guide for more information), the DMX-R100 even provides multichannel equalization and dynamics processing. Surround monitoring enables you to listen to all six buses, all under the control of a single volume knob, and to mute or solo buses independently.

Interconnections

It is the presence of not two, but six discrete rear panel Control Room outputs that allows the DMX-R100 to provide surround monitoring. These outputs are labeled 1 through 6. When operating in standard stereo or mono mode, Control Room outputs 1 and 2 normally carry the PGM bus Left and Right signals, respectively. (However, when the MINI MONITOR button is selected [lit green] in the Monitor window, Control Room outputs 5 and 6 carry the PGM bus Left and Right signals. This allows a secondary pair of speakers to be connected, with the MINI MONITOR button effectively acting as a speaker switcher.)

When operating in surround mode, Control Room outputs 1 through 6 carry signal from MTR buses 1 through 6. The internal DMX-R100 surround panner allocates the MTR buses as follows:

MTR Bus	Speaker Output
1	Front left
2	Front right
3	Center
4	Subwoofer (LFE)**
5	Rear left
6	Rear right

This follows the SMPTE recommendation for surround bus allocation and is the same standard allocation scheme used by Dolby.™

Interconnections between the six Control Room outputs and surround monitors are therefore straightforward: connect outputs 1 and 2 to your main stereo speakers (which will double as front left/right speakers in surround mode), output 3 to your center channel speaker, output 4 to your subwoofer, and outputs 5 and 6 to your rear speakers (if you are not doing any surround work, Control Room outputs 3 and 4 should not be connected, and you can optionally connect a second, "Mini Monitor" set of speakers to outputs 5 and 6). All Control Room outputs are balanced line-level and can therefore be connected directly to the inputs of self-powered active monitors or power amplifiers driving passive monitors.

For more information, see page D-3 in this guide.

** *LFE stands for "Low Frequency Effects." This is the ".1" signal in "5.1," since the subwoofer itself is band-limited to carry low frequencies only (unlike the other five channels, which reproduce the full range of frequencies).*

Surround Monitoring

Setting up the DMX-R100 for surround monitoring is a simple process, requiring only a few touchscreen commands.

1 Make all interconnections between the DMX-R100 Control Room outputs and your surround speakers as described on the preceding page.

2 Press the SYSTEM tab at the bottom of the touchscreen. From the pop-up menu select MISC SETUP; the window appears. (See Figure 1)

Figure 1

3 Touch the SURROUND button in the bottom center of the touchscreen in order to set the MTR bus to surround mode. If you go to the Input/Pan/Assign window, you'll find that all icons in the surround section on the right of the touchscreen are now active instead of being grayed out; see Figure 2).

Figure 2

4 Set the Control Room monitor source to MTR, and set the CR monitor knob to a moderate listening level. Set the main meters to MTR.

5 Press the AUDIO tab at the bottom of the touchscreen. From the pop-up menu select MONITOR; the window appears. (See Figure 3)

Figure 3

6 Access the CR MONITOR (Control Room Monitor) tab and then touch the SURROUND button in the upper left-hand corner. Note that the EXT 1 - 6 and MTR 1 - 6 SOURCE buttons all light up, indicating that CR outputs 1 - 6 are now carrying signal from either MTR buses 1 - 6 or EXTernal inputs 1 - 6 (as set in the Audio Input Routing window; see page 1-13 in this guidebook for more information), depending upon which Source switch is pressed in the CR Monitor section.

Once these steps are completed, any signal assigned to MTR bus 1 in the Input/Pan/Assign window will be fed to the front left speaker, any signal assigned to MTR bus 2 will be fed to the front right speaker, any signal assigned to MTR bus 3 will be fed to the center speaker, any signal assigned to MTR bus 4 will be fed to the subwoofer,* any signal assigned to MTR bus 5 will be fed to the rear left speaker, and any signal assigned to MTR bus 6 will be fed to the rear right speaker.

Note that the currently selected Monitor mode (Stereo, Mono, or Surround) is saved along with the Title.

* If required, the SW LVL (Subwoofer Level) control in the Input/Pan/Assign window allows signal to be routed to the subwoofer independent of the MTR bus 4 master fader.

Appendix B

Listening to Prerecorded Surround Material

There are two basic ways to use your DMX-R100 to listen to prerecorded surround material such as DVDs, multichannel SACDs, or encoded CDs. The simplest method is to simply assign six inputs to the EXT MONITOR inputs in the Audio Input Routing window; however this does not allow you to selectively solo or cut individual speaker channels or to apply equalization or dynamics processing. This exercise demonstrates the alternate method — using six channel inputs, allowing you to solo, cut, or apply equalization or dynamics processing to individual speaker channels.

1   Make all interconnections between the Control Room outputs and your surround speakers, and then set up your DMX-R100 for surround monitoring, as described on the preceding pages.

2   Connect the 5.1 outputs from your DVD player, SACD player, or Dolby Digital™ or DTS™ decoder to six AD inputs of the DMX-R100.

3   Go to the Input/Pan/Assign window and access the channel receiving the front left signal. Assign it to MTR bus 1 only (turn off all other bus assignments) and touch the Surround Position button immediately below the Surround pan display. The following drop-down menu will appear: (See Figure 4)

Figure 4

4   This abstract menu presents nine preset static pan positions, showing the signal as a small red square. Select the front left position (upper left-hand corner) for this channel.

5   While still viewing the Input/Pan/Assign window, access the channel receiving the front right signal. Assign it to MTR bus 2 only (turn off all other bus assignments) and, from the Surround Position drop-down menu, select the front right position (upper right-hand corner) for this channel.

6 While still viewing the Input/Pan/Assign window, access each of the remaining four channels in turn and assign them as follows: center signal to MTR bus 3 only at the front center position (upper center from the dropdown menu); subwoofer signal to MTR bus 4 only (the position selected in the dropdown menu is irrelevant); rear left signal to MTR bus 5 only at the rear left position (lower left-hand corner from the dropdown menu); and rear right signal to MTR bus 6 only at the rear right position (lower right-hand corner from the dropdown menu).

7 In the Channel window, access each of the six channels in turn and set its fader to the 0.0 dB position for unity gain. The CR Monitor knob will control the overall level of the entire surround signal (the DIM and CUT switches in the CR Monitor section work as well) and you can also selectively cut or solo each of the surround channels by using the corresponding channel cut or solo buttons.

Appendix B

Surround Mixing

Once the DMX-R100 is configured for surround monitoring, it's an easy process to do surround mixing.

1   Make all interconnections between the Control Room outputs and your surround speakers, and then set up your DMX-R100 for surround monitoring, as described in the preceding pages.

2   Go to the Input/Pan/Assign window. All icons in the Surround Pan section should be active. You can now statically position any signal assigned to one or more of MTR buses 1 - 6 either by selecting a preset from the Surround Position drop-down menu or by simply touching the Surround Pan display/operation area. Note that surround panning moves made to channels within a stereo-linked pair affect only that channel and not the paired channel.

3   To perform dynamic surround panning of any signal assigned to one or more of MTR buses 1 - 6 (that is, to move the signal around in real time in the surround space), simply trace a trajectory with your finger in the Surround Pan display/operation area. (See Figure 3-5) The square pointer in the display indicates the current position of the signal, and the white circles indicate the trajectory of the pan. The faster the pan move, the further apart the circles are generated; the slower the pan move, the closer together the circles are generated.

Figure 5

4   You can also selectively turn off buses / speakers simply by touching their icon or by turning off the associated bus (for example, to turn off the center channel, either touch the center channel speaker icon or deassign the signal from bus 3). For example, one particularly effective way to position a lead vocal in a surround space is to assign it to the center and rear left/right channels (buses 3, 5 and 6) and then bring it "out" into the interior space slightly. Because no signal is being fed to the left and right speakers, the signal will appear to move closer to the listener in a more dramatic fashion.

5 The DIV (Divergence) control to the right of the Surround Pan display/operation area performs an important function. It shifts the amount of center-panned signal from the true center to phantom center (routed equally to the front left and right speakers in order to create a "ghost" image). To demonstrate how this works, take a steady-state signal (like a pad from a synthesizer) and assign it to MTR buses 1, 2, and 3 (corresponding to front left, front right, and center). Make sure that the MTR PAN switch is on (lit green). Then, as the signal plays, slowly change the Divergence control from 0% to 100% (touch the SET button and use the jog/shuttle wheel to increase or decrease the value). At 0%, the signal is sent equally to both the center channel and the two front channels (creating equal true and phantom images); as you increase the Divergence amount, less and less signal is sent to the front left and right channels, until, at 100%, the signal is sent to the true center channel alone.

6 Panning moves made within the Surround Pan display/operation area shift signal between MTR buses 1 - 3 and 5 - 6 only. To send signal to the subwoofer, assign it to MTR bus 4 (or turn on the SW icon for that channel) along with whatever other buses you wish to send it to, and then use the SW LEVEL control (touch it so that it lights green and then rotate the DMX-R100 jog wheel) to selectively send signal independent of the MTR bus 4 master fader setting. Note that if the GANG button immediately underneath the SW LEVEL control is turned on (lit green), the SW LEVEL control will not function and the amount of signal being sent from the selected channel to the subwoofer will be determined solely by the position of the MTR bus 4 master fader.

7 When doing standard stereo mixing using the PGM bus, the PROGRAM fader acts as master. However, when mixing in surround using MTR buses 1 - 6, MTR faders 1 - 6 (accessed by pressing the MASTERS button in the PAGES section) act as masters, allowing you to set independent bus levels. For convenience, you may want to place MTR bus faders 1 - 6 into a surround link, allowing you to raise or lower the overall master level by moving any of the six faders. The graphics display in the SURROUND LINK section in the Copy/Link window also allows you to selectively link together specific channels within a surround link. For example, you can opt to link together only the front LCR channels, or only the rear LS/RS channels. Similarly, the subwoofer channel can be left independent, or can be linked to the front channels, rear channels, or all five main channels. (For more information, see page 1-34 in this guide.) For premastering or pre-encoding operations, you can use the equalization and/or dynamics processing sections in MTR bus channels 1 - 6 as desired. If the MTR master faders are surround-linked together, even advanced operations such as 5.1 equalization or dynamics processing can be easily applied.

8 To automate surround sound panning moves, make sure the DMX-R100 is in surround monitoring mode (as described previously) and then simply arm either or both of the F/R WRITE and L/R WRITE objects in the Input/Pan/Assign window (these allow you to restrict panning moves to Front/Rear or Left/Right only if required) or the MTR PAN value object (not the on-off switch) in either the Input/Pan/Assign or Channel window for the selected channel so that a yellow or red underline appears. As long as valid timecode is received, any trajectories drawn in the Surround Pan display/operation area will be saved as part of an automated mix (as usual, automated mixes are saved as part of a Title). See Tutorial 3 in this guidebook for more information about automated mixing operations.

Channel Strip Block Diagram

C
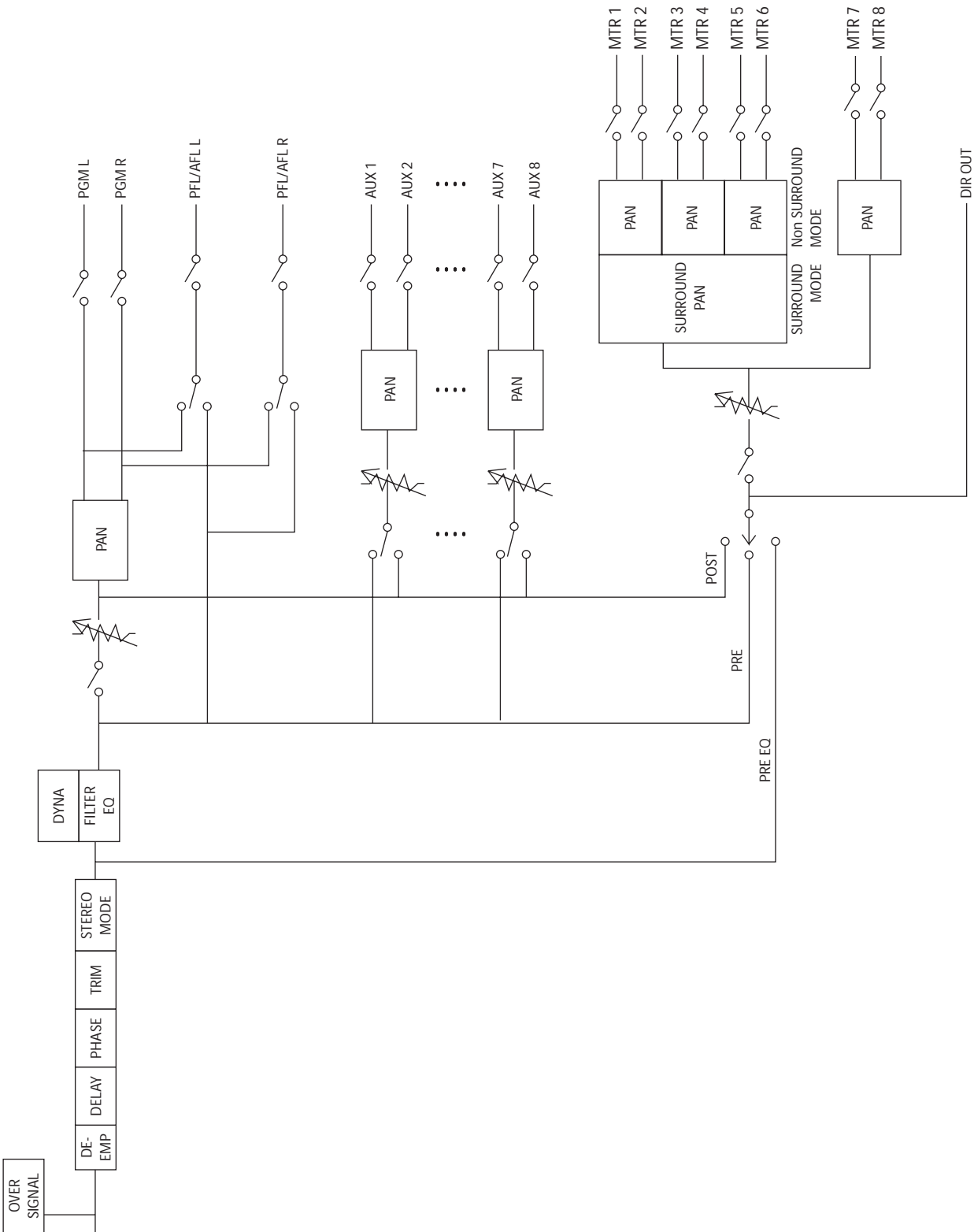
2Fs Operation

In addition to being able to pass and process high resolution 24-bit audio, the DMX-R100 provides support for the increasingly popular double-speed (2Fs) sample rates of 88.2 and 96 kHz.

At these higher sampling rates, however, the number of input channels, direct outs, bus inserts, and Aux returns is halved. In addition, there are two Aux sends (1 and 2), and the maximum channel delay times are halved (to 499.9 ms). Also, the HF band of the channel and bus equalizers extends from 19.9 to to 39.8 kHz, and the HPF in the channel equalizers extends from 22.4 to to 42.2 kHz. Finally, the number of MTR buses is reduced to either 4 or 6, depending upon whether or not the 2FS SURROUND button in the Sync/Time Code window is on (lit green). For more information on surround functionality at 2Fs, see page D-3 in this guide.

To operate the DMX-R100 at either 88.2 or 96 kHz, touch the corresponding SAMPLING FREQUENCY button in the Sync/Time Code window, then touch the CHANGE button. If the DMX-R100 is currently operating at a single-speed sample rate of either 44.1 or 48 kHz, the following dialog will appear: (See Figure 1)
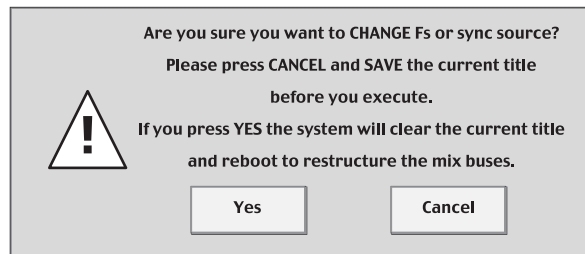

Are you sure you want to CHANGE Fs or sync source?
Please press CANCEL and SAVE the current title
before you execute.
If you press YES the system will clear the current title
and reboot to restructure the mix buses.

| Yes | Cancel |

Figure 1

Press YES to continue and reboot the system at the new double-speed sample rate (a second dialog will warn you to first remove any floppy disk that may be in the drive) or CANCEL to abort. As the dialog states, be sure to save any current Title operating at 44.1 or 48 kHz before carrying out this procedure, or it will be lost permanently.

After rebooting, you will notice some changes in the operation of the DMX-R100. Pressing the switch labeled "25-48" in the PAGES section has no effect, because those channels are no longer available. If you press the MASTERS button in the PAGES section, you will find that Aux sends 3 - 8, and Aux returns 5 - 8 are no longer available and cannot be accessed. In addition, there will be a reduced number of MTR buses, depending upon whether or not 2FS SURROUND is active or not (see page D-3 for more information).

D

The bus structure of the DMX-R100 when operating at 2Fs sample rates becomes most apparent when accessing the Audio Input Routing and Audio Output Routing windows. (See Figures 2 and 3)
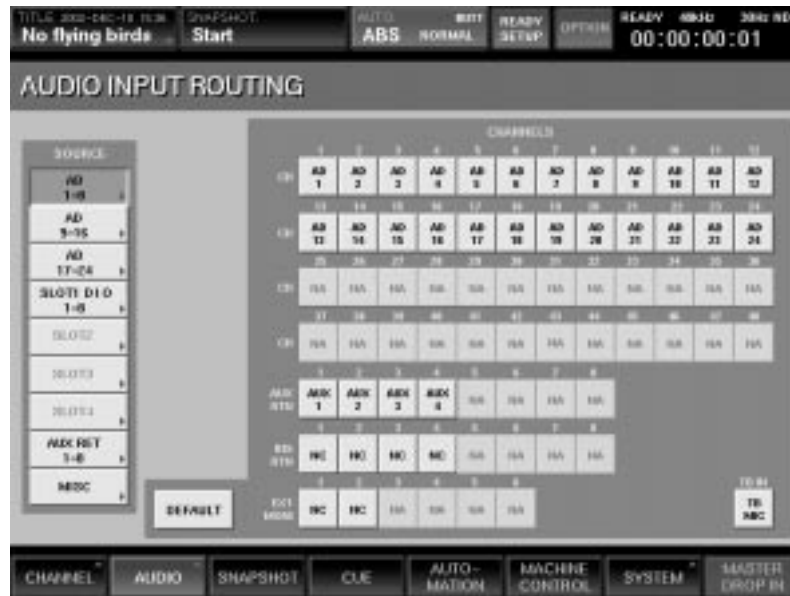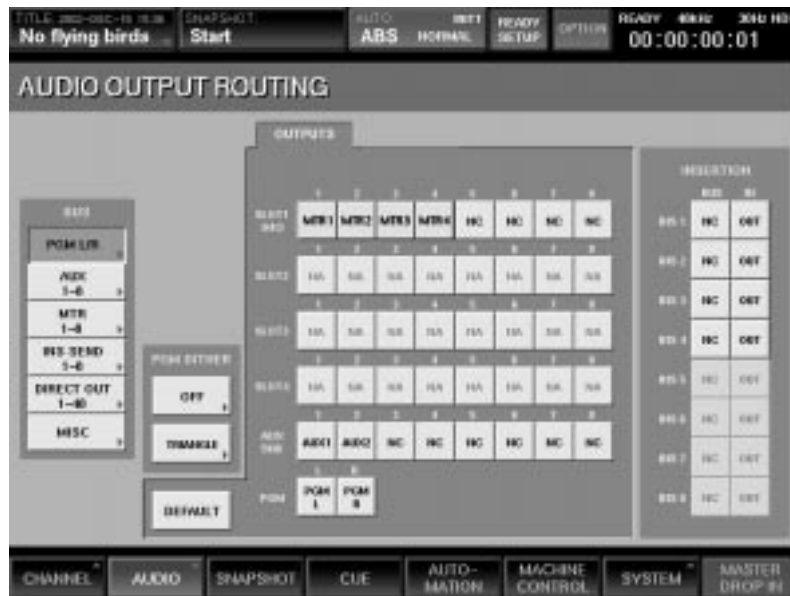

Figure 2

Figure 3

The grayed-out boxes in these windows indicate functions that are available only when operating at single-speed sample rates of 44.1 or 48 kHz. For example, the Audio Input Routing page shows that channels 25 - 48 are no longer available and that there are four Aux returns* and four Insert returns; there will also be two External Monitor inputs if the console is not set to 2Fs Surround mode (see section below). The Audio Output Routing page shows that there are two Aux sends, four bus Inserts, and either four or six MTR buses, depending on whether or not the console is set to 2Fs Surround mode (see below). In addition, the MISC box (in the Bus section of the page) will indicate that the right side of the Oscillator is not available as a source, and two Control Room outputs will be available if the console is not set to 2Fs Surround mode (see below).

Note that the DMBK-R103 AES/EBU and DMBK-R109 MADI expansion cards support 2Fs sample rates. If you have any other expansion cards installed in your DMX-R100 (such as, for example, DMBK-R106 or DMBK-R107 ADAT or TDIF cards), their slots will be grayed out and therefore unavailable as sources in the Audio Input Routing window and as outputs in the Audio Output Routing window.

Note also that SURROUND cannot be selected as the MTR Bus Mode in the Misc Setup window unless the DMX-R100 is set to 2Fs Surround mode (see below).

Surround Monitoring and Mixing At 2Fs

The DMX-R100 supports 5.1 surround monitoring and mixing even when operating at 2Fs sample rates. To prepare the console for surround operations at 88.1 or 96 kHz, touch the 2FS SURROUND button in the Sync/Time Code window so that is switched on (lit green), then press the CHANGE button and reboot.

In this mode, SURROUND is automatically selected as the MTR Bus Mode in the Misc Setup window, and cannot be deselected. All six External Monitor inputs are now available (as reflected in the Audio Input Routing window), as are MTR buses 1 - 6 and all Control Room outputs (as reflected in the Audio Output Routing window). This provides you with all the tools you need to do surround monitoring and mixing, as described in Appendix B in this guide.

Note that, when operating in 2Fs Surround mode, the Studio LS section is non-functional (it is no longer available as a source in the Audio Output Routing window, the associated tab is no longer available in the Monitor window, and the buttons in the STUDIO LS section on the DMX-R100 front panel become inoperative). Additionally, the Program master fader is inoperative in this mode (it will return to its fully off position even when moved, and its ACCESS button does not light), even though the physical PGM out connectors on the rear panel will still carry whatever signal is assigned to them in the Audio Output Routing window. To restore these functions when working in 88.2 or 96 kHz, simply deselect the 2FS SURROUND option in the Misc Setup window (so that it is no longer lit green), press the CHANGE button, and reboot.

Note that the Audio Input Routing window allows you to assign any four of the physical aux return input connectors to the Aux Returns, so both analog and digital connections can be used.

MADI Operations

MADI is an acronym for the Multichannel Audio Digital Interface. It is an audio standard that allows the simultaneous sample-accurate transmission of up to 56 digital signals (at single-speed sample rates of 44.1 or 48 kHz) over a single coaxial or fiber optic cable. MADI can also operate at double-speed (2 Fs) sample rates of 88.2 or 96 kHz; however, at these rates, the maximum number of simultaneous signals is halved to 28.

The optional DMBK-R109 expansion board adds MADI I/O capability to the DMX-R100. It allows the console to interface with a wide variety of MADI multitrack recorders, as well as with the optional SIU-100 system interface unit (which provides eight additional expansion card slots — including a remote-controlled 8-channel mic preamp card — thus greatly increasing the total number of physical inputs and outputs available for routing). The DMBK-R109 expansion board also allows two DMX-R100s to be cascaded together, sharing many common functions such as bus routings and soloing — even tandem recall of snapshots and titles.

Detailed instructions for accessing MADI functions using the DMBK-R109 expansion board and cascading dual DMX-R100s are provided in the DMX-R100 Software Version 2.1/2.2 Supplement. Rather than duplicate these instructions, the purpose of this Appendix is to highlight a number of key and less obvious features.

Interconnections

One DMBK-R109 can reside in a DMX-R100, and it must be installed in card slot 4. The DMBK-R109 card provides its own dedicated word clock input/output connectors. If you are using the DMX-R100 as master clock, a separate connection should be made between the DMBK-R109 word clock output and the word clock input of the MADI device you are using. If the DMX-R100 is being slaved to an external word clock source, a separate connection should be made between the word clock output of that source and the DMBK-R109 word clock input.

MADI signal — the audio data itself — can be transmitted and received using either standard 75-ohm coaxial cable (via BNC connectors) or fiber optic cable. The primary advantage to using fiber optic cable is that it permits longer cable runs, of up to 300 meters in length (coaxial cable runs should be limited to no more than 50 meters). Both coaxial and fiber optic outputs can be used simultaneously — identical signal will be transmitted on both — but only one input can be used. A switch on the back of the DMBK-R109 allows you to select either BNC or OPTICAL connector for the MADI input.

When valid MADI signal is being received and transmitted, status MADI IN and MADI OUT LEDs on the back of the DMBK-R109 will light steadily. If you see them blinking, the likely cause is that the clock of the external MADI device is non-synchronous with the DMX-R100. In this condition, audio will be degraded or not received at all, so check all connnections and settings in the Sync/Time Code window.
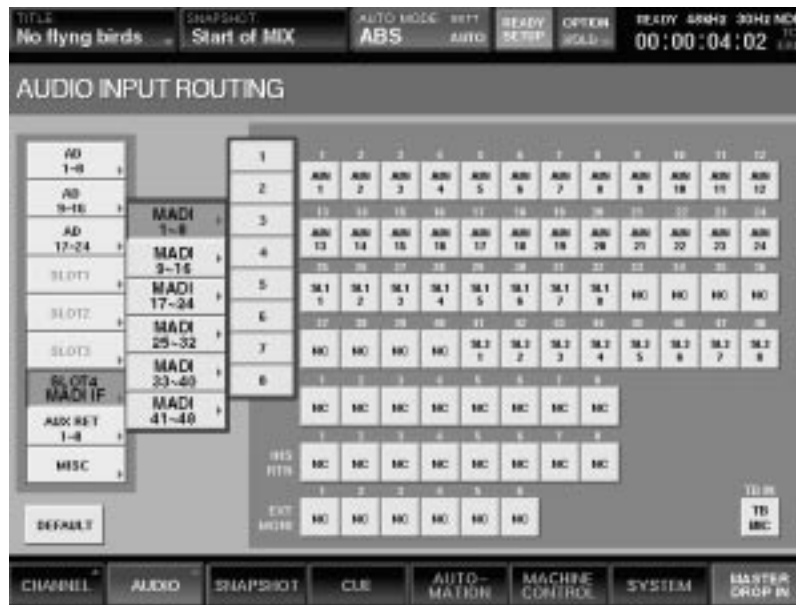
If you are using a single DMX-R100, or if you have two DMX-R100s but do not wish to cascade them, be sure to set the DMBK-R109 Mode Select switch to MADI. For more information on cascading two DMX-R100s, see page E-5 in this guide.

MADI Input and Output Routing

The MADI specification allows for up to 56 channels at single-speed sample rates of 44.1 or 48 kHz. The DMX-R100 is able to access the first 48 channels of data being received*; similarly, it transmits 48 channels via MADI. At double-speed sample rates of 88.2 or 96 kHz, the DMX-R100 recognizes the first 24 (out of a possible 28) channels being received, and transmits 24 channels worth of MADI data.

Thus, the installation of a DMBK-R109 adds 48 or 24 channels of I/O to a DMX-R100, depending upon the sample rate. If digital eight-channel expansion cards such as the DMBK-R103 (AES), DMBK-R106 (ADAT), or DMBK-R107 (TDIF) are installed in the remaining three expansion slots, that makes for a grand total of 72 inputs and outputs via the expansion slots when operating at 44.1 or 48 kHz sampling rates. Even when operating at 88.2 or 96 kHz, a fully loaded DMX-R100 with a DMBK-R109 card and three DMBK-R103 AES cards installed offers 48 digital inputs and outputs. And the number of inputs and outputs can be expanded further still when the DMBK-R109 is connected to a SIU-100 system interface unit!

When a DMBK-R109 is installed, the Audio Input Routing and Audio Output Routing windows will reflect the additional new available channels. Slot 4 will be displayed as six banks of eight slots each, or three banks of eight slots if operating at 2Fs. In the Audio Input Routing window, any of these can be routed to any of the 48 channels, 8 Aux returns, or any available EXT inputs.** (See Figure 1)

Figure 1

* There is no means of accessing MADI channels 49 - 56, or, in the case of 2Fs operation, MADI channels 25 - 28. However, many MADI devices allow for channel reassignment that enable the rerouting of MADI channels 49 - 56 to MADI channels 1 - 48.

** The total number of available EXT inputs depends upon the current sample rate and whether or not the console is set to 2Fs Surround mode. See page D-3 in this guide for more information.

MADI Input and Output Routing

Also, when a DMBK-R109 is installed, a new tab is added to the Audio Output Routing window, allowing any output bus to be routed to any of the 48 (or 24) MADI outputs. (See Figure 2)
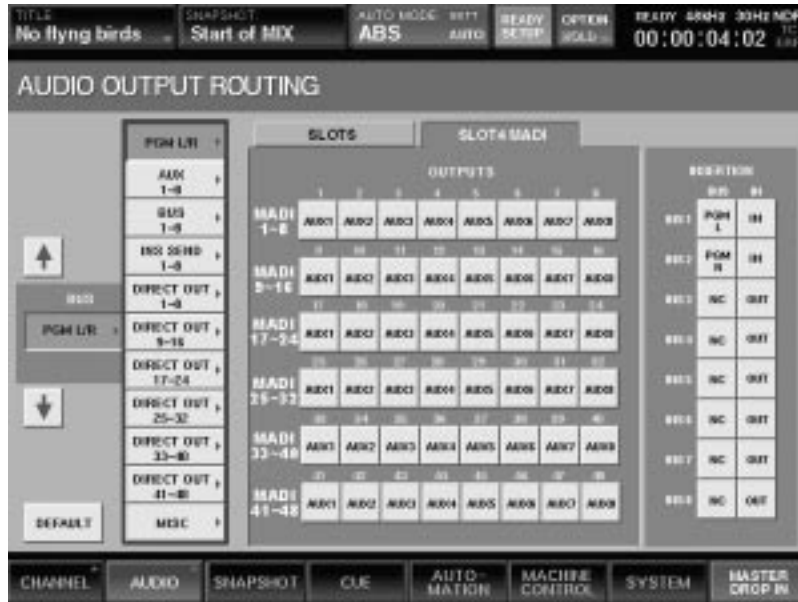

Figure 2

For large recording projects at 44.1 or 48 kHz, all 48 Direct outputs can be routed to all 48 MADI outputs. Note that MADI inputs and outputs can also be used as "Floating" bus insert sends and returns, thus allowing digital patching without using up Aux sends and returns. For more information, see page 1-20 in this guide.

Note that, if two DMX-R100s are cascaded together, all DMBK-R109 output slots in the sub console will be grayed out (unavailable) since they are fixed assignments — they are used to route audio signal via MADI to the master console. In the master console; signal can be routed to physical MADI outputs, to MTR, AUX, and PGM buses and to direct outputs; in the sub console, signal can be routed to any of the cascaded MTR, AUX, and PGM buses, and, from there, to the outside world. For more information, see the section on page E-5 entitled "Cascading Two DMX-R100s."

MADI Input and Output Routing

The I/O Status window also changes when a DMBK-R109 is installed. (See Figure 3)

Figure 3

Page up and down arrows (to the right of the Slot 4 display) allow you to view all 48 (or 24) slots in banks of eight. In addition, when operating at 2Fs sample rates (88.2 or 96 kHz), two new buttons, labeled 1/2 FS and LEGACY, are added. When on (lit green), the 1/2 FS button causes the DMBK-R109 word clock output to generate clock signal at half the sample rate. This is useful if you are operating the DMX-R100 at 88.2 or 96 kHz but want to interconnect it with another MADI device that can only operate at 44.1 or 48 kHz. When off (unlit), the sample rate of the DMBK-R109 word clock output will be precisely the same as its input.

The LEGACY button affects the outputted MADI audio signal itself. When on (lit green), the MADI output will be at 44.1 kHz if the DMX-R100 is operating at 44.1 or 88.2 kHz sample rates, or it will be at 48 kHz if the DMX-R100 is operating at 48 or 96 kHz sample rates. This allows it to transmit MADI data to older devices which may be incapable of receiving 88.2 or 96 kHz signals via "bit-splitting."* The LEGACY switch affects MADI transmission only; regardless of its setting, incoming MADI signal will be correctly received by the DMX-R100 regardless of its sample rate. Of course, for correct synchronization, both the DMX-R100 and the transmitting device must be set to the same sample rate and interconnected via word clock. (See previous section.)

* "Bit-splitting" refers to the practice of using two channels of a 1 Fs (44.1 or 48 kHz) device to carry a single channel of 2Fs (88.2 or 96 kHz) audio.

Cascading Two DMX-R100s

If you have two DMX-R100s running version 2.2 software or higher with DMBK-R109 cards installed in both, they can be cascaded together in a "master-sub" configuration, essentially acting like a single 96-channel mixer.

When cascaded, the following actions are coordinated between the two consoles:

- Soloing, PFL, and AFL
- Snapshot recall and store
- Cue recall and store
- Title recall and store
- Automation mode (i.e., ABS, TRIM, SAFE, OFF, BUTT, RAMP, TO END, etc.)

All of these, except soloing operations, are "one-way" in that the action must occur in the master console to be reflected in the sub console, not vice versa. Soloing is always cascaded, so that pressing a SOLO button in either console will cause all channels in both consoles to mute or be cut (depending upon the currently selected Solo Mode).

In addition, because any or all MTR, PGM, and AUX buses can be cascaded from the sub console to the master, any signal from either console can be routed to any cascaded bus. (For more information, see "MADI Input and Output Routing" on page E-2 in this guide.)

The following actions are not coordinated between two cascaded consoles:

- Talkback functions
- Fader and cut control groups (a group cannot contain channels from one console along with channels from the other)
- PAGES and FADERS buttons
- Copy/Link functions
- Monitoring facilities

Automated mixes are stored separately in the two consoles; however, because there is sample-accurate synchronization between master and sub, they will remain locked together and will effectively function as one large mix, even though each console's automation data needs to be stored separately (in Flash Memory or on floppy disk).

To cascade two DMX-R100s, turn the power of both consoles off and then connect a coaxial cable from the DMBK-R109 MADI OUT of the console you designate as "sub" to the DMBK-R109 MADI IN of the console you designate as "master." Set the MODE SELECT switch of the DMBK-R109 installed in the sub console to SUB, and the MODE SELECT switch of the DMBK-R109 installed in the master console to MASTER. (As described in the previous "Physical Interconnections" section, both DMBK-R109 cards must also be receiving the same word clock input signal.) Note that the MODE SELECT switch settings are polled by the DMX-R100 only once, during initial bootup; if for some reason you change the switch settings while the console is powered on, it will not recognize the change until the next bootup. When audio data is routed from a "SUB" DMBK-R109 to a "MASTER" DMBK-R109 in another console, it is being sent in full internal 32-bit format, allowing internal processing in the consoles to occur without compromising the signal. The audio output from a DMBK-R109 set to MASTER or MADI (that is, non-cascaded) is 24-bit, as per the AES MADI standard.

Finally, use a standard Mini DIN 8-pin RS-422 serial cable to make a connection between the PC PORT connectors on the rear panels of both consoles (this is required to carry control link, as opposed to audio, data). Note that, when two DMX-R100s are cascaded, their PC ports cannot be used to receive MIDI Time Code (MTC) or MIDI Machine Control (MMC); instead, use the dedicated MTC IN and MIDI IN connectors for that purpose.

When two consoles are cascaded, normally all monitoring is done through the master console, since it is receiving audio from the sub console (and not vice versa). However, the monitoring facilities of the sub console are still fully functional, so if required (if, for example, there is a second operator in a remote location), speakers can be connected to the sub console's Control Room and Studio Loudspeaker outputs. Even if no buses are being shared, you can easily monitor the mix coming from the sub console by connecting its Control Room outputs to two External inputs of the master console.

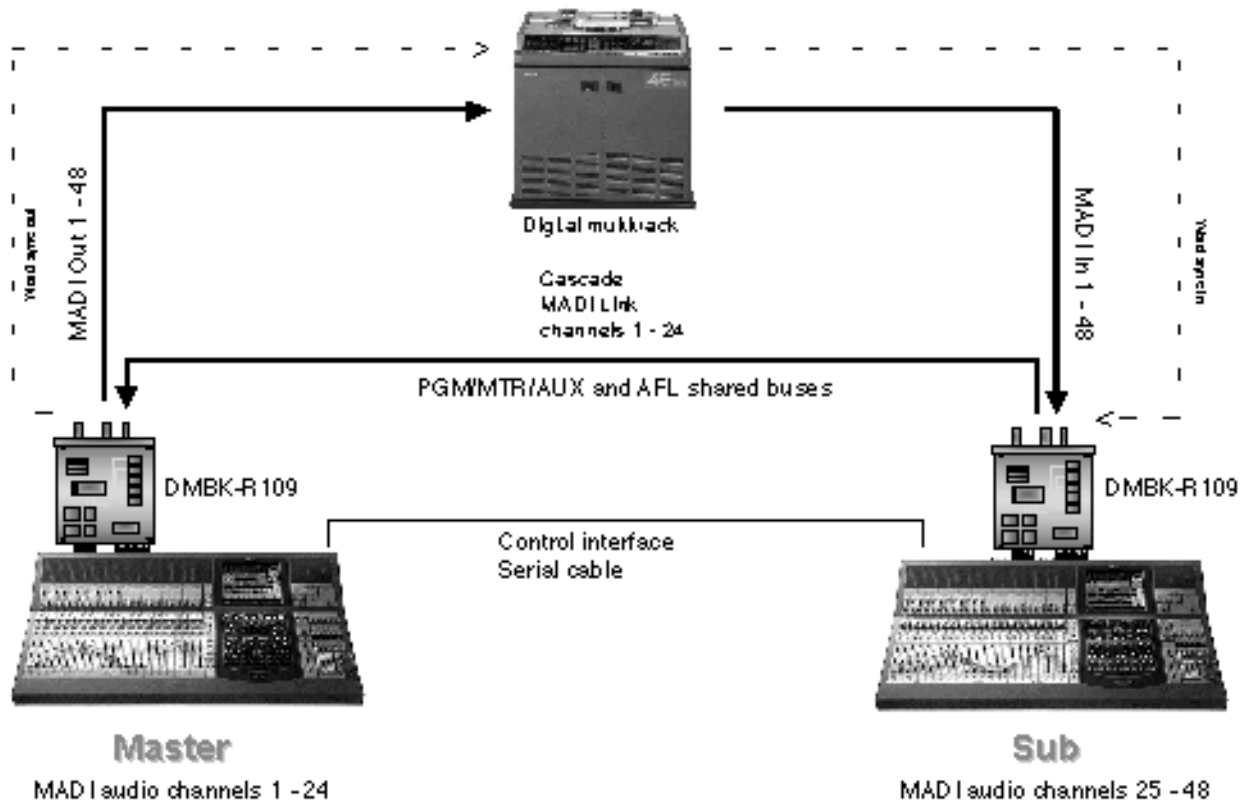Figure 4 shows the interconnections between two DMX-R100s cascaded together.

Figure 4

Once all connections are made, power both consoles up. When both consoles are booted, go to the master console's Cascade window (press the SYSTEM tab at the bottom of the touchscreen, then select CASCADE). (See Figure 5)
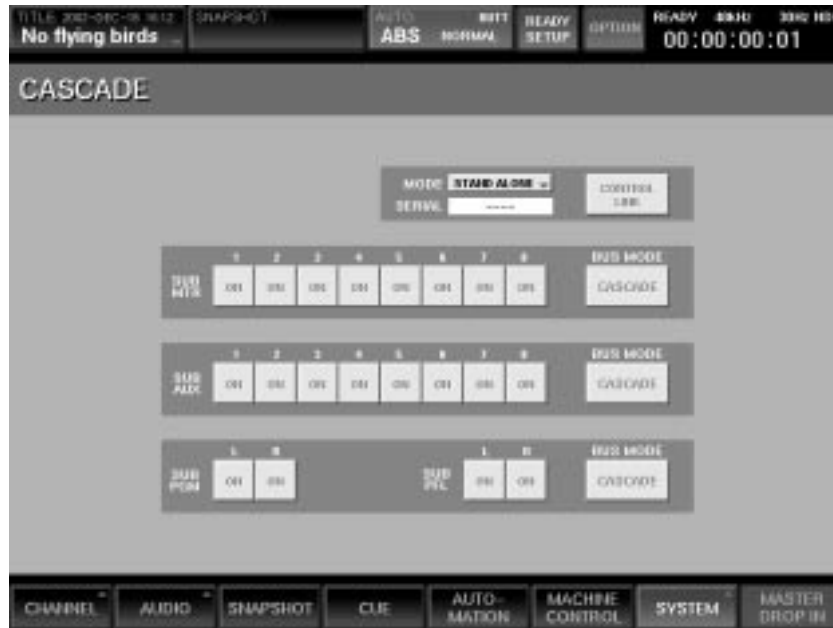

Figure 5

This window allows you to set various functions for cascading. The SERIAL display will show "OK" if both consoles are correctly operating at the same sample rate, or will show "FS ERROR" if for some reason they are operating at different sample rates (which will preclude audio data from being shared). When both consoles are correctly configured, one as master, the other as sub, their cascade linking status will be shown in the upper right-hand corner of the touchscreen, to the right of the SMPTE time code display and directly underneath the currently selected time code mode (i.e., 29.97 or 30 DF or NDF), with one labeled as Master and the other labeled as Sub.

To turn control link operations on, touch the CONTROL LINK button so that it lights green. When on, various operations performed in the master console (as described above) will be duplicated in the sub console. When on, the upper right-hand corner of the touchscreen (to the right of the SMPTE time code display) will display the word "LINK." Control linking occurs in real time, and can be switched on and off at will, even while you are working on a project. Generally, you will want it on when there is only a single operator behind both consoles, but off when there are two operators, one behind each console.

The buttons in the center of the Cascade window allow you to determine which bus outputs you want routed from the sub console to the master. You can opt to route all 8 MTR and/or AUX send buses, as well as the stereo PGM and PFL buses, or you can decide to "split" them so that only some buses are shared. For example, you may want to cascade the AUX send buses so that headphone mixes and/or routings to external signal processors can be shared between the two consoles, but opt to keep the MTR buses separate so that you can independently route signal to different card slot outputs on the two consoles. In a music mixing environment, you might want to have the buses in one console feeding the inputs of a hard disk recorder, while the buses in the other console feed various signal processors and/or two-track recorders. In postproduction applications, you might want to share music stems between the two consoles but keep dialog stems separate for routing to different video or audio recorders. Or in broadcast, you might want to have one large feed shared

Appendix E

between the two, and other "clean" feeds kept separate for routing to the master or sub mixer. The buttons in this window provide you with that kind of total flexibility.

The CASCADE buttons next to each set of buses allow you to invoke automatic time alignment, compensating for the additional time required to send bus signal from the slave console to the master by delaying the bus of the master. This generally should be switched on (lit green) when you are cascading an entire block of buses (i.e., all eight MTR buses, all eight AUX buses, or the PGM bus). If you are doing bus "splitting" — that is, if you only want some buses cascaded and others left independent (as described in the preceding paragraph), the CASCADE button can be left off, in which case you should perform time alignment for cascaded buses manually, as follows:

1   With two cascaded DMX-R100s interconnected as described above, apply the same source signal to one input of the master console and one input of the slave console. Set both faders to the same level, and make sure that both EQ and Dynamics are off for both channels.

2   Assign the output of both signals to a bus that is cascaded (that is, a bus that is lit green in the Cascade window).

3   Use the CR or Studio LS monitor section of the master console to monitor the outputs of that bus at a comfortable listening level.

4   In the Input/Pan/Assign window for the channel in the master console, reverse its phase and turn on Delay.

5   Select WORD (not WORD COARSE) as the Unit selection, and slowly begin turning the Delay knob (in the Input section of the DMX-R100 front panel) clockwise. As you do so, you will hear the signal slowly start to reduce in volume as it goes out of phase. Keep turning the knob until the signal disappears entirely; at this point, the two signals are completely out of phase and are therefore cancelling one another.

6   Write down the WORD value at the position where the signal disappears entirely. This is the Delay time that should be applied to all channels in the master console that are being mixed with channels in the slave console and assigned to the same cascaded MTR, AUX, or PGM bus. Note that this value will change if you change the sampling rate of the two consoles; however, as long as you continue working at the currently selected sample rate, the value should remain constant with all signals.

Note that all settings made in the Cascade window are saved with your title. As with all other DMX-R100 operations, be sure to save your data before powering down!

Cascading two DMX-R100s provides an extra degree of flexibility that enables you to work in a variety of ways. For example, you may opt to have channels 1 - 24 on both consoles carry mic inputs, while channels 25 - 48 on both consoles carry tape returns. This allows you to instantly flip between input and output signal by simply pressing the PAGES button on each console. Or you might prefer to have all your mic inputs on the master console, and all tape returns on the slave console. The multitude of options offered by the Cascade, Audio Input Routing, and Audio Output Routing windows allows the two cascaded consoles to adapt to almost any kind of environment, from music recording to postproduction, and from broadcast to live applications.
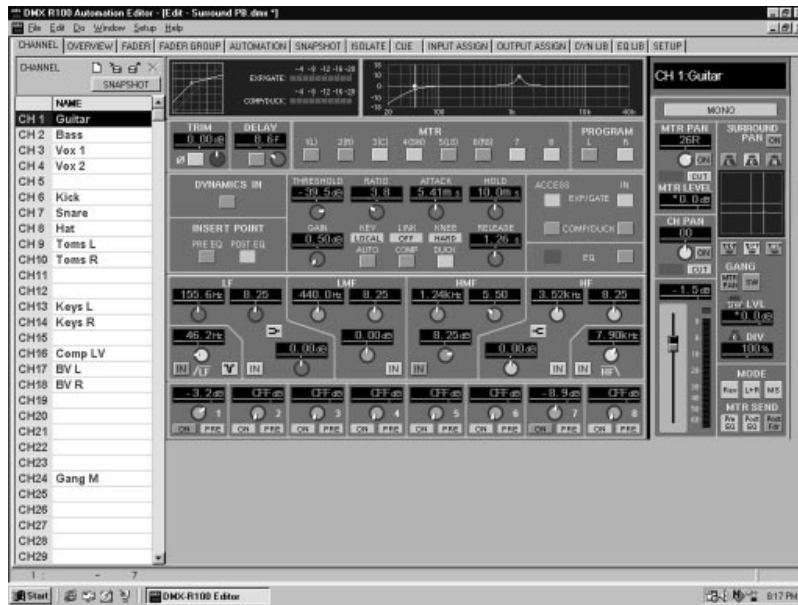
Automation Editor

Figure 1

The DMX-R100 Automation Editor provides a fast and easy means for editing and transferring data between the console and any Windows-based computer. It adds the following important functionalities to your DMX-R100:

 • An infinite number of Titles can be stored on your computer's hard drive or on external media. Titles can be transferred back and forth between the host computer and your DMX-R100 in a matter of seconds, using the console's built-in RS-232 SERIAL port.

 • Multiple Titles can be open simultaneously, so data (such as channel settings, EQ Libraries, Dynamics Libraries, entire Snapshots, or even automation data) can be freely copied between Titles.

 • The Automation Editor allows you to work "offline," so that you can set up an upcoming session beforehand (doing things like Input/Output routings, naming channels, cue and snapshots, entering cue SMPTE time values, setting up fader and cut control groups, etc.), without being anywhere near your DMX-R100! This can save you valuable studio time (and money) — imagine working on your laptop computer on an airplane as you are heading to an important session in another city, then setting up that studio's DMX-R100 exactly the way you want it with the touch of a button.

 • Even automation data can be edited and created offline, using a variety of tools (for example, you can use an onscreen pencil to draw fader or panning moves).

 • Interested in buying a DMX-R100 but not quite ready to take the plunge until you know more about how it works? The graphics displays of the Automation Editor are nearly identical to the touchscreen displays in the console itself, so this is a great way to familiarize yourself with the many features provided by the DMX-R100. (See Figure 1)

Detailed instructions for using this powerful software adjunct are provided in the Sony User's Guide for Automation Editor. Rather than duplicate these instructions, the purpose of this Appendix is to highlight a number of key and less obvious features.

Physical Interconnections

For the Automation Editor to communicate with your DMX-R100, a null modem connection (which changes pin-outs) is required between a COM port on your computer and the SERIAL port on the DMX-R100 rear panel. You can either use a standard RS-232C cable with a separate null modem adapter, or you can purchase a special null modem cable that has the pin-outs altered internally. Failure to use a null modem connection will result in no communications between your computer and your DMX-R100.

The RS-232C option in the Automation Editor's SETUP menu allows you to specify which COM port is being used to communicate with the DMX-R100. Depending upon your system configuration, you may need to go into the Windows control panel to activate this port; see your computer documentation for details.

Note that, even when connected to a DMX-R100, changes made in the Automation Editor are not reflected immediately in your console — this is, after all, an "offline" editor. To hear the changes you are making onscreen, invoke the "Export to RS-232C" option from the File menu and transmit the data to an empty or expendable slot in the Title manager, a process that takes mere seconds. (Alternatively, you can choose "Export to FDD" in the File menu and save your data to a DOS-formatted floppy disk, insert it into the DMX-R100's disk drive and load it from there.)

Note also that, as of software version 1.02 for the Automation Editor, there is no need to reboot your DMX-R100 in order to refresh Title names in the Title Manager after data is transmitted from the Automation Editor via RS-232.

Opening Multiple Titles

When the Automation Editor is first booted up, the only window you are shown is the Title window. In it is a list of all previously saved Titles (in addition, four "generic" Titles at each of the supported sample rates are provided to use as templates). Titles can be freely imported into the Automation Editor, either via floppy disk or, if a DMX-R100 is physically connected to the host computer, via RS-232C.

To open a Title and view its data, simply select it and double-click. In order to avoid inadvertantly overwriting important data, it's a good idea to get in the habit of copying a Title before you open it. This is easily accomplished by using the Backup function, accessed by selecting the Title you wish to and then either clicking on the Backup icon in the upper right-hand corner of the Title window, or right-clicking the mouse and choosing Backup from the drop-down menu. The Backup function instantly creates a copy of the currently selected Title, giving it the same name, but with the word "Copy1" appended to the beginning. (If you make multiple copies of the same Title, the second one is named "Copy2," etc.) To rename copies, simply select the Title and then right-click the mouse and choose Rename from the drop-down menu; to delete unneeded copies, select the Title you wish to delete, right-click the mouse and choose Delete from the drop-down menu.

To open multiple Titles — handy when you want to copy data between them — simply open the first Title you want to access and then minimize it by clicking in the standard Windows MINIMIZE icon in the upper right-hand corner of its window. Then open the next Title you want to access, and continue opening and minimizing each until all the Titles you want to work with are open. To access an open Title, simply click on its MAXIMIZE icon, or select RESTORE from the Windows menu.

Figure 2 on the next page shows a typical setup, with four titles opened but minimized, all waiting at the bottom of the screen to be activated.
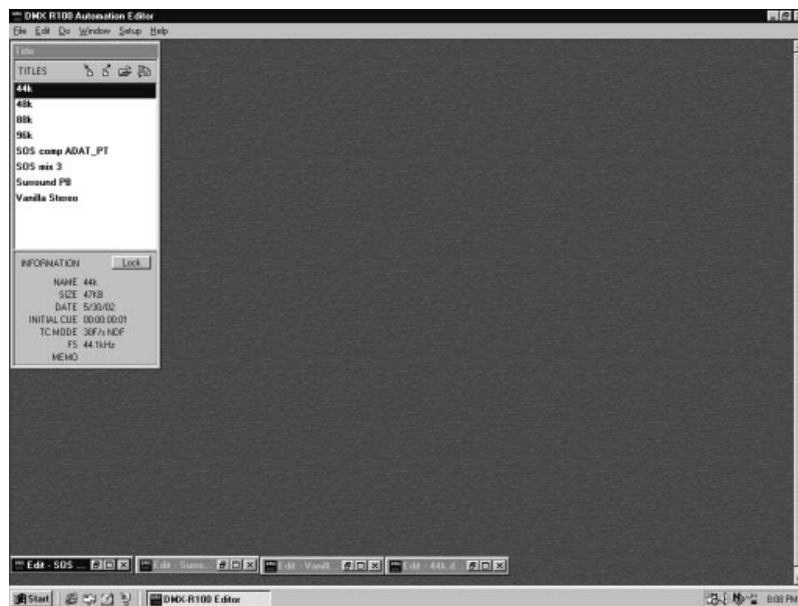
Figure 2

Copying Functions

The Automation Editor provides a powerful set of tools for copying data between different channels or snapshots; as noted above, you can even copy data from one title to another.

When copying data between channels or snapshots, the Automation Editor provides both a standard Copy function, and a unique and comprehensive Optional Copy function. To use Optional Copy, simply select the source channel or snapshot you wish to copy data from, then right-click the mouse and choose Optional Copy from the drop-down menu. This provides a full listing of all individual parameters within that channel or snapshot, and you can then simply check off the boxes of the parameters you wish to copy — all other parameters in the destination channel or snapshot will remain unchanged. For example, you can opt to copy only the EQ parameters from one channel — or even just specific EQ parameters, such as Q settings — to another, or you can opt to copy only the Aux send settings for all channels — or even just those of specific Aux sends — between snapshots. To complete the Optional Copy function, simply select the destination channel or snapshot, right-click the mouse and select Paste from the drop-down menu. Copy, Optional Copy, Paste, Cut, and Delete functions are also available from the Automation Editor's EDIT menu.

In addition to allowing you to copy one channel or snapshot's data (or, using Optional Copy, selected data from a channel or snapshot), the Automation Editor also enables you to copy a range of channels or snapshots (or, again, using Optional Copy, selected data from a range of channels or snapshots). If you then select an equivalent number of channels or snapshots to paste the data into, the full range will be pasted. Even if you select fewer destination channels or snapshots, the Automation Editor will paste as much of the data as it can. For example, if you select channels 1 - 4 and then Copy (or Optional Copy) them into channels 5 - 7, the data from channels 1 - 3 will be pasted (channel 1 will be pasted into channel 5, channel 2 into channel 6, and channel 3 into channel 7). By holding down the CONTROL key on your computer's keyboard, you can also select non-contiguous channels or snapshots — for example, you can Copy (or Optional Copy) the data from snapshots 12, 26, and 37, and then Paste it into snapshots 4, 9, and 16.

Appendix F

The DO Menu

Depending upon the window you are currently viewing, the Automation Editor's DO menu at the top of the computer screen provides several important functions.

 • Its ZERO function works much like OPTIONAL COPY, only it allows you to specify which parameters you wish to zero (set to default values, or, in the case of faders, return to minimum) instead of which parameters you wish to copy.

 • A Fader Copy function works much like the feature of the same name in the DMX-R100 Copy/Link window — it allows you to copy and paste all channel, MTR, or even Aux send levels.

 • A Trim Fader function allows you to apply precise amounts of boost or cut (in tenths of a dB) to selected fader(s), MTR send(s), or Aux send(s).

 • Lastly, Set and Reset Group functions are available in the Audio Fader / Cut Grouping window, and allow you to add or delete selected channels to the currently selected group.

Editing Snapshots and Libraries

The Snapshot, Dynamics Library, and EQ Library windows in the Automation Editor all provide a "lock-out" feature that prevents you from inadvertantly altering or overwriting important data: in order to make changes in any of these windows, you have to first click on the EDIT button in the upper-right hand corner. In the Dynamics Library and EQ Library, if no Library is currently selected, you'll need to first create a new one (by clicking on the New icon in the upper left-hand corner) before you can enter in any changes with your mouse or keyboard.

Editing Automation Data

Perhaps the most powerful function of the Automation Editor — one which currently does not exist at all in the DMX-R100 itself — is the ability to graphically edit automation data. The Automation window (see Figure 3) not only provides a graphic display showing all stored data for all channel objects, but allows you to cut, copy and paste between channels, or even between titles. Onscreen tools allow you to literally draw in fade-ins and fade-outs, pan movements, cuts, Aux send level changes — in fact, any kind of data in the DMX-R100 that's automatable is displayed and can be altered here.

Got a great move, but made it a little too late? No problem. The Automation Editor allows you to easily slip selected data forward or backward in time; simply display the type of data you wish to move, choose the "dotted box" tool, use the mouse to select the area to be moved, and then slide it forward or backward.

You can even insert or delete time into all channels of your automation data, which you'll find especially useful if you're mixing to picture and the director decides to recut it at the last minute. Simply choose the "dotted box" tool, use the mouse to select the length of time to be inserted or deleted (if inserting time, it will begin at the starting point selected) and right-click to invoke a drop-down menu, then choose INSERT TIME or DELETE TIME.
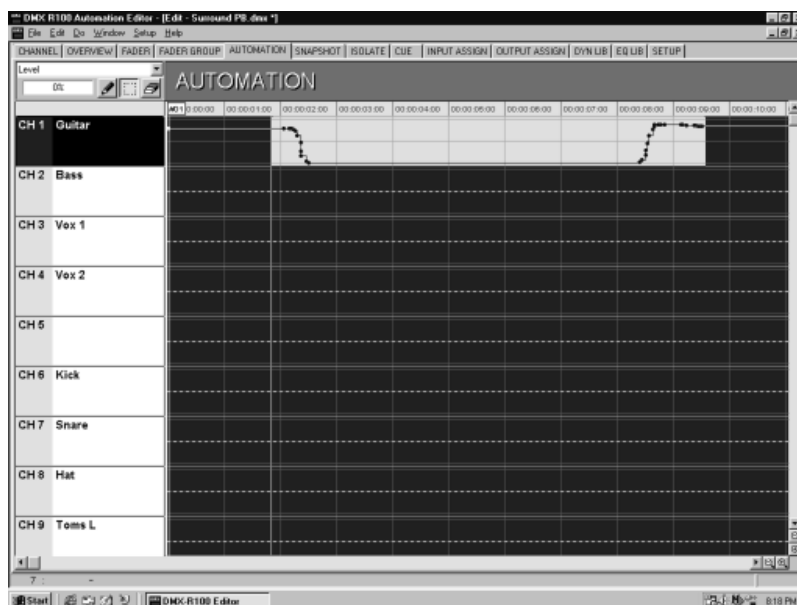

Figure 3

Undo

The Automation Editor provides a single level of Undo/Redo for most functions, accessed from the EDIT menu, or by right-clicking the mouse and selecting Undo/Redo from the drop-down menu. This allows you to go back one step if you make a change in error. Bear in mind that the data you create or alter in the Automation Editor is not saved until or unless you save the Title. **As with all computer-based operations, if you don't Save before you power down, your work will be permanently lost!**

Appendix F