

# **TASCAM**

**TEAC Professional Division**

## **MMR-8**

**Modular Multitrack Recorder**

**MMR-8 Version 4.0  
OWNER'S MANUAL**







# TASCAM MMR-8 Owner's Manual

<b>Chapter 1 General Information .....</b>	<b>12</b>
<b>MMR-8 Introduction .....</b>	<b>12</b>
<b>Hardware Overview .....</b>	<b>13</b>
Internal Boards for Units with Serial Numbers up to 01608.....	13
Internal Boards for Units with Serial Numbers of 01609 and above.....	13
Front Panel .....	14
Rear Panel .....	14
Accessory Products.....	15
<b>ViewNet Audio™ .....</b>	<b>16</b>
<b>Functional Overview.....</b>	<b>17</b>
<b>System Specifications.....</b>	<b>20</b>
<b>Chapter 2 Installation .....</b>	<b>22</b>
<b>MMR-8 Materials Kit Box .....</b>	<b>22</b>
<b>General Guidelines .....</b>	<b>23</b>
Mounting Rack Ears .....	23
Installing Multiple MMR Units .....	24
AC Mains and Grounding (Earthing) Considerations .....	25
<b>Audio Cables.....</b>	<b>25</b>
<b>MMR-8 Back Panel Connections For Serial # Up To 01608.....</b>	<b>26</b>
<b>MMR-8 Back Panel Connections For Serial # 01609 And Above .....</b>	<b>27</b>
Audio Connections .....	28
Analog In/Out Connections.....	28
Digital In/Out Connections .....	28
Monitoring Connections.....	28
Timecode and Video Reference Signals.....	29
Video In/Out.....	29
SMPTE/EBU Time Code In/Out .....	29
Biphase Connections.....	30
Digital Audio Sample Reference Connections .....	30
Word Clock.....	30
AES/EBU Sample Rate.....	30
MIDI Connections .....	31
External Controllers & Bus Connections .....	31
Lynx Bus / KCU Connection .....	31
MMR Sync Bus Connections .....	31
Serial Transport Connection.....	32
Serial Editor Connection .....	32
Parallel Transport .....	32
Parallel Tracks.....	32
<b>Connecting External SCSI Media .....</b>	<b>33</b>
<b>SCSI Cables .....</b>	<b>33</b>
Cable Quality.....	33
Cable Length and Device Support .....	33
Cabling Wide and Narrow Devices in a System .....	34
<b>SCSI Termination.....</b>	<b>34</b>
<b>Kingston Frame Configuration .....</b>	<b>34</b>

<b>Wide SCSI Cards and Kingston Frames.....</b>	<b>35</b>
Removing the Narrow Host Adapter (Symbios SYM 8600SP) .....	35
Installing the Wide Host Adapter (Symbios SYM8751SP).....	35
Wide Kingston Drive Frames .....	36
<b>Approved SCSI Drives .....</b>	<b>36</b>
<b>DVD RAM Support .....</b>	<b>37</b>
<b>LIMDOW Optical Drives.....</b>	<b>37</b>
<b>Remote Controllers for the TASCAM MMR-8 .....</b>	<b>38</b>
<b>Keyboard Operation (with MM-RC option).....</b>	<b>38</b>
Using the PC Keyboard.....	39
<b>Powering Up the System.....</b>	<b>40</b>
<b>Verifying MMR-8 Installation.....</b>	<b>40</b>
Software Updates.....	41
<b>Factory Default Settings .....</b>	<b>42</b>
<b>Testing Your Installation.....</b>	<b>42</b>
<b>Chapter 3 MMR-8 Keys and Status Displays.....</b>	<b>44</b>
<b>MMR-8 Keys &amp; Definitions.....</b>	<b>44</b>
<b>MMR-8 Front Panel .....</b>	<b>46</b>
<b>Front Panel Indicators, Switches, and Displays.....</b>	<b>48</b>
LED Indicators .....	48
Configuration Settings .....	48
Active Mode/Key Indicators .....	48
Track Status and Metering .....	48
Meter LEDs.....	48
Machine Status LEDs .....	49
Liquid Crystal Display (LCD).....	50
Normal State Display.....	50
Setup State Display .....	51
View Track State Display.....	51
Slip Track State Display.....	52
Load Track State Display.....	52
Backup State Display .....	53
Verify State Display.....	54
Error State Display.....	54
<b>Front Panel Key Groups.....</b>	<b>55</b>
Transport Group.....	55
Setup and Wheel Group .....	56
Wheel .....	58
Track Group .....	58
Keypad Group .....	63
<b>Chapter 4 MMR-8 Operation .....</b>	<b>69</b>
<b>Loading and Mounting Drives .....</b>	<b>69</b>
<b>Loading a Project.....</b>	<b>70</b>
<b>Loading Individual Tracks.....</b>	<b>70</b>
Viewing Tracks.....	71
Unloading Tracks.....	71

Deleting Tracks from the Disk.....	71
<b>Recording a New Project.....</b>	<b>71</b>
Default Record Drive .....	72
Disk Initialization and Low Format .....	72
Formatting Macintosh Disks .....	72
Clip Names.....	72
In & Out Points Set In Record.....	72
<b>Using the Backup Functions.....</b>	<b>73</b>
Backup .....	73
Rename .....	74
TapeMode Convert.....	74
Export.....	75
WaveFrame Export.....	75
OMF Export .....	75
To Import the MMP OMF Export File on Pro Tools .....	76
Crossfades in OMF.....	76
Tape Mode Export to OMF.....	76
Pro Tools Export.....	76
Export As .....	77
Dynamic Backup Status Display.....	77
<b>Using Registers .....</b>	<b>77</b>
Recalling Registers .....	78
Capturing the Current Time Code.....	78
Trimming Time Code Values .....	78
Using the Entry Register .....	78
<b>Editing.....</b>	<b>80</b>
<b>Local &amp; Studio Monitoring .....</b>	<b>85</b>
Headphone Volume (LEVEL).....	85
Headphone Jack (PHONES).....	85
<b>The Lynx Bus.....</b>	<b>85</b>
Transport Control.....	86
Track Record Arm/Select (MMR-8 Only).....	86
Head/Tail.....	86
Slip Track/Region.....	86
Prev/Next.....	86
Undo/Redo.....	86
Clear/Paste.....	87
<b>The MMR Bus .....</b>	<b>88</b>
<b>Chapter 5 MMR-8 Setup Menus.....</b>	<b>89</b>
<b>The Setup State &amp; the Setup Menu .....</b>	<b>89</b>
<b>Setup Operation.....</b>	<b>90</b>
<b>Setup Menu Chart .....</b>	<b>91</b>
<b>000 Basic Setup .....</b>	<b>96</b>
000 Control Mode.....	96
Local/Bus .....	96
Time Code Chase.....	96
Biphase Chase .....	96
Serial Transport .....	97
Editor .....	97
Varispeed .....	97
Serial Editor Port Details.....	97

Record Ready Tallies.....	97
Sony P2 Chase and Offset Commands.....	97
Serial Editor Port Active When Not ONLINE .....	97
Automatic ONLINE.....	97
Local Machine Response to Serial Record Commands.....	97
Program Speed Play.....	98
Editor Mode Operation Without Video Reference.....	98
Hybrid Protocol on Serial Editor Port.....	98
001 Frame Reference .....	98
Automatic.....	98
Video.....	98
002 Sample Reference.....	98
Automatic.....	98
AES/EBU Input.....	98
Ext Wordclock.....	99
003 Timecode Type.....	99
004 Sample Rate .....	99
006 Varispeed Rate.....	99
<b>100 Bus Control .....</b>	<b>100</b>
100 Sync Group.....	100
110 MMR Bus Request.....	100
111 Ident Request .....	100
112 Ident Assigned .....	100
120 Lynx Bus .....	100
121 Lynx Bus Address .....	100
122 Lynx Bus V500 Mode .....	100
<b>200 Transport .....</b>	<b>101</b>
200 Record Mode.....	101
Non-Destructive.....	101
Tape Mode .....	101
201 All Safe.....	102
202 Record Key .....	102
203 Rehearse Key .....	102
210 Loop Mode.....	102
211 Loop Record .....	102
212 Pre-roll.....	102
213 Post-roll .....	102
220 Next / Previous Mode.....	102
221 Edit Sync Mode.....	103
230 Tape Mode Start.....	103
231 Tape Mode Length .....	103
240 Dailies Mode.....	103
250 Slip Commit.....	103
<b>300 Biphase .....</b>	<b>103</b>
300 Biphase Frame Rate.....	103
301 Biphase Pulse Rate.....	104
302 Biphase Input.....	104
<b>400 Remote.....</b>	<b>104</b>
400 Editor Device .....	104
TASCAM MMR-8.....	104
Sony PCM-7030 .....	104
Sony BVU-950 .....	104
401 Editor Auto EE.....	104
402 Editor Edit Field.....	105
Auto .....	105
Field 1 .....	105



Field 2 .....	105
403 Editor Track Arm .....	105
Digital Audio .....	105
Analog A1-A4 .....	105
Local [enbl+any] .....	105
Local [enbl+Aud] .....	105
Local [enbl+A1] .....	105
Local [enbl+A2] .....	105
Local [enbl+A3] .....	105
Local [enbl+A4] .....	106
404 Editor Chase .....	106
410 Parallel Track Arm .....	106
Parallel I/O Details .....	106
Dedicated Record/Rehearse ON/OFF pins .....	106
Lock Tally Out .....	106
Record Punch to Local Only .....	106
420 MIDI Device ID .....	106
<b>500 Audio .....</b>	<b>107</b>
500 Input Source .....	107
501 Auto Input .....	107
510 Crossfade .....	107
520 Meter Reference Level .....	107
521 Meter Calibrate .....	107
522 Clip LED on Play .....	107
530 Reference Tone .....	107
540 Gapless Punchout .....	108
550 Remote Meter Source .....	108
<b>600 Digital I/O .....</b>	<b>108</b>
600 Digital Input Ref Track .....	108
602 Digital Input Delay .....	108
610 Digital Output Delay .....	108
<b>700 Disk .....</b>	<b>108</b>
700 Disk Encoding .....	108
701 Record Disk SCSI ID .....	108
710 Disk Initialize .....	109
711 Disk Low Format .....	109
720 Disk Cleanup .....	109
790 Drives Mounted .....	109
<b>800 Tracks/Project .....</b>	<b>109</b>
800 Project Name .....	109
810 Track Prefix .....	109
<b>900 System .....</b>	<b>110</b>
900 Store Settings .....	110
901 Recall Settings .....	110
910 Set MM:DD:YY [Date] .....	110
911 Set HH:MM:SS [Time] .....	110
912 Change Password .....	110
920 LED Brightness .....	110
940 Machine Name .....	110
950 IP Address .....	111
Setting the IP Address .....	111
Format of IP Addresses .....	111
951 IP Net Mask .....	111
952 IP Gateway .....	111
Important Rules for IP Addresses .....	111
980 Serial Number .....	112

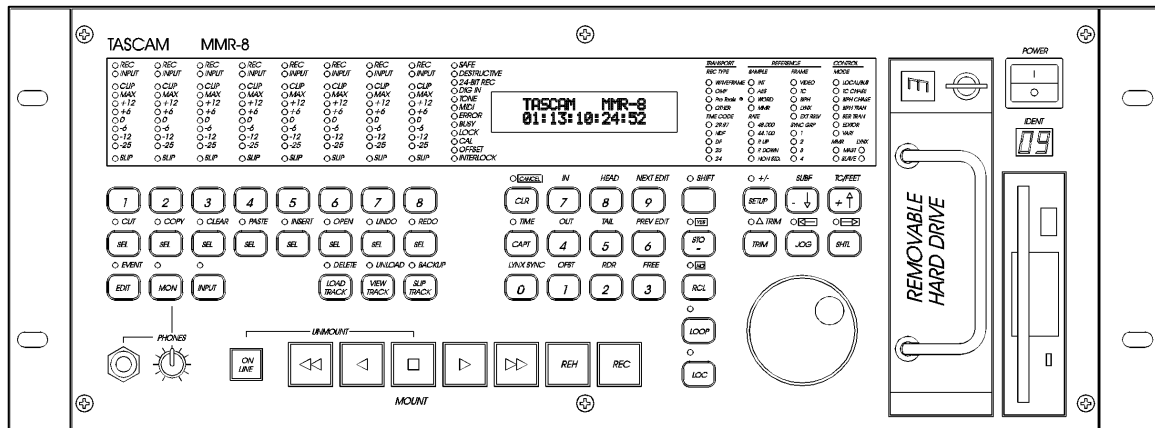
990 Software Version.....	112
995 Load Software.....	112
<b>Chapter 6 File Format Support.....</b>	<b>113</b>
<b>Show Project Format.....</b>	<b>113</b>
<b>Show Track Format, Drive ID .....</b>	<b>113</b>
<b>Formatting Macintosh Disks .....</b>	<b>113</b>
<b>Delete and Disk Cleanup for Macintosh Volumes .....</b>	<b>114</b>
<b>Macintosh File System Errors.....</b>	<b>114</b>
Macintosh Files Created by the MMR .....	114
<b>Support for Pro Tools® Session Files .....</b>	<b>115</b>
Pro Tools Features Supported.....	116
Pro Tools Features Not Supported .....	116
Dynamic Voice Allocation.....	116
TDM Plug-Ins .....	116
Voice Output Assignments.....	117
Restrictions When Using the Pro Tools Session Format .....	117
Pull Up / Pull Down.....	117
Frame and Sample Rates in Tape Mode.....	117
Limitations on Number of Tracks.....	117
Session Start Time Restrictions .....	117
Using TapeMode with ProTools Sessions.....	118
<b>Pro Tools Volume and Mute Automation .....</b>	<b>119</b>
Volume Automation.....	119
Mute Automation.....	119
Disabling Pro Tools Volume Automation .....	120
<b>Audio File Time Stamp Support .....</b>	<b>120</b>
<b>AIFF File Support .....</b>	<b>121</b>
<b>OMF Files .....</b>	<b>121</b>
<b>Zaxcom DEVA Broadcast Wave File Support.....</b>	<b>121</b>
DEVA Files Naming Conventions.....	122
<b>Akai DD-8 Support.....</b>	<b>122</b>
Playback .....	122
Export.....	122
<b>Editing File Formats not Written by The MM Series.....</b>	<b>122</b>
<b>Sonic Solutions File Support .....</b>	<b>123</b>
Using Sonic Lightspeed .....	123
Sonic SSP, USP, and HD System Support .....	123
Sonic Fade Files.....	123
<b>Format Chart.....</b>	<b>124</b>
<b>Chapter 7 MMR-8 System Applications.....</b>	<b>125</b>
<b>Film Post Production .....</b>	<b>125</b>
Biphase Setup Menus.....	126
MMR-8 Film Connections .....	127
<b>Video Post Production .....</b>	<b>127</b>
The Lynx Bus .....	127

<b>Chapter 8 Maintenance &amp; Service</b> .....	<b>128</b>
<b>System Input Level Calibration Using the Meter LEDs</b> .....	<b>128</b>
MMR Input and Output Level Calibrations.....	128
MOC Calibration Procedure.....	129
MIC Calibration Procedure.....	130
<b>Adding External Drives to the System</b> .....	<b>131</b>
<b>Formatting Disks</b> .....	<b>131</b>
<b>Using Removable Media</b> .....	<b>131</b>
<b>Chapter 9 Technical Support</b> .....	<b>132</b>
<b>MMR-8 System Software</b> .....	<b>132</b>
<b>Appendix A: Control Panel Command Summary</b> .....	<b>133</b>
Transport Group.....	133
Setup and Wheel Group.....	133
Keypad keys.....	134
Track Select Keys.....	136
<b>Appendix B: TASCAM MMR-8 Drive Compatibility Chart</b> .....	<b>137</b>
Approved SCSI Drives.....	137
<b>Appendix C: WaveFrame Compatibility</b> .....	<b>139</b>
<b>Appendix D: MMR-8 Cable Information</b> .....	<b>141</b>
Parallel Tracks and Parallel Transport Connector Pinout.....	141
MIDI IN/THRU/OUT Connector pinout.....	142
LYNX (Remote Controller) Connector pinout.....	142
EDITOR Connector pinout.....	142
TRANSPORT (Sony 9-pin) Connector pinout.....	143
ANALOG INPUT & OUTPUT Connectors pinouts.....	144
BIPH (Biphase) Connectors pinout.....	144
DIO (AES/EBU Digital Audio) Connector pinout.....	145
SYNC (MMR-Bus) Connector pinout.....	145
TIMECODE IN Connector.....	146
TIMECODE OUT Connector.....	146
WORD CLOCK IN Connector.....	146
WORD CLOCK OUT Connector.....	146
VIDEO IN/OUT Connector.....	146
SERIAL CONNECTORS.....	147
SCSI Connector.....	147
PRX Connector.....	147
<b>Appendix E: MMR-8 Glossary</b> .....	<b>148</b>
<b>Appendix F: Disk Time Chart</b> .....	<b>154</b>
<b>Appendix G: Macintosh File System Error Messages</b> .....	<b>155</b>
Macintosh File System Error Codes.....	156
<b>Appendix H: MMR/MMP MIDI Machine Control Protocol</b> .....	<b>161</b>
MMC Information Fields.....	162
MMR-8 MMC Signature.....	163
MMP-16 MMC Signature.....	163
MIDI Inquiry Message.....	163
<b>Index</b> .....	<b>164</b>

# Chapter 1 General Information

This chapter presents the main features and capabilities of the MMR-8 hardware and a functional overview of its Panel/Display states. MMR-8 product specifications are also included.

## MMR-8 Introduction



MMR-8 Front View

The MMR-8 is a non-linear digital replacement for the analog or digital tape machines found in recording studios and broadcast facilities, and for magnetic film dubbers found in film and video post-production facilities. The MMR-8 can play back and record eight tracks of material from one or more SCSI hard drives or other removable media. Playback can be in exact or track-slipped synchronization to industry-standard film, video, and audio devices, whether they are mechanical tape-based or hard drive-based.


Audio files recorded on the MMR-8 consist of selectable linear 16-bit or linear 24-bit words at sample rates of 48.0 kHz or 44.1 kHz, modifiable to a pull-up or pull-down rate, including conversion between PAL, film, and video, making fourteen total discrete sampling rates. The analog I/O section uses balanced +4 dBu analog connections on DB-25 connectors that are pin-compatible with the TASCAM DA-88 and may use the same cables. The DIO (Digital I/O) connection provides digital audio inputs and outputs which conform to the AES/EBU standard for direct digital recording and playback. The digital I/O connector can use a standard DA-88 cable (the analog cable – *not TDIF*) to provide four stereo AES inputs and four stereo AES outputs. See the Pin out drawing given in Appendix D for detailed information. Any digital input can be selected as the sample clock reference source. Additionally, any one of the four digital input signal pairs can be selected for routing through a sample rate converter.

The MMR-8 will directly play back material created on many different digital audio workstation systems. A format compatibility chart is given in the Functional Specifications section of this chapter. The disk drive or drives containing edited Project (EDL and audio) files may be simply “unplugged” from the workstation and then “hot-plugged” into the MMR-8, using the standard internal Kingston hard drive carrier, or otherwise connected to the MMR-8’s external SCSI port. Optionally, files on a RAID may be accessed via the external SCSI port as well. Once the drive(s) are mounted by the MMR-8, tracks from one or more projects may be loaded as required for the mix session. Sound files of the same or different audio file formats may be played back on the same unit simultaneously from one or more drives.

When the MMR-8 is turned on for the first time, the system default operating parameters are loaded, and the machine boots into the Normal state (see the Functional Overview section in this chapter). There are ten user settings files that may be stored to and recalled from the internal hard drive so that the MMR-8 setup parameters can be instantly reconfigured between mix sessions. The MMR-8’s operating parameters can be manually changed at any time via Setup menu selections. Password protection may be used to prevent some parameters from being changed inadvertently.

## Hardware Overview

The MMR-8 comes standard with one removable Kingston drive carrier. The Kingston carrier can hold a standard SCSI drive for recording and playback of audio tracks. An internal IDE hard drive holds the operating system, the MMR-8 software, and the parameter settings files. Additional external SCSI drives can be connected and accessed by the MMR-8. This allows loading tracks simultaneously from more than one disk. A list of approved media drives is given in Appendix B.

 The MMR-8 is based on a standard Intel Pentium™ processor-based PC motherboard, with integral PCI and ISA bus slots running under an industry-standard operating system. The MMR-8 processing and interface boards plug directly into this PC motherboard. There is a Lithium battery #CR2032 for the CMOS circuit on the motherboard. **Caution: Battery May Explode if Mistreated. Do Not Recharge, Disassemble or Dispose of in Fire.** The MIC (analog-to-digital Input Converter) and MOC (digital-to-analog Output Converter) boards are in their own shielded cage, connected to the AIO (Analog I/O) card via ribbon cables. Very high quality 20-bit converters on all analog inputs and outputs assure excellent audio fidelity. The MMR-8 uses 24-bit internal digital resolution for all digital audio processing. Recorded audio is stored in standard linear 16-bit or 24-bit sound files.

### Internal Boards for Units with Serial Numbers up to 01608

The PRX (DSP) card performs the audio processing for the MMR-8. A standard Symbios SCSI-2 controller card also plugs into the PCI bus. The Sync card, the UI/B (User Interface/Biphase) card, the AIO (analog I/O) card, and the DIO (AES/EBU digital I/O) card are all plugged into the ISA bus. The Biphase Operations Board (BOB) occupies a slot on the back panel to provide connections for the system’s four Biphase inputs and one Biphase throughput. It is attached to the UI/B card via a ribbon cable and is not plugged into a slot.

### Internal Boards for Units with Serial Numbers of 01609 and above

Units with serial numbers of 01609 and above have a different set of internal processing boards. Functionally, these units are identical to previous units. The change was made to facilitate a more streamlined manufacturing process. Instead of separate boards for DSP processing, sync, remote control, etc., these functions have been combined into a single board designated as the M2 board. Connectors on the side of the M2 board have ribbon cables attached which break out to brackets and connectors serving the same functions as the previous array of boards and connectors.

## Front Panel

The MMR-8 front panel contains 45 soft-touch keys with most of the common dubber and audio playback functions available through one or two keystrokes. There are also seven large illuminated motion control buttons (Play, Stop, FF, Rew, Reverse Play, Record, Rehearse) for track playback and “play head” locating, and an Online button for setting the MMR-8 offline (as a local machine) or online (as a synchronized slave or a master machine). When the MMR-8 is the master and is online, then any number of external SMPTE/EBU, MTC or biphase devices will follow the MMR-8. When the MMR-8 is set as a slave, it can chase time code, biphase, a TimeLine Lynx™ module, or another MMR-8.

A 40-character (two line by 20-character) LCD (Liquid Crystal Display) serves as the MMR-8 status and control text window. The top line typically shows the machine status and current time code or feet/frames location, while the bottom line shows various time code registers (In, Out, memory, slip, etc.) and accepts input from the front panel. The entire display may also alert the operator to any machine or user error conditions. Text can be scrolled horizontally or vertically, using the Wheel or arrow keys, for entering Panel/Display state and setup information, or for finding and loading tracks.

As with other 8-track recorders, there are dedicated front panel LED peak meters that always display monitor level information for the track outputs whether in audio input or playback. Each meter contains seven green, yellow and red LEDs plus a CLIP/Hold LED for easy at-a-glance level monitoring. An additional 74 status LEDs instantly identify current synchronization modes, bus control modes, sample and frame reference settings, record format settings, transport status, and front panel input status.

## Rear Panel

The MMR-8 rear panel contains all the audio and synchronization connections. To minimize connector footprint, female DB-25 connectors are used for the audio connections. The eight analog audio inputs are on one female DB-25 and the eight analog audio outputs are on another female DB-25. Each analog connector mounts on a separate card within the chassis, and is labeled Input or Output. The connectors are pin-compatible with the TASCAM DA-88 analog audio connector.

The DIO card allows direct digital audio transfers into and out of the MMR-8. Because it uses standard AES/EBU digital signal conventions, there are four stereo digital inputs and four stereo digital outputs with odd-even track pairs. Tracks 1+2 are on the first AES/EBU connection, tracks 3+4 on the second AES/EBU connection, and so on. All eight tracks (four pairs of in and out) are on a single female DB-25 connector. Any of the digital inputs can serve as a sample rate reference and any of the input pairs can also be routed through an on-board sample rate converter. Note that this connector carries AES/EBU digital signals and is NOT pin-compatible with the TASCAM DA-88 TDIF digital audio format connector.



Built-in biphase control allows the MMR-8 to automatically lock to and chase biphase devices without having to use an external biphase to SMPTE LTC adapter. Up to four biphase input signals can be simultaneously connected to the MMR-8. The active biphase input is linked to the active Sync Group assignment and is determined by menu selection (Setup Menu 100). A biphase throughput connector passes through the selected incoming biphase signal. Software Setup Menu 300 bank parameters (frame rate, pulses per frame, input type) allow various biphase devices to be used with the MMR-8. **The biphase connector is not intended for public telecommunications network connection.**

Video post-production work can be done with any industry-standard playback device. The MMR-8 supports SMPTE/EBU Linear Time Code, Word Clock, Video sync, MIDI Time Code, MIDI Machine Control input, and Sony 9-pin serial in and out (P2- protocol).

## **Accessory Products**

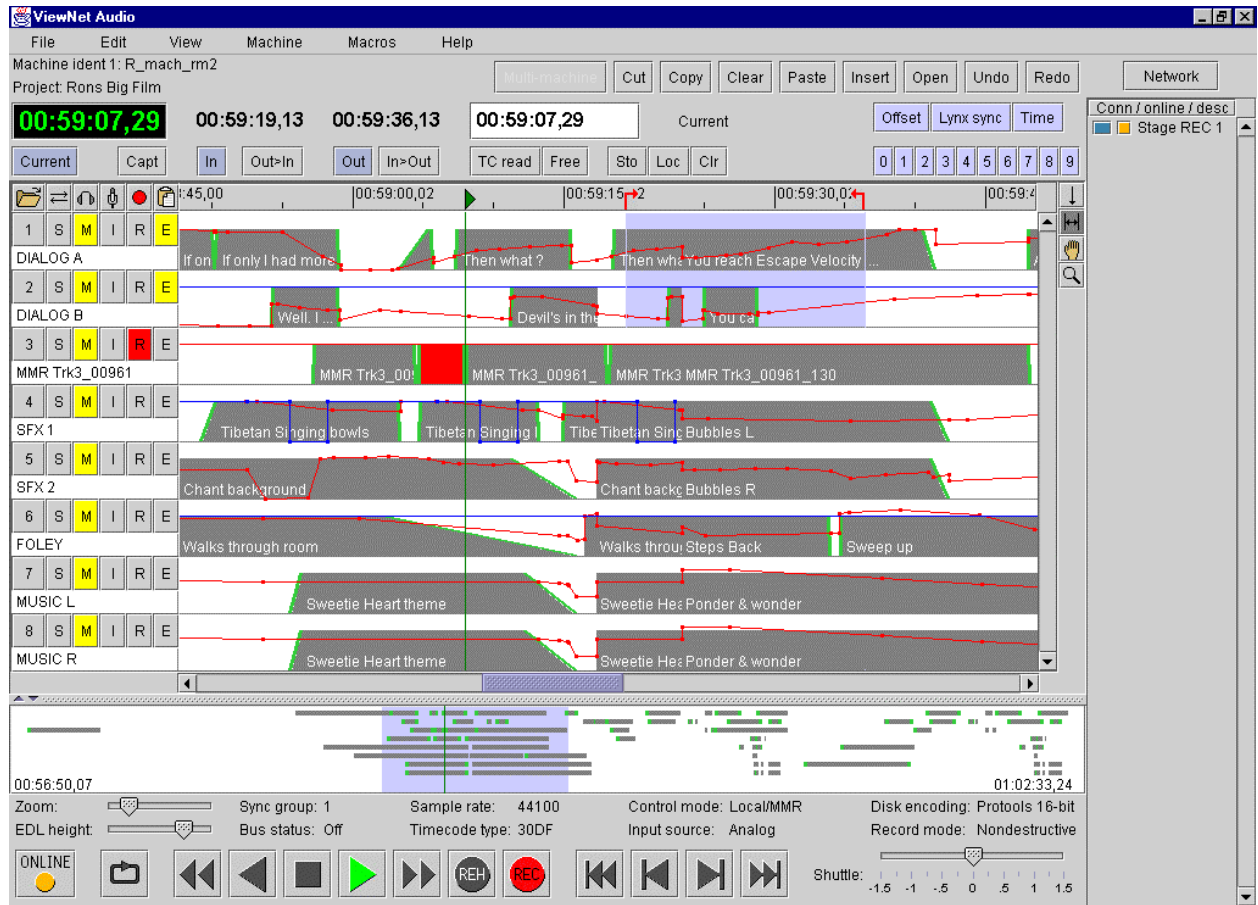
The TASCAM MM-RC is a dedicated remote control unit designed specially for use with the MMR-8 and the MMP-16 sixteen-channel player unit. It connects directly to the UI/B board on the MMR back panel and allows control of any combination of up to 100 MMR-8 or MMP-16 units.

The TASCAM MMU-16 is a multi-segment digital meter unit which can display sixteen channels of audio level information. Two connectors on the back of the MMU-16 allow it to be connected to one or two MMR-8 units, or an MMP-16 sixteen channel player. The MMU-16 can also be connected to the MM-RC for displaying detailed level information for the MMR-8 or MMP-16 unit being accessed by the MM-RC. The MMU-16 comes with standard rack ears for mounting in a standard 19" equipment rack and also with mounting brackets for attaching the unit to an MM-RC.

The TimeLine Lynx Keyboard Control Unit (KCU) can function directly as a remote controller for up to six MMR-8s without the use of dedicated Lynx-2 modules, since the MMR-8 contains the functional equivalent of an integrated Lynx-2 synchronizer. Optionally, Lynx-2 modules can also be connected to the Lynx port of the MMR so that other transports connected to the Lynx bus may also be controlled from a Lynx KCU connected to the MMR-8. TimeLine offers a special software version for the Lynx KCU (KCU 900 software) which includes special MMR support for some editing and event slip commands. Other remote controllers can also be used for controlling the transport and track arm functions of the MMR-8 through the two Parallel ports or via Sony P2 protocol through the 9-pin serial Editor port.

# ViewNet Audio™

TimeLine's ViewNet Audio is a graphical interface network option for the MM Series modular multitrack machines which provides a Fast Ethernet (100 Mbps) connection for the MM unit and the special ViewNet Audio software application running on a computer attached to the network.



**ViewNet Audio Project View Screen**

ViewNet Audio is designed to allow system administration and control of setup parameters for all machines from any computer on the network. Since ViewNet was written using the Java programming environment, the software application can be run from computers running the Windows (95, 98, or NT), Macintosh, or UNIX (Linux) operating systems. Administration and Server software is included with the system to allow for setting levels of security in multi-room facilities. This helps to prevent operators from accidentally controlling machines in other areas of the facility for which they do not have access permission.

ViewNet provides a graphical editing environment for making changes to sound events at the mix. Multi-machine edits and macros are also supported. Real time scrolling of sound events with clip names provides a visual cue sheet for mixers. Complete access to all system setup parameters and the ability to broadcast parameters to multiple sets of machines makes it easy for machine room operators to set up jobs for different clients in different rooms. ViewNet is available from authorized TASCAM MM series dealers and distributors.



## Functional Overview

The MMR-8 operates in any of eight different Panel/Display states (simply referred to as “states” for convenience). These states are distinguished by the nature of the information displayed in the LCD window and by which keys are functionally available while in that state. These MMR-8 Panel/Display states are described here.

**Normal** state is the default Panel/Display state on power-up. In this state, the LCD shows the current system play time in the top of the display, and shows the active register (last requested register or function time) in the bottom of the display. All keys are active while in this state, and will respond by performing an action, accessing a register, or changing to the state written on the key. Shifted key functions are also available by first pressing the SHIFT key, then pressing the key which corresponds to the desired shifted function. Once the SHIFT key is selected, pressing the appropriate key to activate the desired shifted function completes the SHIFT operation. The SHIFT state can be cancelled by pressing SHIFT again, or by pressing CLR, to return the system to normal key selection.

Pressing the SETUP key activates the **Setup** state. This state gives access to the system setup menus, where most of the operating parameters of the MMR-8 can be altered. Some parameters are changeable only under certain operating conditions (non-record, stopped, etc.), although all are viewable at any time in the Setup state. Once in the Setup state, you may return to the Normal state by pressing the SETUP key again, or by pressing CLR.

There are three types of Panel/Display states that deal with MMR-8 track operations. These are **Load Track**, **View Track**, and **Slip Track**. Pressing the LOAD TRACK, TRACK, or SLIP keys puts the MMR-8 into one of these Track states. The SEL keys for each MMR track are used in conjunction with these keys to identify the specific track to be loaded, viewed, or slipped.

There are also three keys to the left of the Track state keys labeled EDIT, MON, and INPUT. These keys do not change the state of the MMR display, but are used to determine what status is being indicated for each MMR track by the track selection LEDs when the SEL keys are pressed while in the Normal state of operation. One of these keys is always active as the current Track Mode. Since these keys function along with the Track state keys to identify the function being specified by the SEL keys, the entire group of six keys (EDIT, MON, INPUT, LOAD TRACK, TRACK, and SLIP) are also referred to as the Track Mode keys.

The Track states supersede the Normal state since they change the display and make certain keys unavailable until the Track state is exited or cleared. To exit a Track state and return the MMR-8 to the Normal state, it is necessary to either complete the selected track operation (by pressing STO to load a Project, for example), or press the selected Track state key again, or press the CLR key to cancel the operation. After exiting a Track state, the system will return to the Normal state and the last selected Track Mode (EDIT, MON, INPUT).

Pressing the LOAD TRACK key activates the **Load Track** state. This state allows for loading WaveFrame projects, OMF Compositions, or Pro Tools Session files from any mounted disk volume. This state also allows loading of individual tracks from a Project, Composition, or Session (hence the name of this key and state), and moving of tracks from one MMR channel to another. The shifted function of LOAD TRACK allows for deleting WaveFrame Projects or Tracks. The MMR-8 software does not currently allow OMF Compositions and Pro Tools Session Files to be deleted.

The MMR **Backup** state is accessed via the Load Track state by pressing SHIFT+SLIP after choosing (scrolling to) the desired Project while in the LOAD TRACK state. This state is similar to the Setup state in that it has two menu choices which are accessed by using the Up/Down arrow keys or the Wheel. The key choices available in the Backup state are the same as those in the Setup state, hence it exists at the same level of the hierarchy of panel/display states as the Setup state.

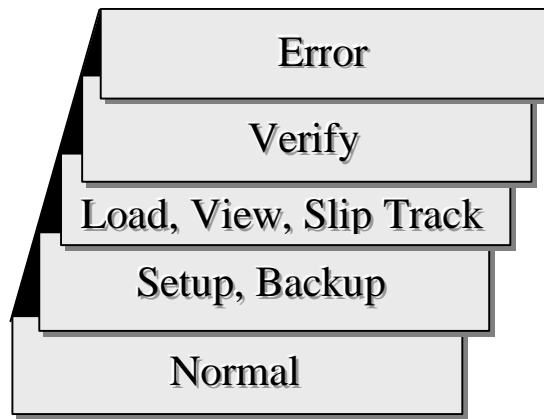
Pressing the TRACK key activates the **View Track** state. This state allows for viewing the names of loaded tracks, and unloading of tracks (the shifted function of the TRACK key) from the loaded track list.

Pressing the SLIP key activates the **Slip Track** state. This state allows for slipping one or more of the already loaded tracks in time.

**Verify** state supersedes the Normal and Track states. The two most common Verify state functions are confirmation (a Yes/No answer is required from the user) and password entry (a password must be entered to complete the action request). Both of these requests override most other actions or do not allow access to the Normal, Setup, or Track states until they are cleared or a valid response is entered. Verify state, when cleared, usually drops the MMR-8 back into the previously active state.

**Error** state is the final level in the hierarchy of Panel/Display states. In this state, the ERROR status light flashes and the user is asked to clear a condition by pressing the CLR key, or if that is impossible (as in the case of a fatal error), to note the error information and possibly take some extraordinary action (such as re-starting the MMR-8). Until the Error state is cleared, or a valid response is entered, access to the Normal, Setup, or Track states is not allowed. The Error state, when cleared, may drop to another state, or to any appropriate condition—depending on the type and severity of the error.

These states are hierarchical in the sense that some require a response or they require a state to be cleared before certain keys or other states can be accessed. The Normal state is at the base of the hierarchy because it is the default on startup and can always be accessed from any other state or by pressing the CLR key as many times as is necessary to clear any other state. The track record arm function and the transport keys can be accessed directly from any state, so the MMR can always record and playback, regardless of what other functions or states are being accessed. The following diagram illustrates the hierarchical relationship between the various states, based on the number of choices available from each state.



**MMR-8 Panel/Display State Hierarchy**

<b>STATE</b>	<b>LCD WINDOW DISPLAY</b>	<b>COMMENT</b>
<b>NORMAL</b>	Shows current play head time on top and selected time register on bottom of display.	Default at startup. Allows direct access to SETUP and TRACK states, all keys functional.
<b>SETUP</b>	Shows setup menus and parameter choices for each menu item.	Press SETUP to enter state, press TRIM to view parameters.
<b>LOAD TRACK</b>	Shows disk directory list of projects, compositions, sessions, and their tracks. Shows other levels for WaveFrame projects. Backup state can be accessed only while viewing name of project while in this state.	Press LOAD TRACK once to see Project level, again to see successive levels (tracks). Press SHIFT+SLIP while in LOAD TRACK to enter Backup state.
<b>VIEW TRACK</b>	Shows the name of each loaded track. Use wheel, arrows, or press appropriate SEL key to choose which track to view.	Press TRACK to enter state, SHIFT+TRACK to unload track.
<b>SLIP TRACK</b>	Shows Current Play position on top, Slip register value for each track below, allows for slipping tracks in time. All SEL keys have a SLIP register, so numbers can be stored, recalled, or cleared directly.	Press SLIP to enter state, use wheel or arrows to change value, or enter TC value on keypad & press STO then SEL to enter number directly.
<b>VERIFY</b>	Asks for a response (usually requires pressing Yes or No) to clear state and return to previous state.	Disallows most key entry or switching to other states until response is made.
<b>ERROR</b>	Shows Error message, usually requires pressing CLR to clear and return to previous state.	Disallows most key entry or switching to other states until condition is cleared.
<b>BACKUP</b>	Menu with two choices: BeginBackup to (device#) or TapeMode Convert to (device#). Only currently mounted devices will appear as choices.	Accessed only via LOAD TRACK state. Use Up/Down arrows or wheel to choose Backup style, press STO to begin backup process.

**MMR-8 Panel/Display State Chart**

# System Specifications

Analog Input and Output Level: +4 dBu balanced, +24 dBu clip, nominal levels trim pot adjustable  
Headroom: 20 dB above nominal input level  
Analog Input / Output Impedance: 10k, balanced / <75 ohms, balanced  
Input / Output Adjustment Range: +10 dBu - +25 dBu, clipping / +18 dBu - +25 dBu, clipping  
THD+N: <.004 % @ 1 kHz, @ clip level -0.5 dB

Dynamic range: >104 dB (10 Hz - 22 kHz, with A-weighted filter), including Record.  
S/N ratio: >108 dB (10 Hz - 22 kHz, with A-weighted filter)  
Crosstalk: <-85 dB (between any channels, 20 Hz - 20 kHz)  
Frequency Response: 20 Hz - 20 kHz  $\pm$ 0.1 dB

Digital Conversion / Quantization: 20-bit ADC and 20-bit DAC conversion  
Sample length, Recording: 16-bit, linear or 24-bit, linear  
Sample Length, Internal: 24 bit  
Timing Reference sources: Internal, Internal Varispeed, Follow time code in, Follow biphasic signal input (any one of four inputs), Video (either NTSC or PAL), AES/EBU digital clock input (optional), Word clock input, MMR bus, Lynx bus

Internal Sample Rates in Hz: 42294 (44x23/25), 42336 (44x24/25), 44056 (44100-), 44100, 44144 (44100+), 45938 (44x25/24), 45983 (44x25/23), 46034 (48x23/25), 46080 (48x24/25), 47952 (48000-), 48000, 48048, (48000+), 50000 (48x25/24), 50050 (48x25/23)



External Sample rates: 32 kHz - 51 kHz (via external sync input)  
Time Code Type & Rate: 30 Non drop frame (NDF) @ 30 frames per second  
30 Drop frame (DF) @ 30 frames per second  
PAL @ 25 frames per second (PAL default setting)  
Film @ 24 frames per second  
NTSC @ 29.97 frames per second NDF (NTSC default setting)  
29.97 Drop frame (DF) @ 29.97 frames per second

Display Modes: SMPTE/EBU time code, with or without subframes  
Feet & Frames, with or without subframes

Time Code Memories: ten (numbered 0 - 9)

Time Code Registers: IN (punch in point)  
OUT (punch out point)  
HEAD (jump to beginning of project)  
TAIL (jump to end of project)  
NEXT EDIT (jump to next track edit)  
PREVIOUS EDIT (jump to last track edit)  
TIME (for establishing 0 film feet and frames referenced to time code)  
LYNX SYNC (Lynx bus offset time calculation)  
OFFSET (Offset time for Lynx bus and time code chase)  
READER (time code from LTC or Serial inputs)  
FREE (available record time on current disk) lskdf

Electrical Ratings:

 115 VAC @ 2A, 50-60Hz 230 W Max  
-OR-  
 230 VAC @ 1A, 50-60Hz 230 W Max

PC Power supply rated at:

90-132VAC 6.2A @full load  
180-265VAC 3.1A @full load

Nominal temperature should be 41 to 95 degrees Fahrenheit (5 to 35 degrees Centigrade).

Relative humidity should be 30 to 90% (non-condensing)

Analog input/output is 12.28 VRMS Max

Weight is approximately 37 Pounds ( 16.78 Kilograms) with a hard disk loaded.

## Chapter 2 Installation

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This chapter covers the physical installation of the TASCAM MMR-8 as either a stand-alone recording/playback system or as part of a larger, multiple unit digital dubber system. Descriptions are given of the various connectors on the MMR back panel. Both general installation procedures and specific application installations are covered.

### MMR-8 Materials Kit Box

Before connecting the MMR-8 hardware to your audio system and to your video or film playback devices, verify that you have all the equipment required to complete the task. The following equipment is included in the MMR Materials Kit Box:

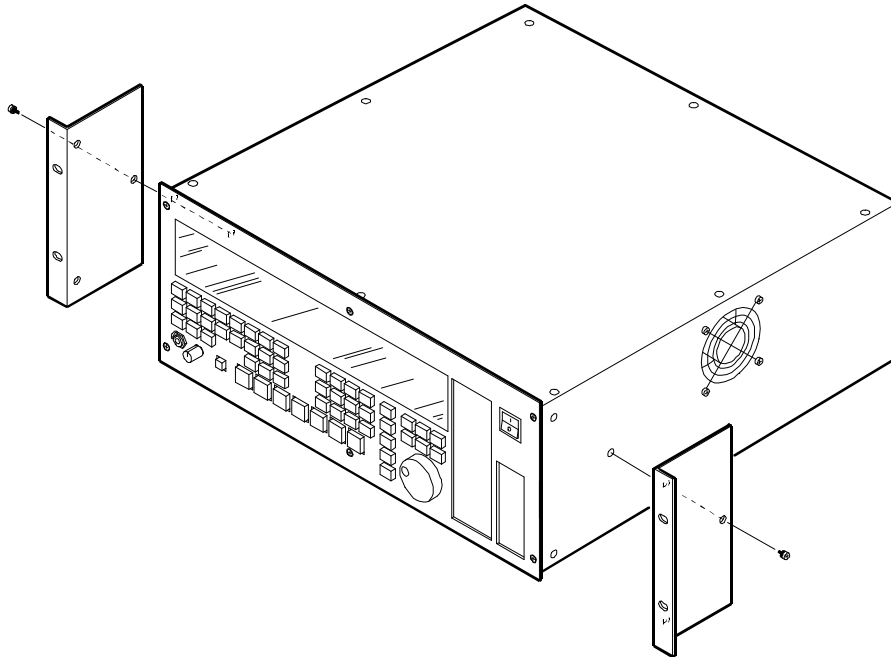
<b>Rack Ears Kit</b>	For rack mount installation, the two rack ears may be attached to the front sides of the MMR-8 chassis using the six 8-32 x 3/8" Phillips head screws included in the MMR-8 materials kit. The MMR-8 can be used without the rack ears for desktop applications.
<b>MMR Bus Sync Cable</b>	A three-foot sync cable for synchronizing the operation of multiple MMR 8's together via the rear panel MMR bus connectors.
<b>RS422 Cable</b>	A 9-pin RS-422 (232) cable for attaching the COM port to a terminal for running field diagnostics. Also may be used for 9-pin serial connections.
<b>Kingston Removable SCSI Drive Carrier Instructions</b>	One Kingston removable drive carrier is included with the system. This carrier allows drives to be hot-swapped while the system is powered on. It is necessary to install a SCSI drive from the list of approved drives into the Kingston carrier before you can record or playback audio using the carrier with the MMR-8. The instruction manual for installing drives in the Kingston carrier is in the MMR-8 materials kit.
<b>AC Power Cord</b>	A six-foot (1.83 Meter) IEC AC Mains cord set is included with the MMR-8. The mains connector for 115 VAC systems is USA standard. A six-foot (1.83 Meter) AC Mains cord set for use in Europe, proper for the country of use will be supplied by your TASCAM dealer. Attach the AC connector in accordance with local requirements.
<b>Toolkit</b>	As a convenience, a small tool kit consisting of a "tweaker" and a small screwdriver is included in the zip-locked plastic bag in the materials kit. The "tweaker" may be used for making any necessary adjustments to the analog trim pots on the analog audio output board.

# General Guidelines

## Mounting Rack Ears

The MMR-8 is a self-contained eight channel digital playback and recording device designed to be mounted in a standard 19" (48.26 cm) IEC equipment rack in either the mix studio or a dedicated machine room in a professional audio recording facility. As such, each MMR-8 is housed in a steel chassis 19-inches (48.26 cm) wide by 17 ¼ inches (43.81 cm) deep by 7-inches (17.78 cm) tall. Each MMR-8 requires 5U (7-inches or 17.78 cm) of rack space.

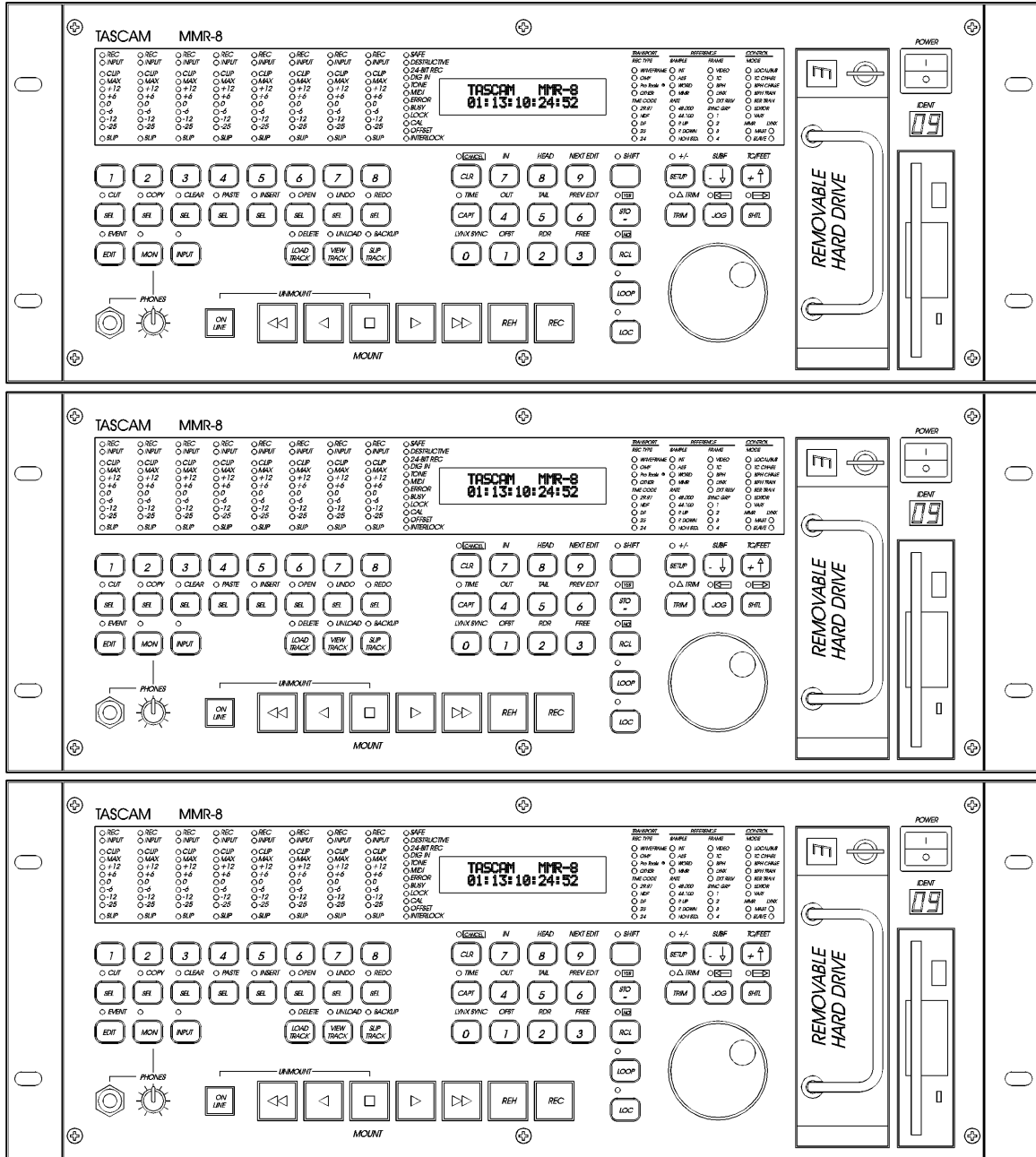
Integral rack ears are provided with the chassis. If the unit is not rack-mounted, the rack ears do not need to be installed onto the MMR-8 chassis. For rack mounting, install one rack ear to the front of each side of the MMR-8 (three Phillips screws per side are supplied for fastening the rack ears to the chassis).



**Rack Ear Installation**

# Installing Multiple MMR Units

Multiple units can be mounted one on top of the other when forced air rack ventilation is provided. A one-inch clearance is required on both sides of the MMR-8. In facilities with raised computer room-style flooring, a ventilation opening in the floor is recommended. In no case should the internal rack temperature ever exceed 110 degrees Fahrenheit (43 degrees Centigrade) during normal operation (as measured at the rear of any of the MMR-8s in the system).



Multiple MMR-8 Rack Installation



## **AC Mains and Grounding (Earthing) Considerations**

Each MMR-8 requires one AC mains connection. A standard six-foot (1.83 Meter) power cord set is included with each MMR-8, wired for the USA standard. A six-foot (1.83 Meter) AC Mains cord set for use in Europe, proper for the country of use will be supplied by your TASCAM dealer. The AC mains outlet must be capable of delivering 230 watts (2 amps) for each MMR-8 in the system. The main power supply has a 115/230 VAC switch on the back of the unit. This switch should be set to match the facility power level.

An unswitched female IEC convenience outlet is located on the rear panel of each MMR-8. In normal use there is no connection to this outlet, although other electronics equipment using IEC plugs, and drawing less than 120 watts total, can be connected to this outlet using the appropriate male-to-female IEC power cord (like those used with computer monitors).

A facility-wide UPS system is recommended for protecting the MMR-8, and all your audio equipment, from power line spikes, surges, brownouts, and line failure. If a facility-wide UPS is not available, each MMR-8 should be connected to a home computer-type surge/spike protection system (of 250 watts minimum) which is then plugged into an isolated ground AC outlet.

### **Caution: Grounding (Earthing)**

**Do not defeat the AC cord U-ground as this will present a potentially dangerous operator hazard. Using an isolated ground outlet ensures the proper chassis grounding to the mains “power company” ground. Using only isolated ground outlets throughout a facility will prevent audio ground loops caused by AC outlets with different ground potentials. A Ground Stud is provided on the back panel for chassis grounding of the MMR-8.**

## **Audio Cables**

**Analog I/O Cables** All analog input and output on the MMR-8 is done through a pair of 25-pin D-sub connectors which are pin-compatible with the TASCAM DA-88 connector. TASCAM DA-88 DB-25 to XLR cables, with either male (output) or female (input) XLR connectors, are available from your authorized TASCAM dealer.

**Digital I/O Cables** Analog I/O cables can be adapted for use as Digital I/O cables using 4 XLR gender adapters. This arrangement provides four stereo AES/EBU digital inputs and four stereo AES/EBU digital outputs using a standard DA-88 cable.

## MMR-8 Back Panel for Serial Numbers up to 01608

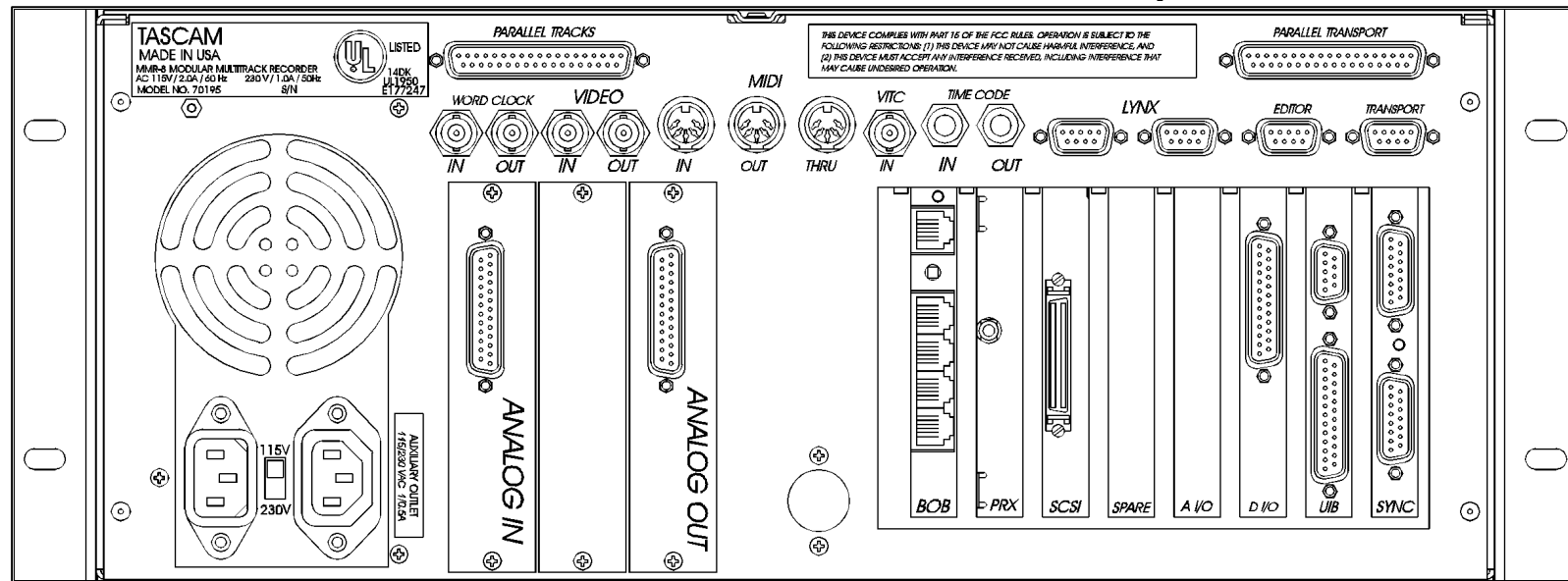


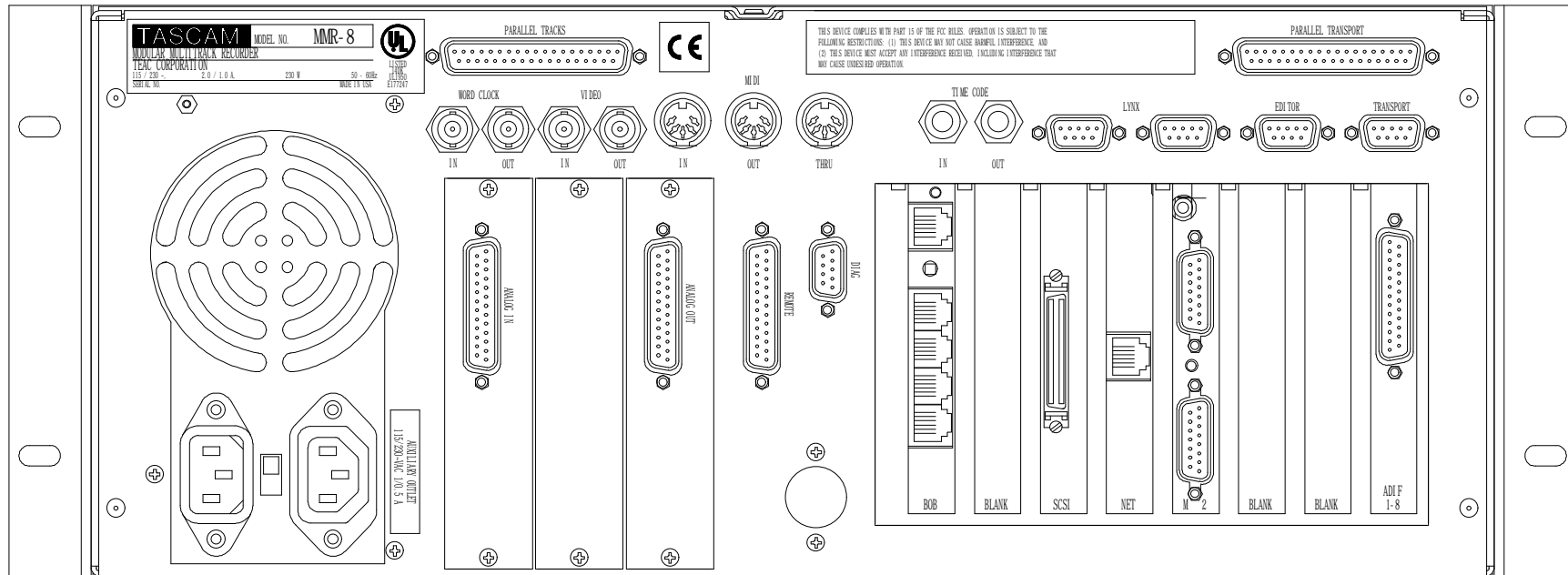
Figure 2-3. MMR-8 Back Panel

### MMR-8 Back Panel Connections For Serial # Up To 01608

The MMR back panel has connectors for analog and digital audio I/O, as well as various types of synchronization and control signals. The following MMR back panel connections are described in this chapter, and the pin outs for many of these connectors are given in Appendix D: Cable Information.

- Analog audio in
- Analog audio out
- Digital audio I/O
  - Biphase in (BOB)
  - Biphase out (BOB)
- Mono mix audio out (PRX)
- SCSI
- Remote control (UI/B)
- MMR bus (Sync)
- Word clock in
- Word clock out
- Video in
- Video out
- Midi in
- Midi out
- Midi thru
- Time code in
- Time code out
- Lynx (2 connections)
- Editor (Sony 9-pin)
- Transport (Sony 9-pin)
- Parallel Tracks
- Parallel Transport

# MMR-8 Back Panel for Serial Numbers 01609 and above



## MMR-8 Back Panel Connections For Serial # 01609 And Above

MMR units with serial numbers starting at 01609 and higher have a different arrangement for back panel connectors than previous units. The arrangement of connectors for serial numbers 10609 and above are shown in the drawing above and are listed here.

- Analog audio in
- Analog audio out
- AES Digital audio I/O (labeled ADIF 1-8)
  - Biphase In (BOB) } Not intended for public
  - Biphase Thru (BOB) } telecommunication
- Mono mix audio out (M2) network
- SCSI
- Remote control
- MMR bus (M2)
- Word clock in
- Word clock out
- Video sync in
- Video sync out
- Midi in
- Midi out
- Midi thru
- Time code in
- Time code out
- Diagnostic port (service tech only)
- Lynx (2 connections)
- Editor (Sony 9-pin in)
- Transport (Sony 9-pin out)
- Parallel Tracks
- Parallel Transport
- Network (for OPTIONAL 100Mbit Ethernet)

## Audio Connections

All audio inputs and outputs (both analog and digital) connect to/from the MMR-8 using DB-25 connectors. The pin configuration used on the DB-25 analog audio connectors is identical to that used for TASCAM DTRS format digital tape machines such as the DA-88. Two female DB-25 connectors are used for the analog connections, one for input and one for output, as labeled on the MMR back panel. A single female DB-25 carries all eight channels of AES/EBU digital input and output signals.

## Analog In/Out Connections

All analog inputs and outputs use balanced signals designed to mate with standard 600-ohm devices using +4 dBu levels. Internal trim pots are available to set the exact input levels, as required to match external equipment, although the MMR-8 is factory set to a nominal +4 dBu in and out. The inputs can also be set for a nominal -10 dBu level for unbalanced consumer and semi-pro equipment signal levels.

Analog audio processing is done on two separate 20-bit Analog to Digital and Digital to Analog converter cards mounted within the MMR-8. These converters are mounted in a special shielded cage within the MMR and are attached via ribbon cable to a card (labeled A I/O) plugged into one of the system ISA bus slots on the PC motherboard. These A/D and D/A boards have their own power supply separate from the main PC power supply. Maximum load is 12.28 vrms.

## Digital In/Out Connections

A single female DB-25 connector is used to provide four stereo digital inputs and four stereo digital outputs. TASCAM DA-88 analog I/O cables can be adapted for use as Digital I/O cables by using 4 XLR gender adapters. Digital input 1 is the default reference track for the AES/EBU reference. This can be changed to use digital input 3, 5, or 7 from one of the other three digital input pairs using Setup Menu 600 (Dig In Ref Track).

NOTE: The digital clock signals coming from any external device connected to the AES/EBU inputs will force the MMR-8's internal clock to try to lock to it when digital input is selected (Setup Menu 500). This can cause playback and record problems if the clock source is not accurate. If this occurs set that track to use the sample rate converter in Setup Menu 500 (Input Source).

## Monitoring Connections

For monitoring at the MMR-8 there is a mono headphone jack on the front panel (compatible with stereo headphones of either low or high impedance). For studio Cue or remote monitoring there is a rear panel line level mono mini phone jack. It is an unbalanced output designed to be connected to external amplification.

The front panel headphone monitor jack is controlled by the LEVEL control located next to the jack on the front panel. Press the MON key and select the desired tracks using the Track Select keys to choose which of the MMR-8 tracks will be summed to appear at the headphone jack output. The rear panel jack is a pre-LEVEL control, so it is a fixed line level output (-10 dBu), and it always presents a summed output of the audio channels selected using the MON function on the front panel.

## Timecode and Video Reference Signals

To accurately synchronize the MMR-8 to film or video, or with other audio playback equipment, some method of providing a stable timing reference must be used. Because the MMR-8 is very flexible, there are numerous methods one could use to connect film and video equipment. The best method depends upon the chosen method of sync, the other equipment that is being controlled, and whether the MMR-8 will be the master or a slave to the other equipment. This section covers the various reference signals available on the MMR-8 system and their applications.

### Video In/Out

Most video post houses have a common house sync signal to lock all the audio and video equipment in the facility to a standard video reference signal. This insures that all devices receiving the house sync signal will lock together to the edge of the video frame. The house sync signal can be black burst, composite sync, or color bars in NTSC or PAL format. The house sync video reference signal should be connected to the VIDEO IN connector on the back of the MMR-8. To loop the connection through the MMR, connect the MMR VIDEO OUT to the next device that will use the house sync signal. If there is not a loop through connection then the VIDEO OUT may need to be terminated, depending upon the facility signal design. To set the MMR frame reference to use this video input, choose setup menu 001, Frame Reference, and set the value of this parameter to be Video Reference.

### SMPTE/EBU Time Code In/Out

The MMR has two stereo phone jack connections using ¼" Tip/Ring/Sleeve connectors (with the tip being + and the ring being - on a balanced signal) for synchronizing the operation of the MMR to other devices using SMPTE/EBU Longitudinal Time Code (LTC). To synchronize the MMR to an external device which outputs SMPTE/EBU LTC, connect the time code audio output of the master device to the MMR TIME CODE IN jack. The MMR-8 can also generate a stable SMPTE/EBU time code output (equivalent to a time code track signal) that can be used to synchronize external equipment or to stripe time code onto tape. The TIME CODE OUT jack will always output SMPTE/EBU LTC when the MMR is playing.

## Biphase Connections

Biphase is a control signal typically generated by a film projector and is traditionally used to interlock the operation of the film with sprocketed magnetic tape machines. The Biphase Operations Board (BOB) on the back panel of the MMR has four biphase input connections and one biphase throughput connection for synchronizing the operation of the MMR-8 to film transports. Use Setup Menu 100, Sync Group, to select which of the four Biphase inputs (Sync Groups) will control the system. The biphase connections use 6-pin modular RJ-12 connectors (like those used on commercial phone systems) and twisted multi-pair cabling (Category 5 Ethernet). Up to 100 feet of cable can be typically run from a biphase device to the MMR-8 or vice versa. The pinout diagram for these connectors is given in Appendix D: Cable Information.



Unlike time code, Biphase gives only speed and direction and does not contain an absolute address. To set the MMR to lock to biphase, use Setup Menu 000, Control Mode. The various biphase parameters such as frame rate, pulse rate, acceleration, etc. are set in the 300 series Setup Menus. **Not intended for public telecommunication network connection.**

## Digital Audio Sample Reference Connections

In combination with a frame reference for video and film, there may also be a sample reference for the audio. The sample reference can be taken from one of the digital inputs, the frame reference, the Word Clock input (if there is an active signal on that input), or the system's internal clock source. These connections are described here in more detail.

### Word Clock

Word Clock is a digital reference signal used by many digital editors and digital tape machines. This permits two digital audio devices to synchronize their sample clocks to facilitate digital audio transfers between machines, and to insure that they are running at precisely the same sample frequency. The signal is transmitted on an unbalanced coaxial cable that terminates into a BNC connector at the MMR-8 end. The MMR-8 has both a digital WORD CLOCK IN and a digital WORD CLOCK OUT connection using BNC connectors.

When an external tape machine is to control the sample rate of the MMR-8, connect the Word Clock output from that machine to the WORD CLOCK IN on the MMR-8. When the MMR-8 is to control the sample rate of an external machine connect the WORD CLOCK OUT from the MMR-8 to the Word Clock In on the controlled machine. The maximum practical cable distance is up to 100 feet. Use setup menu 002 to select the sample reference for the MMR-8 system. Normally this is a 48 kHz TTL-compatible (5 volt) signal.

### AES/EBU Sample Rate

When using AES digital audio input, the audio sample reference for the MMR-8 can be taken from one of the four AES digital inputs. Use setup menu 002 to select the sample reference for the MMR-8 system. Setup Menu 600 selects which AES/EBU digital input pair will be used for the reference signal (input 1+2, 3+4, 5+6, or 7+8).

## MIDI Connections

The MMR-8 has MIDI (Music Instrument Digital Interface) In, Out, and Thru connectors. These are used for sending MIDI Time Code and for controlling the transport via MIDI Machine Control.

The MMR MIDI OUT connector carries a MTC signal generated by the MMR-8 whenever the unit is in Play. To slave MIDI devices that can follow MTC (MIDI Time Code) to the MMR-8, connect the MMR MIDI OUT connector to MIDI In port of the external device. The MIDI out signal (and the MIDI Through signal, if it is set as a second MIDI output) will contain any MMR-8 responses to the MMC input commands in addition to MTC generated by the MMR-8 from the time code reference source.

The MIDI IN port on the MMR can receive MIDI Machine Control messages for operating the MMR's basic transport control functions. The MIDI THRU jack on the MMR will pass through any MIDI signals appearing at the MMR MIDI IN port.

## External Controllers & Bus Connections

In most installations the MMR-8 will be rack mounted in a machine room and thus will either be remote controlled through slaving to another time code-based machine (typically a VTR) or to a biphasic machine (typically a film transport). Any controller that has a Lynx port can also directly control, or be controlled by, the MMR-8 (the TimeLine Lynx Keyboard Control Unit and the TimeLine Lynx-2 module are two examples). There is also a fully featured remote, the TASCAM MM-RC, which is specifically designed to control multiple MMR units.

### Lynx Bus / KCU Connection

The TimeLine Lynx Keyboard Control Unit (KCU) can be used with the MMR-8. Multiple units may be daisy-chained using either of the two LYNX connectors as input. The other LYNX connector could be tied to another MMR-8, or to a Lynx module for controlling other tape machine transports. The Lynx KCU can control a total of up to six machines.

### MMR Sync Bus Connections

The real power of the MMR system comes into play when multiple MMR-8s are tied together using the MMR Bus to create larger "virtual" audio playback machines. The MMR bus supports up to 100 MMR-8s, all tied together to create up to an 800-track playback system that could be controlled by a single MMR-8, MM-RC Remote, Lynx KCU, or other machine remote controller.

The MMR Bus connects each MMR-8 using a 15-pin connector located on the SYNC card connector on the MMR back panel. Two DB-15 connectors are provided on the back of each MMR-8 so that multiple machines can be daisy-chained together. The system is auto terminating. To add MMR-8 units to the system, connect a cable from the last unit in the chain to the new unit.

The MMR Bus is made active on each machine by choosing the MMR Master or Slave setting in Setup Menu 110, MMR Bus Request. All of the MMR-8s that are tied together can then be software divided (Setup Menu 100) into four Sync Groups, each featuring fully independent control within their group. All of the MMR machines that are connected, Online, and set to the same sync group can then be controlled together. The MMR Bus thus turns three MMR-8s into a single 24-track machine, six MMR-8s into a 48-track machine, and so on up to 100 MMR-8s functioning as a single 800-track machine. Any MMR-8 tied onto the MMR bus can also be individually taken off-line and controlled locally at any time. Recorders can be added or dropped from Sync Groups using the Online key on the front panel.

## **Serial Transport Connection**

The TRANSPORT connection uses the industry-standard RS-422 Sony 9-pin P2 protocol (Ampex VPR-3 is also supported) for controlling external serial transports such as audio or videotape machines. It is intended for transport control of a single external device. This port will send out the appropriate transport commands when the transport functions of the MMR are engaged through the front panel or via the MM-RC Remote controller. Use Setup Menu 000 (Control Mode) to set the MMR to control external devices via the Serial Transport connection. A video reference source is recommended for this type of operation.

## **Serial Editor Connection**

The EDITOR connection uses the industry-standard RS-422 Sony 9-pin P2 protocol. The Editor connection allows for controlling the MMR-8's transport functions from a standard Video editor controller or other external device. Use Setup Menu 000 (Control Mode) to set the MMR for control via the Editor connection. A video reference source is recommended for this type of operation.

## **Parallel Transport**

The PARALLEL TRANSPORT connector allows use of remote control devices that operate by sending messages via parallel signals for the motion control keys. There are +12 volts available to drive switch lamps in conjunction with the tally outputs that are available for each key. The pinout diagram for the Parallel transport connector is given in Appendix D: Cable Information.

## **Parallel Tracks**

The PARALLEL TRACKS connector allows use of external remote control panels for controlling the track record ready and input monitoring functions on the MMR. There are +12 volts available to drive switch lamps in conjunction with the tally outputs that are available for each key. The pinout diagram for the Parallel Tracks connector is given in Appendix D: Cable Information.



## Connecting External SCSI Media

The MMR-8 SCSI interface card is pre-set to SCSI ID 7. The internal Kingston drive receiver in the MMR-8 is set to SCSI ID 0. Each device added in the SCSI chain must have a unique SCSI ID number or else the MMR-8 will not boot properly.

External SCSI connections should be made using the shortest possible length of double-shielded SCSI-2 cables with 110 ohms impedance. Only the last drive in the chain is terminated. All other drives must have their terminating resistors removed or have termination jumpers set to off (including those drives placed in the MMR-8 internal drive slot). SCSI cables are readily available from most computer stores. For the most reliable operation, the total length of SCSI cabling must not exceed 15 to 20 feet.

Drives with capacities of up to 9 GB have been tested and found suitable for use with the MMR-8. The MMR-8 system records all audio in separate uncompressed 16-bit or 24-bit linear files. Approximately 5 MB (Megabytes) of disk space is required for each minute of audio recorded per track. Thus a 4 GB drive can hold about 12 track hours of 16-bit audio, while a 2 GB drive will hold about 6 track hours. See the disk time chart in Appendix F for more information on disk recording time at different sample rates, bit depths, and track counts.

## SCSI Cables

There is a considerable difference in quality and performance of cables used to connect SCSI devices. It is imperative that users pay close attention to this issue.

### Cable Quality

High quality SCSI cables are essential for proper MMR/MMP system performance. Low quality cables, which are often thin, may cause data transmission errors, file corruption, and system malfunctions. This is often due to improper and insufficient grounding, incorrect pin wiring, and unwired pins. The following SCSI cable manufacturers are highly recommended as a source for MMR/MMP SCSI cables:

**Paralan Corporation** -  
www.paralan.com  
4655 Ruffner St., San Diego, CA 92111  
Tel. (619) 560-7266 || Fax 619-560-8929  
email: scsi@paralan.com

**Black Box Corporation** -  
www.blackbox.com  
1000 Park Drive Lawrence, PA 15055-1018  
Tel: 724-746-5500 || Fax: 724-746-0746  
email info@blackbox.com

### Cable Length and Device Support

The MMR/MMP SCSI host card supports from one to eight SCSI devices. However when one to four SCSI devices are connected, total cable length should not exceed three meters. When five to eight SCSI devices are connected, total cable length should not exceed 1.5 meters. Note that total cable length includes the internal cabling in carriers or drive bays. Thus if a 4-bay drive enclosure contains ribbon cable internally that measures one meter in length, the external cable must not exceed 2 meters. Improper cable length often causes an MMR system to freeze while mounting volumes. (Note: Paralan can provide custom-length SCSI cables).

## Cabling Wide and Narrow Devices in a System

**NARROW SCSI** uses 8-bit data transfers. It generally uses a 50-pin connector.

**WIDE SCSI** uses 16-bit data transfers. It generally uses a 68-pin connector. Wide SCSI may also refer to 32-bit SCSI data transfers but 32-bit wide SCSI is not as common.

**Narrow drives should always be placed at the end of a SCSI chain.** This is due to the fact that when a Wide to Narrow connection is made, 8 bits are not passed through, so the Wide drive (and all subsequent SCSI devices in the chain) receives only 8 bits of data instead of 16. If a Narrow drive is connected after a Wide drive, the Wide drive still receives all 16 bits of data.

## SCSI Termination

A terminator provides electrical circuitry at the end of a SCSI chain to prevent the reflection of electrical signals when they reach the end of the chain. The SCSI bus requires termination only at the ends of the SCSI chain, not in the middle. There are several types of SCSI Termination: Passive, Active, Active Negation, Force Perfect Termination, and Low Voltage Differential.

**The MMR/MMP should only use Active terminators.** This is because active terminators involve a voltage regulator to reduce fluctuation effects in termination power to insignificance. This results in more stable SCSI signals, less signal reflection and fewer data errors. Active negation terminators are most optimized for Fast- and Ultra-SCSI speeds. Active negation termination is currently not under testing and thus is not supported by TASCAM.

## Kingston Frame Configuration

When configuring a Kingston receiving frame the settings in Figure 1 must be used.

Note: All but one setting are factory defaults. Jumpers should be installed on W3, W1 and pins 1&2 of J6 (Figure 1). Jumper W2 determines termination. In the “A” position (default) termination resistors are disabled (This is the recommended configuration for most external applications). In certain conditions it may be desirable to terminate at the frame, for example, if an internal bay is being installed in the MMR/MMP. If this is the case jumper W2 should be set in the “B” position

**On-Board Termination (W2):** Position 'A' is installed at the factory and will disable termination. Moving the jumper to Position 'B' will enable on-board termination.

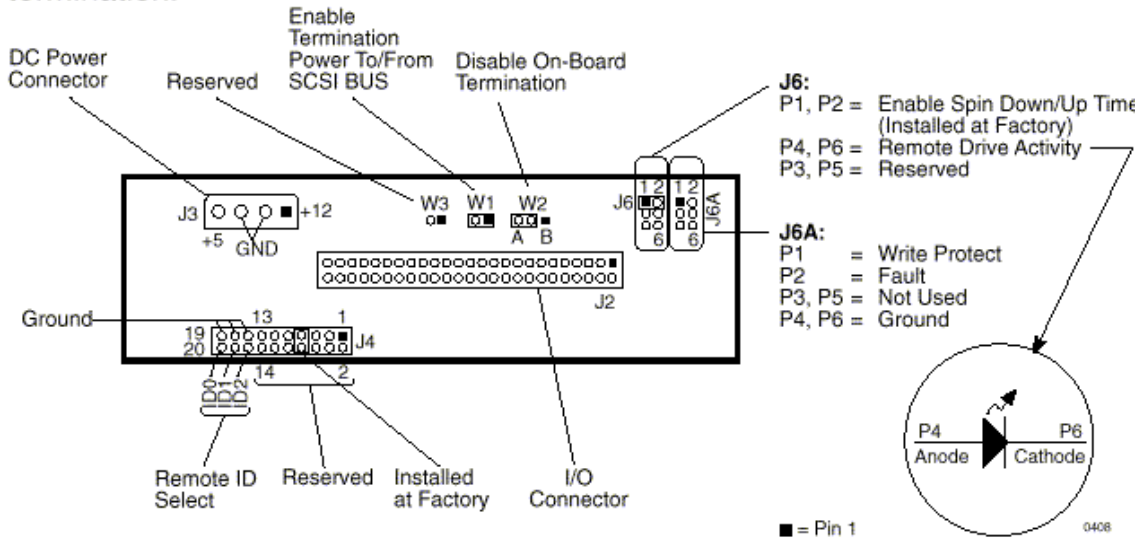


Figure 1

## Wide SCSI Cards and Kingston Frames

The MMR/MMP are normally shipped with a narrow Symbios SCSI card. The MMR/MMP units also support the Symbios SYM8751SP Wide SCSI card. To install a wide SCSI card, use a grounding strap and follow the installation instructions below:

### Removing the Narrow Host Adapter (Symbios SYM 8600SP)

- 1) Disconnect the 26-pin ribbon cable from J2 on the MMR Biphase Operations Board, and fold out of the way.
- 2) Disconnect the 50-pin ribbon cable from J2 on the Symbios SYM8600SP SCSI host adapter.
- 3) Remove the Phillips head screw that secures the host adapter to the chassis.
- 4) Carefully remove the host adapter.

### Installing the Wide Host Adapter (Symbios SYM8751SP)

- 1) Prior to inserting the wide host adapter into the PCI slot, connect the 50-pin ribbon cable to J4 on the SYM8751SP. This connector is located on the side of the card, which makes it very difficult to install if the card is already in the PCI slot.
- 2) Insert the wide host adapter into the same PCI slot that previously contained the narrow adapter.
- 3) Secure the wide host adapter to the chassis with the Phillips head screw.
- 4) Reconnect the 26-pin ribbon cable to J2 on the MMR Biphase Operations Board.

## Wide Kingston Drive Frames

The Kingston SCSI drive frame in the MMR is normally configured for narrow SCSI. TASCAM can also provide MMR/MMP units configured with wide Kingston frames and carriers, and can perform a service upgrade to remove the existing narrow Kingston frame and carrier and replace it with a wide Kingston frame and carrier. Contact your TASCAM representative for pricing and availability on these wide units. Note that a narrow drive carrier will not fit into a wide frame, and vice versa.

It is possible to mount a narrow SCSI drive in a wide Kingston carrier (or vice versa) by means of an adapter inside the carrier. One source for these adapters and other SCSI cable peripherals can be found at:

CS Electronics  
17500 Gillette Ave.  
Irvine, California 92614  
Tel (949) 475-9100 Fax (949) 475-9119  
<http://www.scsi-cables.com/Index.htm>

CS Model # ADP-9051 is for HD68-pin male to 50-pin male (mounts a wide drive in a narrow carrier)

CS Model # ADP-9056 is for HD68-pin female to 50-pin female (mounts a narrow drive in a wide carrier).

## Approved SCSI Drives

The following disk drives have been approved for use with the MMR-8 as of July 19, 1999:

Drive Manufacturer	Drive Model	Firmware Version
Seagate	ST118273LW	6246
Seagate	ST19101W	0014
Seagate	ST318203LW	0001
Seagate	ST318275LW	0001
Seagate	ST32272N	0876
Seagate	ST34371N	0484
Seagate	ST34573N	5958
Seagate	ST34573W	5764
Seagate	ST39102LW	0005
Seagate	ST39173N	5764
Seagate	ST39173W	5764
Seagate	ST39173LW	6264
Nikon*	DD53-SIP Beluga AV	Unknown
IBM	DCHS09F	2222

Manufacturers frequently release new drive models and obsolete other drive models. The most current list of approved drives can be found on the TASCAM web site at <http://www.tascam.com>.

\* Users should be aware these drives do not perform as well as hard drives. Test results with the NIKON Beluga drive with 1K/sector media show 8 tracks of record and playback in 16- or 24-bit TapeMode is generally reliable. Non-destructive mode performance is less reliable, especially with heavy edit density.

## DVD RAM Support

The MMR/MMP will support SCSI backup and export to DVD RAM disks. These drives are several times slower than Magneto-Optical disks for recording and transfers. Playback of a limited number of tracks is possible from a DVD RAM disk, but maximum performance seen to date is 6 channels of 16-bit material in TapeMode.

## LIMDOW Optical Drives

For backing up files, and for ease of moving smaller projects around, we recommend using a “LIM/DOW” (Light Intensity Modulation / Direct Over Write) type optical disk. The LIM/DOW technology achieves better performance than is available on older types of Magneto-Optical media, which must execute an erase pass before they can write new data to the disk. The Nikon Beluga AV MO (Magneto-Optical) disk drive has been tested and rated to perform well when used with the MMR-8. A chart of currently tested and certified disk drive media is given in Appendix B, MMR Approved Drives List. The results from performance tests of the NIKON Beluga AV MO drive with 1K per sector media are also given there. It is possible to use other removable media such as the IOMEGA Jaz drive and the SyQuest Syjet, but these do not provide the same level of performance for recording as a hard drive and they are more fragile than optical drive media. Use these devices at your own risk, as they are not supported as primary record or playback devices. DAT, Exabyte and other streaming tape device cannot currently be used with the MMR-8 system.

## Remote Controllers for the TASCAM MMR-8

**TASCAM MM-RC** The TASCAM MM-RC is a dedicated remote control unit designed specially for use with the MMR-8 and the MMP-16 sixteen channel player unit. It connects to a special remote connector on the UI/B card on the back of the MMR and MMP units. This remote allows complete control of all attached functions of the MMR and MMP units, including all setup menus. It also allows for machine grouping as well as system wide control of all attached units. A total of up to 100 units (any combination of MMR and MMP) can be controlled from the MM-RC.

**Lynx KCU** The TimeLine Lynx Keyboard Control Unit (KCU) is a tabletop controller which is typically used in conjunction with Lynx 2 synchronizer modules. It provides a time code display, motion control functions (including a jog/shuttle Wheel), track selections, and audio editing functions for most professional video and audio transports. The KCU can remotely control the operation of a total of up to six transports including MMR-8s. When used with the KCU 900 software, the Lynx KCU unit allows control of the following MMR functions:

- Transport Control
- Track Record Arm/Select
- Slip Track/Region
- Undo/Redo
- Goto Prev/Next Edit
- Goto Head/Tail
- Clear/Paste

The Lynx KCU may be directly connected to either of the two integrated Lynx ports on the MMR back panel. The second Lynx connector provides a loop thru connection to an external Lynx module for control of other devices from the KCU.

The TimeLine Lynx KCU is available from:

**TimeLine Vista, Inc.**  
**1755 La Costa Meadows Drive, Suite B**  
**San Marcos, CA 92069**  
**Tel: (760) 761-4440 Fax: (760) 761-4449**

## Keyboard Operation (with MM-RC option)

The optional MM-RC (Remote Control unit) has a keyboard connector located on the rear panel which accepts a standard PC-AT style keyboard. The purpose of the keyboard is to facilitate selecting menu items while in the Setup Mode and to make it easier to name Projects and Tracks. There is no way to connect a keyboard directly to the MMR or MMP – this must be done using the MM-RC.

***Note:** The internal software of the MM-RC will be automatically updated when an MMR-8 or MMP-16 is booted while attached to the MM-RC. Be sure the power switch of the MM-RC is on while the MMR/MMP unit is started so the unit can sense the presence of the MM-RC remote.*

## Using the PC Keyboard

Use the keyboard to perform the following data entry tasks on the MMR or MMP:

- Enter Project and Track names directly by using the standard alphanumeric keys.
- Enter Tape Mode Start time, Pre-Roll and Post-Roll directly using the number keys.
- Access Menu Banks directly by using the Number keys.
- Use the Up and Down arrow keys on the keyboard to scroll through the Setup Menus.
- Use the Up and Down arrow keys to scroll through menu parameters. Once the desired menu is reached, press F1 to toggle the Trim key function.
- Pressing Enter on the keyboard has the same effect as pressing STO on the MMR or MMP front panel and will store the parameter selection displayed in the LCD.

Not all keys on the PC keyboard are active. Use the following keys:

**F1** – Press F1 to enter Setup. Once Setup Mode has been entered, F1 will toggle the TRIM key on the MMP front panel.

**Escape (Cancel) key** – This key is equivalent to the Cancel (CLR) key on the MMP front panel. Press Esc to leave the Setup Mode and return to the Normal Display State.

**Arrow keys** - These serve the same function as the Arrow keys on the MMP front panel.

**Enter key** - Equivalent to STO on the MMP front panel. When a menu or parameter setting has been changed pressing Enter stores the new parameter.

**Shift key** - Acts like a standard keyboard Shift key, but will only work in conjunction with Letter keys and the Minus key.

**Letter keys** – May be used shifted or unshifted. Note that most punctuation keys are not supported.

**Minus key** - Shifted for Underscore, or unshifted for Minus/Hyphen.

**Caps Lock** - Works like a standard keyboard Caps Lock key.

**Num Lock** - When Num Lock is active (Num Lock is lit on the keyboard) use of the numeric Keypad is enabled. The Number keys and the Enter key are active in this mode, and they function exactly like they do on the keyboard. When Num Lock is not active (the Num Lock light is not lit), the numeric keypad serves only as up (8), down (2), left (4), and right (6) arrows.

## Powering Up the System

The MMR-8 comes from the factory with the operating system and MMR-8 software pre-loaded onto the internal hard drive. At POWER ON, the front panel LCD should display the following message:

TASCAM MMR-8  
© TimeLine 1996 - 99

If this message is not seen, the front panel is not operating correctly, and you should contact TASCAM technical support for assistance. As the system software is loaded, the LCD will go blank, then after a few seconds will display the message “Mounting Volumes”. Any SCSI drive that will be used by the system must be attached to the SCSI bus and powered on at startup in order to be available for mounting. After all volumes have been mounted, the display will be initialized with a fill character (all character positions will be filled), and will pause as the power-up settings are restored. Various LEDs may turn on and off during this process. The entire sequence of events may take up to 30 seconds. When it is complete, the front panel display should show something like:

01:00:00,00.00  
01:00:00,00.00

This indicates the system is now ready to go to work. Any other indication is an error condition. Should an error occur, note the message, if any (if it is a long message, scroll using the left/right arrow keys), and contact TASCAM technical support.

## Verifying MMR-8 Installation

Once the MMR-8 is properly mounted in a rack or has been positioned on or in the studio furniture, follow these steps to complete, or to verify, the proper installation of your MMR-8 system:

1. Connect the MMR-8’s 25-pin female D-sub analog output connector to the mixing console’s tape returns or to those line-level inputs normally used for tape playback. Refer to Appendix D: Cable Information for the connection pin outs for the analog input and analog output connectors.
2. Install the removable drive into the front panel of the MMR-8 (if it is not already installed). Slide the drive into the front panel opening and press on the drive to fully seat it in the holder. Turn the key to lock the unit into place and to connect the drive power. The LED indicating the drive SCSI address will flash until the drive has finished spinning up and is ready for operation.
3. If external SCSI hard drives will be incorporated into the system, connect a SCSI-2 cable from the MMR-8 rear panel SCSI-2 port to one of the SCSI ports on an external SCSI drive housing.

SCSI NOTES: Each device connected to the SCSI bus must have a unique SCSI ID number. Configure the MMR-8’s removable hard drive (installed in the Kingston carrier) to use SCSI ID 0. The internal SCSI interface board uses SCSI ID 7. Thus, no other drive in the system can use these SCSI ID numbers. Also, only the last drive in the SCSI chain can be terminated. All other drives must NOT be terminated. If two drives are set for the same SCSI ID number, or if any drive other than the last one in the chain is terminated, it will prevent the MMR-8 from properly functioning. See *Connecting External SCSI Media* (in this chapter) for additional information.



4. Connect the MMR-8 to the applicable timing reference source and to the appropriate remote control interface
  - a. To connect the MMR-8 to a film transport, connect the biphasic sync output from the projector to one of the four biphasic inputs. The four biphasic inputs are numbered 1 - 4 from top to bottom. Any, or all, of the inputs can be connected. Use Setup Menu 100, Sync Group, to select which of the four Biphasic inputs (Sync Groups) will control the system.
  - b. To connect the MMR-8 as a slave to a video machine, first connect a source of Video Frame synchronization to the MMR-8's VIDEO IN (either the Video Reference out from a video deck, or a Video black burst signal). This is normally a loop-through connection so the MMR-8's VIDEO OUT jack should be terminated if it is not connected to another machine. Next connect the Time Code signal from the video to the MMR-8, using the SMPTE/EBU TIME CODE IN (LTC) connector. Use the RS422 Sony 9-Pin Editor port to control the MMR-8 via Sony protocol. To connect the MMR-8 as a master for a video deck, connect the TRANSPORT connector to the video deck's Sony P2 protocol-compatible remote control connector.
  - c. To connect the MMR-8 to other audio devices, connect the TIME CODE IN/OUT connectors. If the other devices do not read or transmit SMPTE/EBU time code, but they do read MTC (MIDI time code), then connect the MIDI IN/OUT/THRU as required.
  - d. To connect multiple MMR-8 recorders together, daisy chain them using the MMR Bus (the 15-pin SYNC connectors). A 3-foot MMR bus cable is provided with each MMR-8 for this application. Since each connector parallels the other, connection order is not critical. The MMR Bus is self-terminating.
  - e. If remote control capabilities are desired, then connect a TASCAM MM-RC remote control unit to the 25 pin D-sub connector on the UI/B board on the back panel of the MMR-8. Some functions of the MMR-8 can also be controlled via the TimeLine Lynx Keyboard Control Unit (KCU) by connecting the KCU to either LYNX connection (they operate in parallel, so either one may be used) on the MMR-8 back panel. If necessary the other LYNX connection can be daisy-chained to other equipment (MMR-8, a Lynx-2 controller, etc.).

## Software Updates

Software updates are supplied on one or more floppy disks. To install the software update, insert the floppy disk (or Disk 1, if multiple disks are received) into the front panel floppy drive while the unit is operating normally. Access Menu 995 (Load Software) and press STO. The system will ask "Are you sure?" Confirm the floppy is properly inserted and press STO again to confirm. If multiple disks are supplied, the operator will be prompted via the display to remove Disk 1 and place Disk 2 into the drive. After the software update is installed, the system will display a message that the update is complete, and will display a checksum number (written on the floppy update disk for reference) to verify that the installation has been successful. Remove the floppy disk and recycle the power to operate the unit with the new software installed. All system floppy disks should be kept in a secure location in case they may be needed in the future.

## Factory Default Settings

The MMR-8 is shipped from the factory using a pre-defined set of operating parameters. The factory default settings can be changed in the field at any time through a system of Setup menus that control the MMR-8 operating parameters. The new value settings will be automatically saved and used at system start-up as the normal operating parameters of the MMR-8. The system can be reset to use the factory defaults at any time by accessing menu 901 (“Recall Settings”), and selecting the “Default” value. The system will then be returned to the factory default settings and is ready to use.

## Testing Your Installation

To test your MMR-8, at a minimum connect the analog outputs (or the optional digital outputs) to a mixing console with headphones or speakers powered for playback. If a console is not available, the internal headphone monitor system (or the rear panel Studio Monitor output) could be used. Follow the procedure below:

1. Load and lock the (internal) hard drive that has been installed into the Kingston drive carrier that came with the system, and make sure that any external SCSI drives are securely and correctly connected, addressed, and powered up.
2. Apply power to the MMR-8, and wait for the system to start up. See *Powering Up the System* for details on system start up.
3. To test the analog audio inputs and outputs, feed a 1 kHz or similar steady tone into all eight analog inputs on the MMR-8. To listen to the inputs, press the INPUT keys. Each of the eight SEL key LEDs (just above each track SEL key) and the INPUT LEDs above the meters should be lit as each key is pressed, and after all eight SEL keys have been pressed, all eight tracks should have meter indication. Press the SEL keys for tracks 2 - 8 (to turn off Input Monitor on these tracks) so that only track 1 is in input monitor (only the INPUT LED and the SEL 1 key LEDs are lit). Adjust the audio volume (at the audio source) so that the level meter indicates 0 VU, which is +4 dBu, in the middle of the meter.

Press the SEL 1 key to turn off input monitor for that track and press SEL 2 to turn input monitor on for track 2. Confirm the input level meter reading, and that the output signal is present. Continue to test each input and output in like manner. When all inputs and outputs are tested, put all eight tracks back to input monitor (the INPUT and all SEL key LEDs will be lit and there will be meter indication on all eight meters).

4. Adjust the headphone Level control to full off and then plug headphones into the PHONES jack. Press the MON key. The MON LED and all SEL keys LEDs should turn on. Turn up the Level control to a low level and verify there is audio present. Press SEL 2 - 8 to turn off the audio on all tracks but 1. Verify input audio is present. Press SEL 1 (to turn off monitoring track 1) and then SEL 2 (to monitor track 2). Verify audio is present and continue to test all eight tracks of headphone monitoring in like manner. If the rear panel monitor jack is connected, it can be tested at this same time. Note that it does not have any volume control.

5. Put all Tracks into Record Enable by pressing the Track 1 - 8 RECORD keys (the red keys labeled 1 - 8). The eight REC LEDs above the meters should light. Press the REC+PLAY (>) keys to start recording. After ten or fifteen seconds press STOP (□) to end the recording.
6. If you wish, turn off Input Monitor on all tracks, by again pressing the Track 1-8 RECORD keys, thus disabling record and turning off the input monitor function on those tracks. Locate the transport back to the start of your recording (press SHIFT+8) and then press PLAY (>). You should now hear the playback of what was just recorded, and see a 0VU indication on all the meters. Press STOP (□).

If no audio is heard on any tracks, or if you cannot record, and you've double-checked your input and output connections, your hard drive mounting, and that the system is using the default settings, contact TASCAM Technical Support for troubleshooting assistance.

This completes the standard hardware installation procedure and the basic audio technical checks.

# Chapter 3 MMR-8 Keys and Status Displays

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## MMR-8 Keys & Definitions

Throughout this manual several abbreviations and written shortcuts are used to define user operations and machine functions. The following summarizes how these abbreviations and text shortcuts relate to the operational description:

**Keys** Refers to the colored front panel keys on the MMR-8. The gray keys are used to enter time code numbers (on the numeric keys) and to perform various other common functions. The red numbered keys are record enables, used to toggle tracks between record ready and safe modes. The shift key is the only yellow key. Key use in the text is indicated through capitalizing the key legends (e.g., LOAD TRACK indicates the Load Track key is to be pressed).

**Shift Key** This key, the only yellow key on the front panel, functions like the shift key on a computer keyboard. Located at the top-right corner of the numeric keypad area, shift works in combination with selected gray keys, enabling their shifted functions. The shifted function for each applicable gray key is written above the key on the front panel metal. Press and release the shift key before pressing any other key, to “latch” the shift key until the desired key is pressed. This will light the shift LED above the SHIFT key. Pressing another key while the shift LED is on will cause that key to execute its shifted function. Once the shifted function has been activated, the shift LED will go off and the system will return to the normal non-shifted state. If multiple shifted keystrokes are required, you may also press and hold SHIFT (the shift LED above the key will stay on) while pressing one or more gray keys in succession.

In the text “SHIFT+X” indicates the Shift key is used in combination with one of the gray keys (X) that has a shifted function. Thus, SHIFT+TRIM means “press and release (or press and hold) the SHIFT key and then press the TRIM key.” In this case, the MMR-8 will enter Dynamic Trim mode since the shifted function for the TRIM key is “Dynamic Trim” (which is indicated above the key). To cancel shift, when the shift LED indicator is on, press SHIFT again, or press CLR.

**Text Above Keys** Indicates the “shifted function” for that key. Pressing SHIFT+ key, as detailed above, accesses the shifted function.

### **Reversed Text Above Keys**

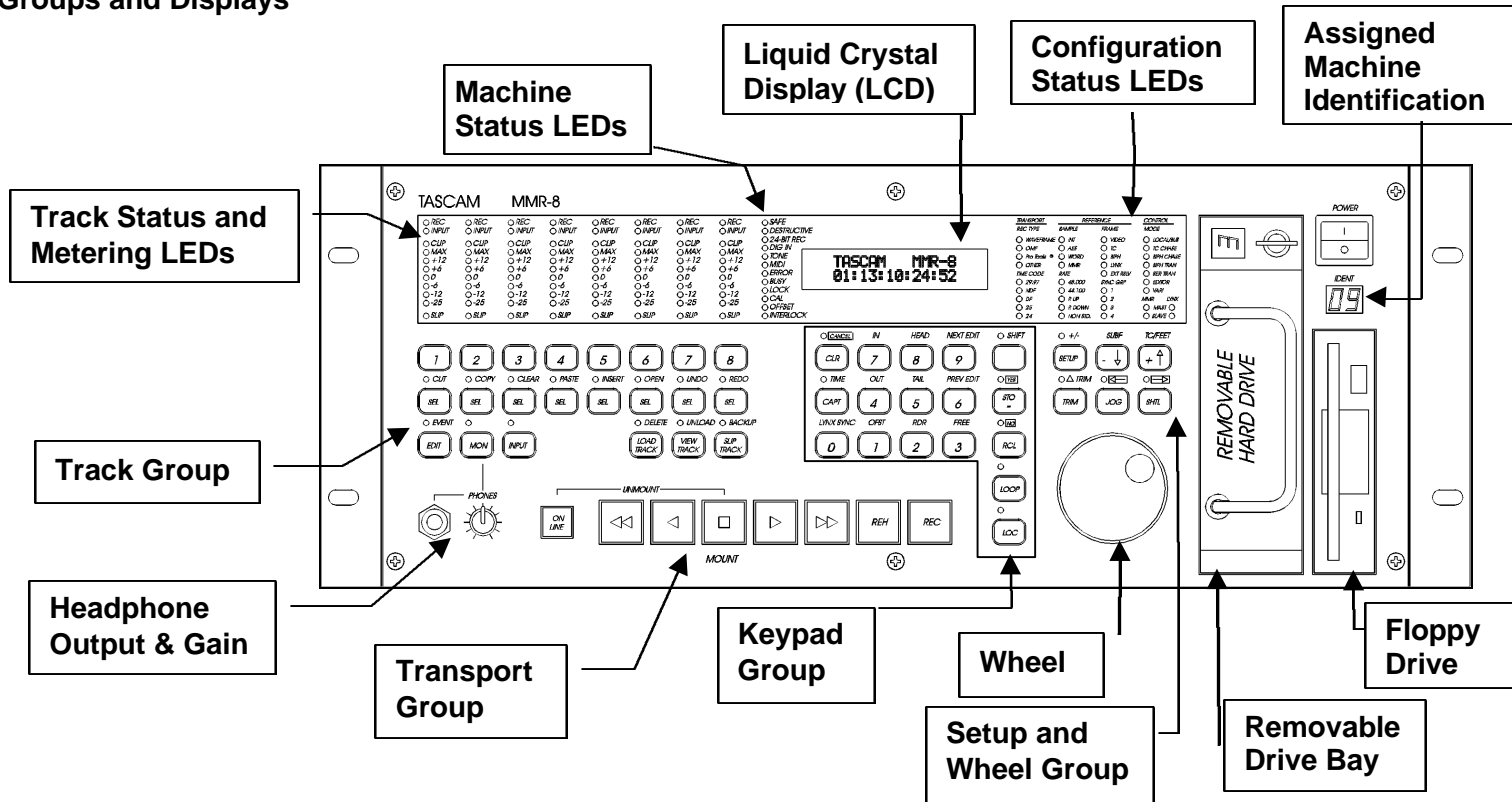
Indicates the “alternate” function for the JOG and SHTL keys, and for the STO, RCL and CLR keys. The alternate functions are used in Setup, Track, Verify, and Error modes, and while trimming values. In Normal mode, the key functions are normal (i.e., pressing JOG turns the Wheel into a Jog Wheel). In Setup or Track modes, pressing JOG indicates a left-arrow function as a cursor or window movement tool.

**Mode** This term is used to refer to the active Control mode selected by Setup menu 000 and to refer to the Track Select Mode which governs the behavior of the SEL keys. It may also be used to refer to various operational modes such as Record, Loop, Trim, or Shift which change the meaning of other keys or controls as long as the mode is active.

**LCD Text** To indicate the front panel LCD text, curly brackets are used to enclose the text. (e.g., {X. 01:00:00,00}) A mono-spaced Courier font duplicates the spacing and alphanumeric characters shown in the LCD. In the Normal state, the top line of the LCD typically shows the current “play head” time code, while the bottom line shows the entry (or other active) register time code. In Setup, Track, Verify, or Error states, the two LCD lines will change to show various text messages as indicated in the Functional Overview section of Chapter 2.

# MMR-8 Front Panel

## Key Groups and Displays





## Front Panel Indicators, Switches, and Displays

Collectively, all the front panel keys and the Wheel are called *switches* and the LEDs, eight motion control lamps, and the Liquid Crystal Display (LCD) are called *indicators*. The MMR-8 is manually controlled through front-panel switches, while system status is shown via the indicators. The front panel switches are divided into five groups: the *track* group, the *keypad* group, the *setup & wheel* group, the *wheel* itself, and the *transport* (or motion control) group. The functions for each switch in each group and how their selection affects the indicators are discussed in this section. The MM-RC remote control unit parallel most of the functions on the MMR front panel. Note that the CLR (clear or cancel) key will almost always terminate an operation, and is a good first key to try to cancel an operation.

### LED Indicators

Most operating parameters and key functions are indicated through LEDs, as are the input or output signal levels and record status.

### Configuration Settings

To the right of the LCD are 38 LEDs used to indicate the Control mode, the frame and sample reference sources, the time code format, the sample rate being used, the active sync group, the state of the MMR-8 buses (master or slave on the MMR or Lynx buses), and the record file type.

### Active Mode/Key Indicators

Above most soft-touch keys there are LEDs to indicate the key status. In some cases they indicate that the shifted function is active. In other cases they indicate a key status. For example, the LOC (locate) key's LED will be on while the MMR-8 is locating, turning off to indicate the transport has completed locating (the time code in the top and bottom lines of the display should then be equal).

The LEDs above the SEL keys indicate which tracks are selected according to which track function key is also active. The track function key (EDIT, MON, INPUT, LOAD TRACK, TRACK or SLIP) that is active will also have its LED turned on. For example, pressing MON will turn on the MON LED, as well as the SEL LEDs for all the tracks that are currently being monitored in the headphones. Pressing any SEL key will then toggle the track between monitor on (when the LED is lit) and monitor off (no SEL LED for that track). If another track mode key is pressed the SEL LEDs will now indicate that mode's selected tracks.

### Track Status and Metering

Immediately above the track record arm buttons associated with the eight tracks in the MMR-8 (tracks 1 - 8, from left to right) are 11 LEDs per track (for a total of 88 LEDs). These indicate audio signal levels (meter LEDs), and the record enable, input monitor, & track slip status for each track.

### Meter LEDs

Each track has its own column of signal level LEDs that can be switched to read the MMR-8 analog input or the output signal off disk. Each meter column contains eight LEDs. Functioning much like a tape machine's peak meters, their meters have a fixed rise time of <30 ms and a default decay time of <0.5 seconds.



The bottom level LED (-25) is a green presence indicator. Any time there is signal on the track there will be an indication. The next three LEDs indicate signal levels of -12, -6 and 0 VU. The next two LEDs are yellow and indicate +6 and +12 VU. The final two LEDs are red to indicate the audio peaks are at MAX (3 dB below clipping) and CLIP, which means the signal has most likely exceeded the input capability of the digital converter and may be distorted. The CLIP indicator acts as a peak-hold indicator during recording. It is only reset when the MMR-8 is stopped and put into PLAY again.

A de-facto film/video industry standard for digital device monitoring is that 0 VU should be set to indicate a signal level of -20 dBFS (decibels below full scale, i.e. 20 dB below the digital clipping level). The MMR-8 default setup follows this recommendation with the MAX LED indicator set to turn on with a signal 17 dB above the nominal 0 VU indication (just before all bits would be set true in the ADC). The CLIP indication is typically adjusted for a 3 dB hotter signal (20 dB above 0 VU). These settings can be adjusted in 1dB increments using Setup mode menu 520 (Meter Reference Level) for any dB reference level from -15 dBFS to -24 dBFS.

When the Meter Calibrate function (Menu 521) is on (for accurate field calibration of the inputs), the LED's reference steps are changed to indicate levels above and below 0 as +/- 1/3 dB, +/-1.0 dB, and +/- 3dB steps to allow fine tuning of input calibration levels. See *Chapter 8, Maintenance and Service* for instructions on calibrating the inputs and outputs using the meters.

### Machine Status LEDs

To the left of the LCD are 12 LEDs used to indicate the status of various MMR machine states (interlock, calibrate, busy, lock, etc.), as well as the master record states (safe, destructive, 24-bit, etc.). These are described here:

- The SAFE LED will light when menu 201 (All Safe) is set to On, indicating that the MMR-8 will not go into record.
- The DESTRUCTIVE LED will be lit when menu 200 (Record Mode) is set to Auto-Cleanup or Tape Mode. This indicates that all recordings will be destructive (i.e. any new recording will replace audio already existing on the recorded track between the punch in & out points).
- The 24-BIT REC (24-bit recording on) LED is controlled by menu 700 (Disk Encoding). When the LED is lit, all audio is recorded in 24-bit file format. When the LED is off, 16-bit file format is used.
- The DIG IN LED (Digital In) will be lit when menu 500 (Input Source) is set to Digital or Rate Converter.
- The TONE LED is lit when menu 530 (Reference Tone) is set to On. Pressing play when this LED is lit will cause all channels to output a 1kHz reference tone at 0 VU.
- The MIDI LED is used to indicate a valid MIDI input signal (MMC) is being received.
- The ERROR LED indicates an error state has occurred and must be cleared before normal operation can resume.
- The BUSY LED indicates the system is occupied with a task, and the transport keys are not available until the system finishes the current task and the Busy LED goes out.
- The LOCK LED indicates the system is locked to the incoming machine synchronization source (usually time code, biphasic, or the MMR Bus).
- The CAL LED indicates the Calibration function (Menu 521) is on.
- The OFFSET LED indicates there is an offset (value other than 0) in the offset register (local MMR offset) or when there is an MMR bus offset and the unit is a slave on the MMR bus.
- The INTERLOCK LED lights when the system is in Biphasic Chase Control Mode.

## Liquid Crystal Display (LCD)

The LCD or “display” consists of two lines of twenty characters that show various operator messages (time code, user prompts, error messages and information, track data, and setup menu information) depending upon the active panel/display state. Both lines of the LCD can also show various system messages according to the operating state. Typically the top line will indicate the current time code position in the Normal state, the Setup menu number and item in the Setup state, and the Track information or action instruction in the Track states. In the Verify or Error states, additional text may be displayed in the bottom line of the display, depending upon the message or error generated.

In cases where the message exceeds the width of the LCD window, the left/right arrow keys can be used to horizontally scroll the message. The window follows the arrow key movement (right-arrow moves the window to the right and left-arrow moves the window to the left), thus scrolling the text across the LCD in the opposite direction. The appearance of the LCD in each of the MMR panel/display states is described in detail here.

### Normal State Display

In the Normal state, the top line shows the current transport status and the current position of the “play head” in either SMPTE/EBU time code or in feet & frames. The bottom line of the display shows the time code entry register or most recently accessed time code register. The display format selected is kept as part of the user settings file. The following illustrates the Normal state display of just the top line for time code and for feet & frames:

01234567890123456789	the 20 LCD character positions
<b>cd      HH:MM:SS:FF.xx</b>	(Top Line Display for time code)
<b>cd      TTTTT FF.xx</b>	(Top Line Display for feet & frames)

“cd” is a one or two character display code for the current state of the MMR-8 transport:

- Indicates the transport is stopped
- > Indicates the system is in play mode but unlocked
- >L Indicates the system is locked and in play
- < Indicates the system is in reverse play
- >> Indicates the system is in fast forward
- << Indicates the system is in rewind

In Shuttle or Jog the display will show <<, <, > or >> according to the movement of the Wheel. The Time Code and Feet & Frames characters shown in the Normal state display are:

HH - the hour display (01 - 23)

MM - the minutes display (00 - 59)

SS - the seconds display (00 - 59)

FF -the frame number (00-29)

xx - the subframe number (00 - 99)\*

TTTTT is the film footage count (00000 - 99999)

\* Subframes is an optional display characteristic.

In the Normal state, the bottom line of the display shows time code (or feet & frames) that has been entered manually, captured, or recalled from one of the memory or special-purpose registers. There is a label in front of the time code (or feet & frames) to indicate what register is being displayed. The “Label” identifies the memory or register that is currently being displayed through these abbreviations: SYNC, OFST, RDR, TIME, FREE, HEAD, TAIL, IN, OUT, NEXT, PREV, and MEM n (where n = 0 - 9). If a time code is manually entered, or if CLR was pressed, there will be no listing in the “Label” area of the display, indicating the timecode Entry register is displayed.

01234567890123456789	LCD character positions (left to right)
<b>Label HH:MM:SS:FF.xx</b>	(Bottom Line Display for time code)
<b>Label TTTTT FF.xx</b>	(Bottom Line Display for feet & frames)

### Setup State Display

In the Setup state, the display is used to show a list of menus for setting various system parameters. Pressing the SETUP key enters this state. The top line shows the 3-digit menu number and the name of the menu. The bottom line shows the list of parameters. To scroll through the list of menus, use the Up/Down arrow keys or the wheel. You may also jump directly to “banks” of menus by pressing any of the numeric keys on the keypad. To scroll through the list of parameters for a selected menu, press TRIM, then use the Up/Down arrow keys or the Wheel. Note that the currently selected parameter will always be preceded by a \* character. Many parameters have system default values which can be accessed by pressing TRIM, followed by press SHIFT + CLR.

01234567890123456789	20 position LCD character positions
<b>NNN Ttttttttttttttttttt</b>	Top: (NNN indicates the menu number, t indicates the menu name)
<b>*Ttttttttttttttttttt</b>	Bottom: (* indicates the currently selected parameter, t indicates the parameter name)

To exit the Setup state and return to the Normal state, press SETUP, or press CLR, or press the EDIT, MON, or INPUT Track Mode keys. To jump directly to one of the Track states from the Setup state, press VIEW TRACK, TRACK, or SLIP. Note that attempting to set the MMR to an invalid condition may result in an Error state, and that attempting to choose some menu parameters will put the system in the Verify state for confirmation of the choice before it is finalized.

### View Track State Display

In the View Track state, the display is used to show the name of the selected track. To enter this state, press the TRACK key. Press the appropriate SEL key to display the desired track. The wheel and the Up/Down arrow keys can be used to move to the next or previous track selection.

01234567890123456789	LCD character positions (left to right)
<b>Track Contents:</b>	Top: (Operator message)
<b>T nnnnnnnnnnnnnnnnnnn</b>	Bottom: (T indicates the assigned track, nnn is the track name in the EDL) and will read *Blank* if the track isn't assigned.

To exit the View Track state and return to the Normal state, press TRACK, or press CLR.

## Slip Track State Display

In the Slip Track state, the display will show the current time position in the top line of the display (the same as in the Normal state), while the bottom line of the display is used to show the contents of the slip register for the selected track. If more than one track is selected, all of their registers are active, but only the last selected track indexes slip register will be shown.

01234567890123456789	LCD character positions (left to right)
<b>Label HH:MM:SS:FF.xx</b>	Top: (Operator message) same as Normal state
<b>SlipX HH:MM:SS:FF.xx</b>	Bottom: (X is the number of the currently selected track index, Time code display is the slip register for the selected track index)

To increment or decrement the slip register amount for the selected track index, use the Up/Down arrow keys or the Wheel. To clear a slip register, set the slip amount to zero (0), or hold the clear key while also pressing the appropriate track SEL key. To directly enter a slip time into a slip register, use the keypad while in the Normal state to enter the desired slip time amount, then press STO followed by pressing the appropriate track SEL key.

## Load Track State Display

In the Load Track state, the display is used to show the directory of all Edit Decision Lists or EDLs (Projects, Sessions, and Compositions) on all mounted drives. Use the wheel or the Up/Down arrow keys to scroll through the list of projects. Press STO to automatically load the first eight tracks of the Project into the eight MMR track indexes.

01234567890123456789	LCD character positions (left to right)
<b>Project:</b>	Top: (Operator message)
<b>nnnnnnnnnnnnnnnnnnnn</b>	Bottom: (nnn is the project name, use wheel or Up/Down arrows to scroll)

Pressing the Load Track key again shows the next level of the EDL hierarchy for the chosen project (usually the Track name) and allows for scrolling through the list of tracks in the Project, and loading any track into the selected track index.

01234567890123456789	LCD character positions (left to right)
<b>Load into Track X:</b>	Top: (X is the currently SElected track index)
<input type="checkbox"/> <b>nnnnnnnnnnnnnnnnnnnn</b>	Bottom: ( <input type="checkbox"/> indicates an unloaded track, and nnn is the track name)

If a track from the list of available tracks has already been loaded into an MMR track index, the display will ask if you wish to move that track into the currently selected Track index. If accepted, this action will remove the track from its previous Track index location, thus leaving it blank.

01234567890123456789	LCD character positions (left to right)
<b>Move Track X Y</b>	Top: (X is the Track index into which the listed track is already loaded, Y is the currently SElected track index)
<b>X nnnnnnnnnnnnnnnnnnn</b>	Bottom: (X is the Track index into which the listed track is already loaded, and nnn is the track name)

To move a loaded track from its current Track index position into the selected Track index or to load a currently unloaded track into the selected Track index, scroll through the list of available tracks until the desired track is located. The display will indicate your choice of both the selected track to be moved or loaded, and the destination Track index. Press the STO key to complete the operation and load the track.

## Backup State Display

The Backup state is accessed via the Load Track state by choosing (scrolling to) the desired Project and then pressing SHIFT + SLIP. There are six menu choices that can be displayed: Backup, Rename, TapeMode Convert, WaveFrame Export, OMF Export, and ProTools Export. Use the Up/Down arrow keys or the Wheel to toggle between the Backup types. Only currently mounted disk volumes will be shown as choices for the target of the backup operation. Press CLR to cancel the Backup state and return to the Normal state.

Backup:

01234567890123456789	LCD character positions (left to right)
<b>Begin Backup to:</b> *Disk X	Top: (Menu Item) Bottom: (Drive SCSI ID #)

Rename:

01234567890123456789	LCD character positions (left to right)
<b>Rename project as:</b> *Project Name	Top: (Menu Item) Bottom:(shows project name)

TapeMode Convert:

01234567890123456789	LCD character positions (left to right)
<b>TapeMode Convert to:</b> *Disk X	Top: (Menu Item) Bottom: (Drive SCSI ID #)

WaveFrame Export:

01234567890123456789	20 position LCD character positions
<b>WaveFrame Export to:</b> * Disk 0	Top: (Menu Item) Bottom: (Drive SCSI ID #)

OMF Export:

01234567890123456789	20 position LCD character positions
<b>OMF Export to:</b> * Disk 0	Top: (Menu Item) Bottom: (Drive SCSI ID #)

Pro Tools Export:

01234567890123456789	20 position LCD character positions
<b>ProTools Export to:</b> * Disk 0	Top: (Menu Item) Bottom: (Drive SCSI ID #)

After choosing an Export option, the display will prompt for a new name for the exported file:

01234567890123456789	20 position LCD character position
<b>Pro Tools Export As:</b> <b>*MMR Project Name</b>	Top: (menu name) Bottom: (Enter new file name)

For more detail on the Backup, Rename, TapeMode Convert, and Export functions, see *Chapter 6, File Format Support*.

### Verify State Display

In the Verify state, the display is used for operator interface messages which usually request a Yes/No answer or require a number to be entered (such as a password) before normal operation can be resumed.

01234567890123456789	LCD character positions (left to right)
<b>Function Message</b> <b>Are you sure (Y/N)?</b>	Top: (Operator message) Bottom: Verification request – press STO for Yes, press RCL for No, use keypad to enter number, or press CLR to Cancel and return to previous state

### Error State Display

The Error state will cause the ERROR LED to flash red and show a message in the display indicating an action cannot be implemented or gives some other instruction. This state may also present various information messages indicating system status, disk mount status, an event has timed out, or that some type of operation (such as disk formatting) is requiring the system to wait until the operation is finished.

01234567890123456789	20 position LCD character positions
<b>Error: nnnn</b> <b>Ttttttttttttttttttttt</b>	Top: (nnnn indicates the error message number) Bottom: (t indicates a possible text message)

It is necessary to clear the Error state to return the front panel keys to normal operation. Most error messages can be cleared from the display by pressing the CLR key.

## Front Panel Key Groups

The MMR-8 front panel keys and controls are divided into five functional groups, the Transport Group, the Setup & Wheel Group, the Wheel itself, the Track Group, and the Keypad Group.

### Transport Group

These keys consist of the On Line, Rewind (<<), Reverse Play (<), Stop (□), Play (>), Fast Forward (>>), Rehearse (REH) and Record (REC) keys. These transport functions are analogous to those found on tape dubbers and recorders. The keys are located on the bottom central portion of the front panel, and are larger and also backlit in order to be seen clearly at a distance.

**ONLINE** This key selects whether the MMR-8 is controlled from an outside sync source or external device (the key is lit), or isolated and working as a stand-alone device (the key is unlit). When pressed in combination with the Stop key (ONLINE+STOP), all currently mounted disk volumes are unmounted in preparation for removal from the MMR-8. The system will keep track of position on the Biphase input even while offline. To set a new sync interlock point at the current position relative to the Biphase source, simply press ONLINE. To put the unit back ONLINE at the previously established sync point (the interlock location that existed prior to when the unit was taken offline), press SHIFT + ONLINE.

**<< (REWIND)** The Rewind key causes the current time code position to roll in reverse at approximately 18 times play speed. Rewind cancels any loop operation. There is no shifted function for this key.

**< (REVERSE PLAY)** The Reverse Play key causes the MMR-8 to play audio backwards at play speed. Except for the direction, other operating parameters such as speed and output level will follow those of Play. If there is a loop function pending, Reverse Play enters Loop play operation and causes the MMR to perform an alternating forward-backward loop. There is no shifted function for this key.

**□ (STOP)**  
**(MOUNT)** The Stop key halts the operation of the transport under all conditions and removes any loop pending mode. It is usually lit in the stopped condition, and not lit under other conditions (with the exception of Jog and Shuttle modes). Used in combination with the On Line key, the Stop key causes all currently mounted disk volumes to be unmounted. There is no shifted function for this key. The alternate function of the Stop key is to MOUNT all available disk drive(s) after a dismount operation has been performed.

**> (PLAY)** The Play key causes the MMR-8 to play audio in the forward direction at play speed, advancing the time code counter. The Play key must be held down at the same time as the Record key in order to initiate recording, or with the Rehearse key to initiate rehearsing, depending on the parameter settings of Setup menus 202 (Record Key) and 203 (Rehearse Key). This may be changed by selecting the single-key REC or REH options in these menus. In this case the Play key is not required to initiate Recording or Rehearsing. If there is a loop pending, Play enters the playback loop operation and will play the loop according to the parameter settings in menu 210 (Loop Mode). There is no shifted function for this key.

**>> (FAST FORWARD)** The Fast Forward key causes the current time code position to roll forward at approximately 18 times play speed. Fast Forward cancels any loop pending operation. There is no shifted function for this key.

**REH (REHEARSE)** The Rehearse key allows the MMR to behave exactly as if a Record operation is taking place, except that audio is not actually recorded to disk and no existing material on any track is disturbed. When the MMR is playing and the REH key is pressed, all armed tracks are switched to Input Monitor. If there is a loop pending, pressing REH starts the Rehearse Loop operation according to the settings in Menus 210 and 211 (Loop Mode and Loop Record). There is no shifted function for this key.

**REC (RECORD)** The Record key initiates recording on those tracks armed for recording, or prepares those tracks not armed for recording for “punch-in” recording. The MMR can be set for one-button record (pressing only the REC key initiates Record), or to enter Record only when pressing PLAY + REC, according to the setting in menu 202 (Record Key). Recording is done in Non-Destructive or TapeMode, according to the setting in menu 200 (Record Mode). If there is a loop pending, pressing REC enters the record looping operation. There is no shifted function for this key.

## Setup and Wheel Group

This group of keys contains the SETUP and arrow keys, and the TRIM, JOG, and SHTL (shuttle) keys. These keys are located on the right section of the front panel, directly over the wheel and below the right end of the LED display panel. The Setup and Wheel Group keys are used to navigate through the various choices in the Setup menus and to control the operation of the Wheel. These keys also have shifted functions that are indicated in the text above the keys and are accessed by first pressing the SHIFT key, then the key itself.

**SETUP** This key places the MMR-8 into the Setup state, where MMR operating parameters can be changed as required using the Setup menus. To exit Setup mode, press SETUP again or press CLR.

**SHIFT+SETUP (+/-)** The shifted function of the SETUP key is the +/- (plus/minus) key. This is used during time code entry to change the sign (+/-) of the time code value being entered. Most often used to enter a negative offset amount.

**DOWN ARROW** This key performs whatever the mode requires, and often duplicates the function of the Wheel in scrolling “downward” through track or menu options, or decrementing numeric values.

**SHIFT+DOWN ARROW (SUBF)** Toggles the display of subframes in the LCD for both time code and feet and frames. Also controls whether subframes may be entered or trimmed using the Up/Down arrow keys or Wheel..

**UP ARROW** This key performs whatever the mode requires, and often duplicates the function of the Wheel in scrolling “upward” through track or menu options, or incrementing numeric values.



- SHIFT+UP ARROW (TC/FEET)** Toggles the LCD transport position and register display between time code or 35mm film feet/frames format.
- TRIM** Activates a mode in which Wheel rotation and Up/Down arrow keys change the time code value in the currently active register. This allows fine control over incremental and decremental changes in a particular time code value.
- When TRIM is pressed, the MMR-8 goes into a Trim mode, indicated by the lit LED over the Trim key. At this point, the active register is being “trimmed”, with the left/right arrow keys (JOG/SHTL) selecting the digit, and the Wheel or Up/Down arrow keys incrementing or decrementing that digit. If no register is recalled beforehand, the trim operation is performed only on the entry register’s time code. When trim mode is exited by pressing the TRIM key, the trimmed value is then kept in the register, and the value for that register is sent to the transport.
- SHIFT+TRIM (Δ TRIM)** The shifted version of this key performs what is called a “dynamic” trim, indicated by use of the Delta (Δ) character for the shifted key designation. The only difference between this and the normal trim is that dynamic trim sends the trimmed value continuously to the transport whenever the value changes.
- At any time during either type of trim operation, CLR may be pressed to cancel the trim operation, returning the value of the register being trimmed to its previous value. Pressing TRIM during the trim operation completes the trimming and automatically stores the trimmed value in the appropriate memory or register.
- JOG** Pressing JOG stops the transport and allows the Wheel to “scrub” over the current location at a speed relative to the motion of the wheel. The minimum Jog speed is Play/8 (3 octaves down), and maximum is 1.5 times nominal speed. Jog is typically used to play audio at slow speed to locate to a particular spot in pre-recorded material in order to identify an edit or punch point. Sound is produced in the Jog mode only as long as the wheel moves.
- Pressing the JOG key again or pressing the STOP key halts the Jog action and takes the system out of the Jog mode.
- Although Jog has no shifted function, the alternate function of this key is the left-arrow, which is active in several different modes, and which typically scrolls the window to view parts of the display that may extend beyond the window. This key also moves the cursor left for selection of a digit within a time code that may need trimming, or for selecting a character value to alter in a Setup menu.
- SHTL (SHUTTLE)** Pressing the Shuttle key stops the transport and allows the Wheel to initiate sustained audio playback from the current location at continuously variable speeds. Shuttle is typically used to assist in locating a particular spot in pre-recorded material, and is useful for “fast-forwarding” through material while listening. The minimum Shuttle speed is a very slow crawl (Play/1000) and maximum is 1.5 times nominal speed. The Shuttle speed is governed by the distance traveled by the Wheel, with ½ turn equal to half speed, a full turn for nominal speed, and 1 ½ turns

for 1.5 times nominal speed. Pressing the Shuttle key again or pressing the Stop key halts the Shuttle action.

Although there is no shifted function of the Shuttle key, the alternate function of this key is the right-arrow, which is active in several different modes, and which typically scrolls the window to view parts of the display that may extend beyond the window. This key also moves the cursor to the right for selection of a digit within a time code that may need trimming, or for selecting a character value to alter in a Setup menu. The lit transport lamps indicate the current relative speed range for Jog and Shuttle according to the following conventions:

- Indicates the transport is stopped
  
- + > Indicates the transport is playing forward slower than nominal speed
  
- > Indicates the transport is playing forward at nominal speed
  
- > + >> Indicates the transport is playing forward faster than nominal speed
  
- + < Indicates the system is in reverse play at slower than nominal speed
  
- < Indicates the system is in reverse play at nominal speed
  
- + << Indicates the system is in reverse play at faster than nominal speed

## Wheel

The wheel is its own group, and has several different functions during MMR-8 operation. In the Normal state, it controls jog and shuttle of the system transport in conjunction with the JOG and SHTL keys. In conjunction with the TRIM key it can be used to manually trim time code registers. In the Setup state, the Wheel normally scrolls through the menu items, but when TRIM is active, it scrolls through the parameter values. In the Track states, it scrolls through the Project or track names for loading and viewing. There is no shifted function for the Wheel.

## Track Group

These keys are located at the left central portion of the front panel under the track meters. Although the SEL keys are active all the time, they affect tracks according to which Track Select Mode (EDIT, MON, INPUT, LOAD TRACK, TRACK, SLIP) is active. The active mode is indicated by the amber LED above the keys, while the active track(s) for that mode are indicated by the amber LEDs above the SEL keys.

**RECORD  
ENABLE** These are the numbered red keys at the top of the Track group, just below the meter panel. Pressing one or more of these keys arms the selected track(s) for recording (just like their counterparts on other types of multitrack recorders). The red record (REC) LEDs located above the peak meters will then flash to indicate the tracks' armed status.

When the transport is in motion, and the MMR-8 is already recording (i.e., the red RECORD key indicator is lit and not flashing), then pressing a record enable key on one of the non-recording tracks causes that track to immediately “punch-in” to record. This automatically creates the necessary record file and a crossfade from

the existing material on that track, and causes the track's REC LED(s) to stop flashing and turn on solid.

Note that arming a track for record also forces that track into Input Monitor, which lights the amber LED just under the REC LED on the meter panel. There are other input monitor modes which can be selected in Menu 501 (Auto Input).

When the Safe LED is illuminated, the Record Safe mode is active. In this case, all of the Track record enables are locked out (to prevent accidental recording). There are no shifted functions for the track record arm keys.

**SEL  
(TRACK  
SELECT)**

The eight gray SEL keys are located just below their associated track record arm keys. These keys are normally used to select and deselect their associated tracks, although they do have track independent shifted functions as well (as indicated by the labels above each SEL key: Cut, Copy, Clear, etc.).

When EDIT, MON, or INPUT is active (as one will always be while in the Normal state), the SEL keys choose which tracks are edited (when EDIT is active), monitored at the headphone jack (when MON is active), or are in input monitor (when INPUT is active). The chosen tracks for each function are indicated through the amber LEDs above each SEL key. The chosen tracks are "remembered" by the MMR-8. Thus as EDIT, MON, or INPUT is pressed, the amber SEL indicators change to reflect the selected tracks for each function.

When loading individual tracks in the Load Track state (after pressing LOAD TRACK twice), the Track Select keys allow the selection of the "target" track—the MMR track index to which a stored track file will be loaded or moved. Only one track at a time may be selected in this mode. When viewing tracks in the Track state (TRACK key is active), only one track can be viewed at a time as indicated by the amber LED above the SEL key (the Wheel and arrow keys are active in this mode, scrolling and selecting one track at a time).

When slipping tracks in the Track Slip state (SLIP is active), multiple tracks may be selected as "targets" for a slip operation. However, only the last selected track is displayed on the bottom line of the LCD. A slip value may be entered manually into the entry register, or recalled from one of the memories or registers. It is then stored into the selected track by pressing STO followed by the appropriate SEL key. Slipped tracks (NOT tracks *selected* for slipping) are identified by an LED on the bottom row of the meter panel, regardless of the operating mode of the MMR-8. Press CLR+SEL to clear the slip register for any track and return it to an un-slipped status.

**SHIFT+SEL  
(various EDIT  
commands)**

When shifted (SHIFT+SEL), the Track Select keys perform various edit operations on those tracks previously selected while the EDIT key was active. Editing is controlled by the In point and Out point times from the In and Out registers. Note that the In and Out registers can be automatically set to the start and end times of any event by placing the play head within the event and pressing SHIFT+EDIT.

<b>SHIFT+EDIT (EVENT)</b>	Loads the start and end of the event currently under the play head on the selected track(s) into the In point and Out point registers (also called “event capture”).
<b>MON</b>	Pressing this key while in the Normal state allows the SEL keys to select which track(s) will be monitored through the front panel headphone monitor output. This does not affect the rear panel Studio Monitor jack, which always presents a mono mix of all tracks.
<b>SHIFT+MON (Slip In/Out)</b>	<p>Pressing SHIFT + MON puts the MMR into a Slip In/Out mode that allows for slipping (or nudging) all material between the In and Out register locations on selected tracks. When Slip In/Out is active, none of the status LEDs for the Track Mode Select keys is lit on the MMR front panel. This is to distinguish this mode from all other Track Select Modes, wherein at least one Track Select Mode status LED is always lit. Upon pressing SHIFT + MON, the bottom line of the display will show Slip and a time code entry field. Use the Wheel or the Up/Down arrow keys to enter the amount by which the defined region (between In and Out) on the selected tracks is to be slipped. This operation does not affect sync on material which is not located between the In and Out register locations. Slip In/Out will overwrite any existing material on the selected tracks that is at the new destination location to which the material has been moved.</p> <p>To complete the Slip In/Out operation, press SHIFT +MON again. The bottom line of the display will show Slip In/Out to indicate that the slip operation has been performed. To exit the Slip In/Out operation without executing the slip, press CLR.</p>
<b>INPUT</b>	Pressing this key while in the Normal state allows the SEL keys to change the main audio outputs from monitoring audio off the disk to monitoring the audio present at the track inputs and lighting the Input LED above the meters. Note that enabling a track for record automatically selects input monitoring for that track.
<b>SHIFT + INPUT (REP/INP)</b>	When shifted (SHIFT+INPUT), the Input key toggles all tracks between the Input monitor state and the Repro state. The Input LEDs above the meters and the status LEDs above each track select key will light or turn off as needed to show the current state. This is equivalent to engaging and disengaging all of the Select keys together at the same time while in Input monitor. This feature is a convenience for saving time when toggling this state for all eight tracks at once.
<b>LOAD TRACK</b>	<p>Pressing this key puts the MMR-8 into the Load Track state, and is the first step to loading pre-recorded material for playback or re-recording, or for deleting recorded material. Information on the pre-recorded material available on the drive is presented in hierarchical levels on the LCD display, according to the EDL format of the material itself.</p> <p>For WaveFrame™ or StudioFrame™ volumes, this means the material will be listed in a Project / Episode / Reel / Dub / Track hierarchy, with Episode being an optional element. For Pro Tools™ volumes, the material will be listed in Session / Track hierarchy, and for OMF™ volumes, the material will be presented in a Composition / Track hierarchy.</p>

As with the Setup menu system, the Wheel and arrow keys are used to navigate through the available selections at a given level. Unlike the Setup menu system, however, descending through the hierarchy of track information is accomplished by repeatedly pressing LOAD TRACK. Pressing LOAD TRACK while at the bottom or “track” level exits the Load Track state and returns the MMR-8 to the Normal state.

When LOAD TRACK is first pressed, the LCD will show a list of all WaveFrame Projects, Pro Tools Sessions, or OMF Compositions on all mounted volumes. The wheel or arrow keys are used to scroll through the various choices (if multiple choices are available) and to display the name of each of the available files. To view the next lower level of the EDL hierarchy (Episode, Reel, Act, Dub or Track), for the currently displayed Project, Session, or Composition, press LOAD TRACK again. Repeat this procedure to reach the lowest level available for the particular EDL file type. Pro Tools Session files and OMF Compositions will exhibit only two levels – the main EDL (Session or Composition) and Track.

Once the desired Project or track is located and displayed, press the Store (STO) key to load the Project (up to eight tracks) or individual track into the MMR Track index locations. The target Track index is designated by activating the SEL key associated with the Track index (the LED above the SEL will be lit when the Track index is chosen as a target). If a track listed in the display has already been loaded into a track index, the display message will read “Move” rather than “Load”. This allows you to move an already loaded track into a different track index. Which operation is performed depends upon whether the source track file is already loaded; if it is, then a track move is performed. If the source track file is not already loaded, a track load is performed and the track file is loaded or “stored” into the target track. If track information is stored into a track location that is already occupied by a previously loaded track, the previously loaded track is automatically “unloaded.” In Load Track mode, the bottom line of the LCD shows the names of “unloaded” tracks preceded by a small box (the STOP character) in the first character of the display. Loaded tracks are preceded by their track number (indicating the track into which the sound file has been loaded).

The last target track (which defaults to Track 1 at the start of a session) is remembered for the duration of the session. A store operation (either load or move) automatically advances the target track by one, circularly advancing back to track one after track eight. The target track may be selected manually by pressing the appropriate SEL key before STO is pressed.

The Load Track key is also used to identify Projects or Tracks for Backup. Choose (scroll to) the name of the desired Project or Track, then press SHIFT + SLIP to enter the Backup state.

SHIFT + LOAD  
TRACK  
(DELETE)

Pressing SHIFT + LOAD TRACK deletes the currently displayed project or track file. The deletion simply removes the EDL information, not the associated sound file(s), so little disk drive space is reclaimed by this operation. However, sound files not associated with the EDL (track) information are made available for deletion by the Disk Cleanup operation accessed via Setup menu 720. This is the typical method by which space on a given drive volume is reclaimed (the other method is by using Destructive Record to record over existing material).

**TRACK** Pressing this key places the MMR into the View Track state to allow inspection of the currently loaded tracks. The Wheel, the Select keys, or the Up/Down arrow keys may be used to select and view a track index. If nothing is loaded in a selected Track index, the word “\*Blank\*” is displayed for that track. Pressing this key again while viewing tracks or pressing the CLR key exits the View Track state and returns the MMR-8 to the Normal state.

**SHIFT+TRACK  
(UNLOAD)** The shifted function of the TRACK key allows “unloading” of a loaded track, and will return the track to the “blank” state, as well as returning the loaded track back to the pool of unloaded tracks, which can then be viewed using LOAD TRACK.

Note that tracks may be loaded or unloaded even while the MMR is playing. This is a very convenient feature of the MMR and allows for auditioning alternate tracks during playback or loading tracks from different projects.

**SLIP** Pressing this key allows the re-positioning of selected tracks relative to the timeline and other tracks. The LCD will show the number of the last selected track, although all selected tracks (as indicated by the LEDs above the SEL keys) will be “slipped” as a group. Once the tracks to be slipped have been selected, the wheel or arrow keys are used to trim the slip value. The slip register for each track will be adjusted by the relative amount entered during the slip operation. In other words, if a track is already slipped by 10 frames and it is then made part of a group of tracks which are slipped by two more frames, that track’s slip register will then show a value of 12 frames. The MMR-8 will “remember” the slipped tracks (as indicated by the SLIP LEDs below the meters) and the slip value for a given session, so any slip value must be explicitly removed (i.e., set to zero) in order to clear the slip register for that track. To clear the Slip register, either use the Wheel or Up/Down arrow keys to set the Slip value to 0, or press CLR + SEL for the desired track.

Note that the value in the slip register is volatile, and will not be retained when the track index is unloaded or replaced by a different track. To slip a track permanently within the EDL, perform an Edit operation (Clear and Paste the contents of the entire track), or use the Slip In/Out function described under SHIFT + MON.

**SHIFT + SLIP  
(BACKUP)** Pressing SHIFT+SLIP places the MMR into the Backup state so that a backup copy of the currently displayed project or track can be made to any mounted drive volume. The Backup state presents two menu items that allow for choosing either normal or Tape Mode style backup. Use the Wheel or Up/Down arrow keys to switch between these two menus after entering the Backup state.

Normal backup will copy the project or track file including all edit information and associated audio clips to the target drive. The Tape Mode backup will rewrite (copy) the project or track files as continuous media files with no audio edits, and all fades fully rendered. Tape Mode backup will copy only media actually used in the project or track, and provides a way to consolidate the data and “flatten” the file for more efficient playback and disk usage. The word \_TAPE will be appended to the end of the file name of the newly created tape mode backup file so that it can be distinguished from the original file name. This is especially important if the backup is made to the same disk as the original file. When not in the Load Track state, pressing SHIFT + SLIP will display the current status (progress) of the Backup function.

## Keypad Group

These keys are located in the central portion of the front panel, directly under the LCD. In addition to the numeric keys 0-9 (which are mainly used to enter and otherwise manipulate time code), keys performing various other operations are also located here:

- (CLR) the clear time code key
- (CAPT) time code capture key
- SHIFT key
- (STO) store key
- (RCL) recall key
- (LOOP) looping key
- (LOC) locate transport key

### NUMERIC KEYS

#### (0-9)

In the Normal state, these keys are used to enter a time code value into the hold register (the bottom line of the LCD). The numeric keys are also used to access ten time code memory registers and in combination with the SHIFT, RCL, STO, LOOP and LOC keys to store or recall time code to and from the various special time code registers. In the Setup state, these keys directly select menu banks, and are used to enter passwords, date, time, and other numeric entry. The Error and Track states may also use these keys to enter a password or other numeric value.

Time code values are entered into the entry register, beginning with the right-hand digit which moves left as additional digits are entered. Use CLR to reset the entry register to zero {00:00:00, 00}. As an example of the entry register's use; to enter a time code of 00:34:00, 15 (thirty-four minutes and 15 frames); press CLR one or two times (to set the entry register to zero), then the 3 (three) key, 4 (four) key, 0 (zero) key, 0 (zero) key, 1 (one) key, and 5 (five) key. The time code is displayed as the numbers are keyed into the hold register.

To store the entry register time code into one of the ten memory registers, press STO followed by one of the numeric keys. This stores the entry register time code into the selected memory register (0 - 9). The stored time code can later be recalled by pressing RCL then the appropriate numeric key.

The entry register time can also be stored to the special-purpose registers that are not display-only (Lynx Sync, Offset, Time, Out, In), replacing the previous register contents. In this case the shift key is added to the store command key sequence (STO then SHIFT+ the appropriate numeric key).

#### SHIFT+ NUMERIC KEY

The shifted function for each numeric key recalls the special-purpose register contents listed above each numeric key, and for certain registers (the registers associated with keys 0, 4, 5, 6, 7, 8, or 9) performs an immediate transport locate to the register time code value. If STO is pressed before SHIFT+ one of the numeric keys is pressed, then the active register contents (bottom line of the display) are stored in the target register location (providing, of course, that the target register is a writeable and not a read-only register).

#### LYNX SYNC (SHIFT+0)

This register holds the MMR-8 sync point time which is used in conjunction with the master sync point on the Lynx bus to calculate the MMR-8 offset. Storing a value to this register automatically calculates this offset.

OFFSET (SHIFT+1)	This display-only register represents the time difference between the MMR-8's time code and the time code being chased. When locked to the Lynx bus, this equals the time difference between the MMR-8's time code and the Lynx master time code. In either case, the offset is equal to the MMR-8 time minus the time code being chased.
READER (SHIFT+2)	This display-only register shows the current time code being chased by the MMR-8. If time code chase mode is active, whatever time code is being read is displayed here. If the MMR-8 is a slave on the Lynx bus, it holds the current time coming from the Lynx bus master machine.
FREE (SHIFT+3)	This display-only register shows the amount of recording time available on the system default disk volume (the only volume or drive available for recording). Note that this value is always displayed in "time code" format, even if the display format currently is feet/frames, because it is essentially an elapsed time value, not a time code. This display will recalculate and update to take into account the currently selected bit resolution (16 or 24 bit) and the number of tracks currently armed for recording. <i>Note: If more than 24 hours of single track recording is available, the display will show only the time over 24 hours. This is not a software bug, but is a result of the fact that free time is expressed in terms of time code values and there are only 24 hours possible for a time code style display. This happens most often with 9 gigabyte drives where the disk capacity at 16 bit 44.1kHz is more than 28 hours.</i>
OUT POINT (SHIFT+4)	This register holds the "punch out" time. It is used as the end point of a record or a play loop and as the end time for a track marked for editing.
TAIL (SHIFT+5)	This read-only register shows the end time of the last edit on the currently loaded tracks. Tracks selected while in the EDIT track select mode govern the operation of this function. If no tracks are selected in the EDIT track select mode, the MMR will scan across all loaded tracks to find the last edit location. To select a single track or a group of tracks for location of the last edit point location, press only the desired track SEL keys while in the EDIT track select mode, then select SHIFT + 5. The location of the last edit point on the selected tracks will be shown.
PREVIOUS EDIT (SHIFT+6)	This register represents the location of the first splice point (or start of the sound event) located just previous to the current location. Each time PREV EDIT is selected the register value moves "back" one event in time in the edit list, showing the start point of the earlier of event.  Pressing SHIFT+PREV EDIT not only finds and displays this point, but also performs an automatic locate function, moving the transport to that point. This is in contrast to RCL+SHIFT+PREV EDIT, which will simply find and display the appropriate time point in the entry register without performing a locate function (also see the Recall key).
IN POINT (SHIFT+7)	This register holds the "punch in" time code. It is used as the start point of a record or play loop as well as the beginning time for edit operations on any track selected for editing in the Edit track select mode.



- HEAD (SHIFT+8)** This read-only register shows the start time of the first edit on the currently loaded tracks. Tracks selected while in the EDIT track select mode govern the operation of this function. If no tracks are selected in the EDIT track select mode, the MMR will scan across all loaded tracks to find the first edit location. To select a single track or a group of tracks for location of the first edit point location, press only the desired track SEL keys while in the EDIT track select mode, then select SHIFT + 8. The location of the first edit point on the selected tracks will be shown.
- NEXT EDIT (SHIFT+9)** This register shows the location of the first splice point (or start of sound event) located just after the current location. Each time NEXT EDIT is selected the register value moves “forward” one event in the edit list, always coming to rest at the next splice point or start of event. Pressing SHIFT+NEXT EDIT not only finds and displays this point, but also performs an automatic locate function, moving the transport to that point. RCL+SHIFT+NEXT EDIT simply finds and displays the next edit time code in the hold register (also see the Recall key).
- CLR** This key performs both a clear and a cancel function, operating in almost all modes and situations. CLR has no shifted function.
- In the Setup and Verify states, the CLR key takes on its alternate function, “cancel.” In Setup, pressing CLR generally returns a changed value back to the previously stored value, or exits altogether. It is also used to re-enter a password, to cancel a password entry, and as an alternative method of providing a “no” response to an operator query. In the Error state, pressing CLR will clear the error message and return the MMR-8 to the previous operating state. During track slip or register trim, pressing the key returns the registers to their previous values (before the slip or trim operation changed them). During time code entry in the Normal state, CLR returns the entry register time code to a zero value. For most other operations, CLR will return the MMR-8 to the Normal state.
- CAPT** The capture key places the time code value from the top line of the display into the entry register in the bottom line of the display. After capturing the time code value the CAPT LED will flash until a target register key is pressed to place the captured time code value into that register. Note that pressing CAPT automatically readies the system to store the value into the target register, as if the STO key had already been pressed. This action can be done at any time during normal operation of the MMR-8 (including play and record). To complete the capture operation, either press a target register key or press CLR to cancel.
- SHIFT + CAPT (TIME)** This register holds the Time code location that is set to be equal to 0 feet and frames. This is used in film post production work to set a “local 0” for interlocking film to a time code source. To set the offset between the time code display and the feet and frames display, use the keypad to enter the time code that will be equivalent to 0 feet and frames into the entry register. Next, press LOC to locate the MMR transport to that time and press CLR to clear the entry register. Finally, press STO + SHIFT + CAPT to enter the number listed in the top of the display into the TIME register. There will now be an offset between the time code display and the feet and frames display when toggling between these two display styles. To clear the time register, locate to 00:00:00:00 and store that to the Time register.

**SHIFT** The yellow SHIFT key functions like a locking keyboard shift key. When active, it modifies those keys that have a shift function assigned to them (identified by the function name written above the gray keys). Pressing and releasing the yellow Shift key causes the shift LED to turn on, indicating SHIFT is active. Pressing a gray key with a shift function will then perform the shifted function and turn off the yellow Shift LED. To cancel Shift without pressing a function key, press SHIFT again or press CLR (the shift LED will then turn off).

If multiple shifted keys are to be entered in a sequence, press and hold SHIFT (the shift LED will light) while pressing the various gray keys in sequence. When you lift your finger off SHIFT, the Shift function will be canceled (and the shift LED will turn off).

Use of the shift key is indicated in the text by SHIFT+X, where X indicates one of the gray keys. For example, pressing SHIFT+EDIT captures the in and out points of the current edit event, while pressing SHIFT+LOOP only cancels Shift (since LOOP has no shift function). All the various shifted functions are described in the appropriate key definitions. They are also listed in the *Key Command Summary* in Appendix A.

**STO (STORE)** The Store key is an important key, performing the functions of an enter or confirmation key for various operations, as well as being a selection key for an actual store operation. Pressing STO + SEL will enter the current hold register time code as a Slip amount for the selected track. In the Setup and Track states, its alternate function is to answer “yes” to a Verify or Error state operator query.

In the Normal state, the store key is used to save the hold register value into another register. To store a time code value into a register, press the STO key followed by a numeric key (to save the value to a memory register) or by the shift key and a numeric key (to save the value to a special-purpose register). In the Setup state, pressing STO selects the parameter value displayed in the LCD or undertakes an action, according to the type of menu displayed. In the Verify state, the Store key serves both to complete a password entry and to confirm a potentially destructive action. When loading projects or tracks (in the Load Track state), the Store key initiates the action of loading tracks into the MMR Track index locations. The LED above the Store key will flash when the key is pressed to begin a store operation, and will flash more quickly when pressing this key is a possible YES response to a verify request or menu parameter selection. There is no shifted function for this key.

**RCL (RECALL)** This key is used to recall one of the time code registers, and to make it the “active” register. Pressing RCL+ a numeric key recalls one of the 10 system memory registers. Special-purpose register contents may also be accessed in this way through using RCL+SHIFT+ a numeric key. After a recall operation, the recalled value is displayed in the bottom line of the LCD. It is preceded with a four-character mnemonic indicating the register that was recalled. The Recall key is also used to provide a NO or negative response to a query when confirmation of a potentially destructive action is required. The LED above the Recall key will flash when the key is pressed to begin a recall operation, and will flash more quickly when pressing this key is a possible NO response to a verify request or menu parameter selection. There is no shifted function for this key.

**LOOP** Pressing the Loop key prepares the MMR transport for performance of one of several possible types of loop sequences relative to the In and Out time code registers. To start looping after LOOP is pressed and the In and Out times are set, press the appropriate transport key (<, >, REH, or REC). To cancel Loop mode press LOOP again before pressing a transport key.

The start point of the loop is always the In register (minus any pre-roll time set) and the end point is the Out register (plus any post-roll time set). If the value of the Out register is less than (i.e., before) the value of the In point register, then the loop will not play and an error message “Loop points inverted” will be displayed, since the In point value must always be considered the “start” point. The loop cannot play across the “midnight crossing” at the 24 hour mark. This includes pre-roll or post-roll amounts. There must be at least one frame between the 00:00:00:00 time code location and the In minus pre-roll or Out plus post-roll times. There is no shifted function for this key.

There are three selectable Loop Play modes (Setup menu 210): Play Once and Stop, Play Once and Cue, and Play Repeatedly. For Play Once and Stop, when play (>) is pressed after LOOP, the MMR-8 will loop from the In register time (minus any pre-roll amount) to the Out register time (plus any post-roll amount), and then stop. For Play Once and Cue, when play (>) is pressed after LOOP, the MMR-8 will loop from the In register time (minus any pre-roll amount) to the Out register time (plus any post-roll amount), then cue to the In point minus pre-roll time. If Play Repeatedly is selected, the MMR-8 will play from the In time (minus any pre-roll amount) to the Out time (plus any post-roll amount), and repeat this same play sequence until STOP or LOOP is pressed again. The MMR does not execute a seamless repeat, so there will be a small gap in time between the end of the loop and beginning of the next iteration of the loop.

Rehearse Loop and Record Loop work similarly, with the Rehearse Loop performing input monitor switching at the In and Out times in the loop, and Record Loop actually placing the machine into record at the In and Out points. Press LOOP then REH to initiate a Rehearse Loop and LOOP then REC to initiate a Record Loop.

There are three selectable Loop Record modes (Setup menu 211): Record Once Only, Repeat Record, and Repeat w/Unload. Record Once Only will record only on the first pass of the loop, and then switch to playback only for subsequent loops. Repeat Record will initiate a recording between the In and Out points for every loop. Repeat w/Unload will make a recording on each pass and then unload the track just created by the record pass before the next loop begins. This allows for rapidly making many recordings in succession and keeping them all as separate sequentially numbered track files in the project.

To perform a forward-backward loop, press Loop and then Reverse Play (<). The MMR-8 will play forward from the start time (minus any pre-roll amount) to the end time (plus any post-roll amount) and then play in the reverse direction from the end time (plus any post-roll amount) to the start time (minus any pre-roll amount). The MMR will then continually repeat the process (according to the Loop Play menu setting). Press STOP or LOOP to cancel Looping.

**LOC (LOCATE)** This key causes the transport to locate to the active register (bottom line of the display) time code. The time code may be from a recalled register, a captured value or a value entered through the numeric keypad. An implicit (or automatic) locate to certain registers is done when a SHIFT+ numeric key is pressed. A locate operation always stops the transport if it is not stopped. There is no shifted function for this key.

# Chapter 4 MMR-8 Operation

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## Loading and Mounting Drives

The MMR-8 will scan the SCSI bus when the system is powered up and will mount all available drives. Be sure that all drive bays holding removable drives contain fully-seated and engaged SCSI disk drives throughout the power-up process. Removable storage devices (such as the Nikon Beluga™ AV LIMDOW optical drive) must be attached to the system SCSI bus when the system powers up. Removable storage devices do not require that removable media disks be present at power up, as long as the device itself is present and turned on. Once the power up process is complete, drives in the removable Kingston carriers may be “spun down” and removed from the MMR-8 following the unmount procedure, and later re-inserted and re-mounted using the mount procedure.

After this point, it is not necessary to turn off power to the MMR-8 if the internal removable hard drive needs to be changed. “Hot swapping” is possible because the Kingston Drive Carrier features an integral lock/unlock key which removes power from the drive when in the unlock position. Before removing the internal drive, **always unmount the drives first** (press STOP+ONLINE), before turning the drive key to remove power. DATA MAY BE LOST IF DRIVES ARE NOT UNMOUNTED BEFORE REMOVING.

### **HARD DRIVE NOTE:**

**To prevent drive damage when moving hard drives, always allow plenty of time for the drive heads to lock, and for the drive to spin down and stop, before removing the drive.**

Once a new drive has been installed (simply press it into place, it only goes into the slot in one direction), move the key from the unlock position to the lock position. The drive will automatically spin up to speed. After allowing a few seconds for the drive to reach locked speed and release the heads, press the STOP key. The MMR-8 will attempt to mount the drive. The “Mounting Volumes” message will be displayed on the LCD as the mount attempt begins. The MMR-8 will try for up to 30 seconds to find the first drive to mount. This is to allow time for the disk drive to spin up completely. After a successful re-mount (i.e., not a power-up mount), the LCD will display the message “n Volumes Mounted”, where n is the number of volumes mounted. If you receive the message “No Volumes Mounted”, press the STOP key again. If the “No Volumes Mounted” message persists, re-seat, format, or replace the drive(s) as necessary until the mount succeeds. If the mount operation is attempted after all drives are already mounted, the message “No New Drives Mounted” will be shown.

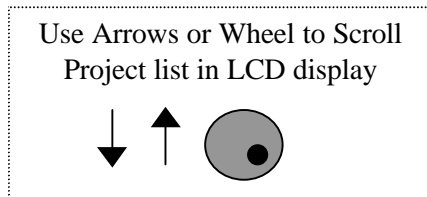
If an unformatted drive is installed, or if the drive is not compatible with the system (i.e., is unreadable by the MMR-8), then the MMR-8 will not be able to mount the volume. To initialize a volume, access menu item 710 (Disk Initialize), and press the STO (store) key. The LCD will display the message {Initialize Disk? }. If it's a new hard drive, or you wish to fully erase and re-initialize a used drive, press STO (store) to continue. The message {Are you sure (y/n)?} then appears. If you wish to continue, press the STO (store) key again. If the drive is known to have information on it, and you wish to keep the information, answer no by pressing the RCL (Recall) key. Drives are initialized in WaveFrame format.

Once the drive has been initialized, it can be used on the MMR-8 or on a WaveFrame/StudioFrame system for recording and playback. A low-level format may be accomplished in a similar fashion, using menu item 711 (Disk Low Format). Note that it will take quite some time to low-level format a disk, with the amount of time dependent upon the size of the hard drive (e.g., for a 2 GB drive figure at least 30 minutes). A low-level format is rarely needed, and should have been done by the drive manufacturer.

## Loading a Project

Press LOAD TRACK to show list of Projects, Sessions, or Compositions from all mounted drives. The list is shown in alphanumeric order.

Example: To load 2B Project



Project  
2B Project

A Project  
Dialogue Export 1.omf  
Mix Stems 1  
Pro Tools Session RWF  
Pro Tools Session SW  
WaveFrame CDoo

From Disk:

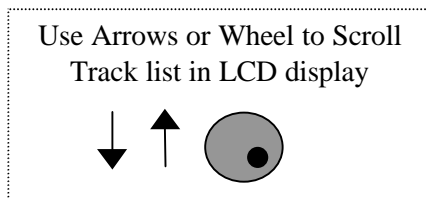
1 (MMR/WaveFrame)  
1 (MMR/WaveFrame)  
2 (Macintosh)  
1 (MMR/WaveFrame)  
2 (Macintosh)  
2 (Macintosh)  
1 (MMR/WaveFrame)

Press STO [YES] to load the first eight tracks from the desired Project into MMR Track Index 1 – 8

## Loading Individual Tracks

After pressing LOAD TRACK (as above), choose (scroll to) the Project, Session, or Composition containing the tracks you wish to load. Press LOAD TRACK again to show the list of tracks in the Project, Session, or Composition (if Project is WaveFrame, it may also show Episode, Act, Reel, or Dub).

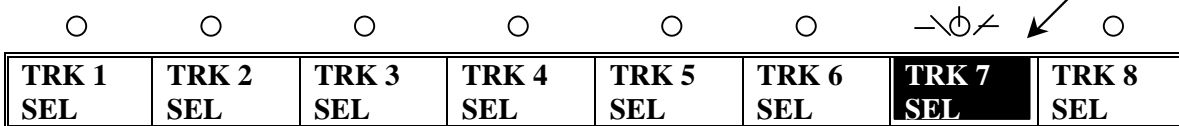
Example: Track list for project: 2B Project



Load into Track 7:  
MMR Trk1 00250

MMR Trk2 00251  
MMR Trk3 00252  
MMR Trk4 00253  
MMR Trk5 00254  
MMR Trk6 00255  
MMR Trk7 00256  
MMR Trk8 00257

Loads into any  
Selected Track Index



- Press the appropriate SEL key to choose the desired Track index into which the track will be loaded.
- Press STO [YES] to load the displayed track from the list into the currently selected Track index.
- Use the arrows or wheel to scroll to a different track from the list of available tracks in the project.
- To facilitate loading tracks in succession, the MMR will automatically increment the selected Track index and advance the display to the next track in the list of available tracks after a track is loaded.

After pressing the LOAD TRACK key twice, the first Track name will be displayed in the bottom line of the LCD preceded by a small box (the STOP character) in the first character of the display to indicate the track has not been loaded yet (it is “unloaded”). To load tracks individually in succession starting with Track 1, first press the Track 1 SEL key. The LED on Track 1 will be lit to indicate that when STO is pressed the displayed track will load onto track 1. After track 1 is loaded, the next track name in the list will automatically display, and the LED on track 2 will turn on to indicate pressing STO will store that track onto track 2. Any target track may be selected manually by pressing the appropriate SEL key before STO is pressed. Typically, a hard drive will contain eight or more tracks for one project, and thus tracks can be loaded in rapid sequence by simply pressing STO eight times in a row. After a track is loaded, the track index number into which the sound file has been loaded will precede the track name.

Once a track is loaded into a track index, it is removed from the “pool” of tracks available for direct loading, but it may be moved from its current track index position to another track index position. If a track from the project is already loaded into a track index, then choosing (scrolling to) that track name in the list of tracks will cause the MMR to ask if you want to Move that track to the currently selected Track index. If a track is moved from its current track index position to a new track index by this method, the previous Track index will then be empty and will show \*Blank\* when viewed using the TRACK key (View Track state). If you do not wish to move a currently loaded track into an empty Track Index, use the arrows or Wheel to scroll through the list of available tracks to find currently unloaded tracks which may then be loaded into the empty track index. If track information is stored into a track location that is already occupied by a previously loaded track, the previously loaded track is automatically “unloaded.” Press TRACK again (or press CLR) to exit the Track state and return the MMR-8 to the Normal state.

## Viewing Tracks

To view which tracks are currently loaded, press TRACK, which puts the MMR-8 into the View Tracks state. Use the Wheel, the arrow keys, or the Select keys to select which track index to view. If nothing is loaded for a given track, the word “\*Blank\*” is displayed for that track in the LCD.

## Unloading Tracks

To “unload” a loaded track and return the track to the “blank” state, while returning the loaded track back to the pool of unloaded tracks, put the MMR-8 into “view tracks” mode by pressing the TRACK key. Select the track you wish to unload, and press SHIFT+TRACK. The displayed track will be “unloaded”, and the word “\*Blank\*” will appear in the display.

## Deleting Tracks from the Disk

To delete a displayed track, enter the Load Tracks state by pressing the LOAD TRACK key, and descending through the project/file hierarchy as detailed above. Select the track you wish to delete, and press SHIFT+LOAD TRACK. Deletion simply removes the track edit information (the “EDL”), not the associated sound files, so very little disk drive space is reclaimed by this operation. However, sound files not associated with any track edit information may be deleted from the disk by using the Disk Cleanup function (found in Setup Menu 720). This is the typical method by which space on a given disk drive volume is reclaimed. When Tape Mode is used on an MMR-8 recorder, existing material will automatically be recorded over (deleted) when a new recording is made where material already exists.

## Recording a New Project

To record a new project, first go to Setup menu 800 and create a name for the project using the Trim key and the Wheel or Up/Down arrow keys to spell the Project name. Press STO after inputting the name. This will unload any currently loaded projects and the new name will appear with an asterisk as the currently loaded project. The new project name initially exists only in memory, so the name will not appear in the disk directory until some audio is recorded. It is necessary to actually record some audio on at least one track before the project will be created on the disk. Loading a project will set the project name to that of the loaded project so it may be recorded into. Once audio is recorded into the new project, that project’s name will appear as a choice in the disk directory when pressing the LOAD TRACK key. Use Menu 700 to set the disk encoding type (WaveFrame or Pro Tools, 16 or 24 bit) and use Menu 200 to set the record mode to be Non-destructive or TapeMode. Once a recording is started as Non-Destructive, the Record Mode cannot be set to TapeMode unless the project is first converted using the TapeMode Convert function.

## Default Record Drive

The MMR-8 will default to recording to the disk with the lowest number SCSI ID, or the disk on which a currently loaded track resides. To set a difference SCSI volume for the recording, use Setup menu 701 to choose the SCSI disk to which the recording will be made.

## Disk Initialization and Low Format

When attempting to record WaveFrame files to a new drive for the first time, it will be necessary to first Initialize the drive so that audio may be recorded to it. The MMR-8 will currently format drives only for the WaveFrame audio file format. To Initialize a drive, go to menu 710 and select the SCSI ID of the volume to be initialized by pressing the TRIM key and turning the wheel or using the Up/Down arrow keys until the SCSI ID of the drive appears as the selection. If the SCSI ID does not appear, be sure there is no SCSI ID conflict between any of the attached drives and that the desired target drive is connected and turned on. Reboot the MMR-8 with the desired target drive on line and look for it again in menu 710. Once the desired drive is selected press STO to select it and STO again after the prompt "Are You Sure?" appears. The drive will be initialized within a few seconds and is now ready for recording using WaveFrame format.

## Formatting Macintosh Disks

The MMR-8 and MMP-16 cannot format disk drives as Macintosh HFS volumes, so a drive must first be formatted as a Macintosh HFS volume using a Macintosh computer before the drive can be used with the MMR-8 or MMP-16. If a non-Macintosh formatted drive is mounted, the MMR/MMP will not allow Pro Tools or OMF as a choice for recording, backup, or file export to that disk. Users are advised to follow the recommendations of Digidesign for formatting disk drives for use with the Pro Tools system and with the MMR-8 and MMP-16.

## Clip Names

Clip Names for new audio recordings are now set when in non-destructive record mode. The name format for MMR-8 clips will show the track prefix, followed by a track take number that increments for each new track created, but will be the same for all clips created on a track, followed finally by a sequential clip number that increments each time a new clip is recorded.

**Dlog Trk3 01112 135**

Track Trk Track Clip #  
Prefix # Take #

Track Name

The MM series unit only shows track names, but clip names are stored and can be shown if the file is taken to a digital audio workstation (WaveFrame or Pro Tools) or displayed on the ViewNet Audio project view screen.

## In & Out Points Set In Record

The In and Out time registers are now automatically set to correspond to the beginning and end of a record punch operating when in non-destructive record mode.



## Using the Backup Functions

The MMR-8 and MMP-16 are capable of Backing up files, Converting Projects or Sessions created in Non-Destructive Record Mode into TapeMode Projects or Sessions, Renaming some projects, and Exporting some formats as other formats. To Backup, Convert, Rename, or Export a file using the MMR-8 or MMP-16, first press the Load Track key and scroll (using the up/down arrow keys or wheel) to the name of the Project. Next, press the Shift key followed by the Track Slip key. The shifted function of the Slip key is labeled Backup. Pressing Shift+Slip brings up a series of menus that allow setting the parameters for file Backup, Convert, Rename, or Export. Choose a process by scrolling to the appropriate menu and then press the Trim key to select the SCSI ID number of the drive to which the file is to be backed up, converted, or exported. Press the STO (YES) key to initiate the process. The system will ask if you are sure. Press STO (YES) again to initiate the process, or CLR (CANCEL) to cancel and return to the previous menu.

### Backup

Both the MMR-8 and MMP-16 can make a backup copy of any WaveFrame Project, OMF Composition, or Pro Tools Session, either to the same disk as the original file or to an external disk volume. This provides a convenient way to make a safety or archive copy of a project, including the EDL (Project, Composition, or Session) and the audio files. The Backup process will copy the EDL and audio data to the drive specified. If any of the audio files already exist on the target disk, they will not be copied again. The backup menu is accessed by pressing the Load Track key to find the file to be backed up, then pressing Shift + Slip to access the Backup menu:

01234567890123456789	20 position LCD character positions
<b>Begin Backup to:</b>	Top: (Menu Item)
<b>* Disk 0</b>	Bottom: (Drive SCSI ID #)

Press the Trim key to select the SCSI ID number of the drive to which the file is to be Backed Up. Press the STO (YES) key to initiate the Backup process. The menu will ask if you are sure. Press STO (YES) again to initiate the Backup process, or CLR (CANCEL) to cancel the process and return to the previous menu.

The MMR/MMP Backup process will back up all Pro Tools data created on the MMR/MMP but will not copy Pro Tools fade files or preserve Session data such as TDM bus data. If it is necessary to back up Pro Tools files which have this type of data, it is best to use the Pro Tools system to perform the backup.

**Note that Backups must be made to a disk of the same type (WaveFrame to WaveFrame or Macintosh to Macintosh).**

## Rename

The MMR-8 and MMP-16 software can rename any Project or Session file that currently exists on a disk in the WaveFrame, Pro Tools or OMF/SDII formats. Rename of other formats such as Sonic Solutions, Fairlight, Akai and DEVA formats is not supported because the MMR and MMP do not write these file types. To rename a file, access the file by pressing LOAD TRACK and scrolling to the name of the Project to be renamed. While the name of the Project to be renamed is showing in the LCD, press SHIFT+SLIP (backup) and scroll to the Rename menu item:

01234567890123456789	20 position LCD character position
<b>Rename project as:</b>	Top: (menu name)
<b>*Project Name</b>	Bottom:(shows project name)

Use the Up/Down arrow keys or wheel to choose alphanumeric characters and the Left/Right arrow keys to move to the next or previous character. When the new name has been entered, press STO to complete the process and write the new file name to the disk.

When Rename is used, the old file name will be overwritten and will no longer exist. To save a copy of a Project under a new name while still retaining the original file with the original name, use the Export menu to Export the file to the same disk, using the Export As function described elsewhere in this document to create a copy of the file with a different name. The original file will still exist under the original name.

## TapeMode Convert

The TapeMode Convert process will copy the audio data to the drive specified and will “flatten” the EDL so that each track consists of a single audio file. If the same TapeMode audio files already exist on the target disk, they will not be copied again. The word \_TAPE will be appended to the end of the file name of the newly created tape mode backup file so that it can be distinguished from the original file name. This is especially important if the backup is made to the same disk as the original file. The Convert to TapeMode menu is accessed by pressing the Load Track key to find the file to be backed up, then pressing Shift + Slip to access the Backup menus and then pressing the up/down arrow keys or wheel until the TapeMode Convert menu appears:

01234567890123456789	20 position LCD character positions
<b>TapeMode Convert to:</b>	Top: (Menu Item)
<b>* Disk 0</b>	Bottom: (Drive SCSI ID #)

Press the Trim key to select the SCSI ID number of the drive to which the file is to be TapeMode Converted. Press the STO (YES) key to initiate the Backup process. The menu will ask if you are sure. Press STO (YES) again to initiate the TapeMode Convert process, or CLR (CANCEL) to cancel the process and return to the previous menu.

## Export

The Export feature of the MMR-8 and MMP-16 allows files in one format to be exported as files of a different format. There are three Export menus available, which allow exporting the chosen file as a WaveFrame Project, OMF Composition with Sound Designer II audio media, or as a Pro Tools Session. The Export menu is accessed by pressing the Load Track key to find the file to be exported, pressing Shift + Slip to access the Backup menus, and then pressing the up/down arrow keys or wheel until the appropriate Export menu appears.

Press the Trim key to select the SCSI ID number of the drive to which the file is to be Exported. Press the STO (YES) key to initiate the Export process. The menu will ask if you are sure. Press STO (YES) again to initiate the Export process, or CLR (CANCEL) to cancel the process and return to the previous menu.

### WaveFrame Export

Use this menu to Export an OMF Composition with Sound Designer II media to a WaveFrame formatted disk as a WaveFrame Project with WaveFrame audio media. Pro Tools Sessions may not be exported as a WaveFrame Project.

01234567890123456789	20 position LCD character positions
<b>WaveFrame Export to:</b> * Disk 0	Top: (Menu Item) Bottom: (Drive SCSI ID #)

### OMF Export

Use this menu to Export a WaveFrame Project (with WaveFrame audio media), or a Pro Tools Session file (with Sound Designer II audio media) to a Macintosh formatted disk as an OMF Composition referencing Sound Designer II audio media files.

01234567890123456789	20 position LCD character positions
<b>OMF Export to:</b> * Disk 0	Top: (Menu Item) Bottom: (Drive SCSI ID #)

To perform the OMF export operation, first select the project that you wish to convert by pressing LOAD TRACK on the MMP front panel. Then use the Wheel to scroll through the names of available projects and select the desired project.

To access OMF Export press SHIFT + SLIP (this accesses the BACKUP function) and use the Wheel to scroll through the Backup menus until "OMF Export to:" is displayed. Press TRIM and select the disk to which you would like to export (shown by SCSI ID number) and then press STO. You will be prompted by the message "Are you sure (y/n)?" to confirm that you wish to perform an OMF export. Press YES to execute the export or press NO to cancel the export. The target disk must be Macintosh-formatted in order to perform the OMF export function. If it is not, the message "Vol does not support format" will be displayed. The newly created OMF project will have the same name as the project from which it originated, but it will be identifiable by the extension ".omf" which is automatically added to the file name of the exported file. The original project from which the OMF project was created will remain unaffected.

## To Import the MMP OMF Export File on Pro Tools

The OMF export files created by the MMP can be imported into the Pro Tools Session format by using the Digidesign OMF Tool software to convert the OMF Composition (EDL file) into the Pro Tools Session EDL format. Sound file data is not re-written for this import step. To get the Digidesign OMF Tool, contact your authorized Digidesign representative, or go to the following FTP site to download the Digidesign OMF Tool:

<ftp://ftp.digidesign.com/pub/support/digi/mac/PTs/>

Once at this site, download the file OMFTool203.sea.hqx onto a Macintosh computer and un-stuff the file. Once you have completed installation of the software, use it to translate the OMF Composition files generated by the MMP into Pro Tools Session files. Then open the Session files directly in Pro Tools.

## Crossfades in OMF

Occasionally a WaveFrame project will have an asymmetrical crossfade that must be adjusted in order to perform an OMF Export, since asymmetrical crossfades in OMF files are not supported. This is very rare, but when this situation does arise the message “OK to conform xfades?” will be displayed. Answering YES will conform the crossfades (make them symmetrical) and the OMF export will be performed. If NO is selected the message “EDL not exportable, try TapeMode convert first” will be displayed. Once the project is converted to TapeMode it is possible to perform an OMF Export without conforming the crossfades. This is because all crossfades are rendered into a single media file per track after using the Tape Mode Convert backup function.

## Tape Mode Export to OMF

The WaveFrame format allows “holes” to exist in a sound file, a capability that preserves disk space when working in the MMR/MMP Tape Mode. The Macintosh file system does not allow this, so Tape Mode projects exported to the Mac take more space because the “holes” in the file are written as digital silence and take up disk space. However, when projects that were created in Tape Mode in the WaveFrame format are exported as OMF Compositions and Sound Designer media files, each event in the track will be exported as a separate sound file rather than allocating continuous space for the entire track. This saves drive space when going to the Macintosh file system.

Note that this affects only the export of Tape Mode projects to OMF. Using the Tape Mode Convert capability (in the Backup menu) will cause the new files to be “flattened out” so that the track is written as one continuous piece of audio media. Because of this change, the OMF export composition will be seen by the MMR/MMP as a Non-destructive Record mode project, not a Tape Mode project.

## Pro Tools Export

Use this menu to Export a WaveFrame Project, or an OMF Composition with Sound Designer II media to a Macintosh-formatted disk as a Pro Tools Session file with Sound Designer II audio media.

01234567890123456789	20 position LCD character positions
<b>ProTools Export to:</b>	Top: (Menu Item)
<b>* Disk 0</b>	Bottom: (Drive SCSI ID #)

Pro Tools files may be Backed up to a Macintosh disk, Converted to Pro Tools Tape Mode Sessions, or may be exported to a Macintosh disk as an OMF Composition referencing Sound Designer II audio files. Export directly from Pro Tools Session format to the WaveFrame file format is not supported, although you may export a Pro Tools Session as an OMF file and then export the OMF file to the WaveFrame format. As explained elsewhere in this document, you may also Export OMF or WaveFrame files as ProTools Sessions. Exporting a Pro Tools Session as an OMF file to the same disk is a very fast operation since it will only rewrite the Session EDL as an OMF Composition, but will not rewrite the audio files.

## Export As

The Export menus allow for changing the name of a file when it is exported. After pressing STO to initiate an Export, the Menu changes to allow entering a new name. It is also possible to use Export As to make a copy of the Project (EDL) under a different name to the same disk as the original file. Audio files will only be copied if they do not already exist in the proper format on the target SCSI device.

01234567890123456789	20 position LCD character position
Pro Tools Export As: * <u>M</u> MR Project Name	Top: (menu name) Bottom: (Enter new file name)

The MMR/MMP software only allows writing to WaveFrame or Macintosh HFS disk volumes. If an attempt is made to Backup, Export, or Convert to a disk that is not in one of these formats, an error message is shown:

01234567890123456789	20 position LCD character position
File Vol does not support format	Top: (menu name) Bottom: (Error message - scroll to read entire message on LCD)

## Dynamic Backup Status Display

Clear the display and press SHIFT + SLIP (Backup) to interrogate the current status of the backup process. The current status (percent complete) for the Backup, Tape Mode Convert, and OMF Export functions in the Backup Menu is dynamically updated and will display progress all the way to completion as it goes.

## Using Registers

There are 21 time code registers (10 memory registers and 11 special-purpose registers) that hold time code values for immediate or future use. Some of the special-purpose registers are automatically filled when tracks are loaded (e.g., HEAD, TAIL), others are updated according to the current play or stop time code reading (e.g., PREV, NEXT), while others (notably memory registers 0 - 9) are entered either manually or through using CAPT, STO, or RCL functions. The register currently displayed on the lower line of the LCD is called the *active* register. By default, the active register is the entry register, which is the register used to capture manual time code input from the keypad.

Accessing registers is done using a two-keystroke command sequence which consists of the function (store, recall, capture) and the numeric or shifted numeric key associated with the desired register (i.e., 0 - 9). Before pressing the second key, operations can be canceled by pressing the same function key again or by pressing CLR, but are typically ended by completing the full key sequence.

## Recalling Registers

To recall the time code previously stored into a memory register, press RCL (the RCL LED will flash) and then press the desired key (0 - 9). The RCL LED will turn off and the time code from that register will be displayed in the bottom line of the display, with a prefixed heading indicating which register is the currently displayed (active) register. All special-purpose registers may be recalled similarly, first by pressing RCL, then SHIFT+the desired numeric key. Special-purpose registers have their names written on the front panel directly above the numeric key with which they are associated. Note that if RCL is not pressed first, then pressing SHIFT+ one of these special-purpose register keys — LYNX SYNC, IN, OUT, HEAD, TAIL, NEXT EDIT, or PREV EDIT — will cause the transport to automatically locate to the register contents. This is a short cut for RCL + SHIFT+ register key + LOC.

## Capturing the Current Time Code

During any transport state (stop, play, record, etc.), the current time code shown on the top line of the LCD display can be captured into the entry register by pressing the CAPT key. The captured time code can be stored to one of the ten memory registers for later recall, or to one of the five “writeable” special-purpose registers (IN, OUT, OFST, LYNX SYNC, TIME). The capture key places the time code value from the top line of the display into the active time code register in the bottom line of the display. After capturing the time code value the CAPT LED will flash until a target register key is pressed to place the captured time code value into that register. Note that pressing CAPT automatically readies the system to store the value into the target register, as if the STO key had already been pressed. To complete the capture operation, either press a target register key or press CLR to cancel.

## Trimming Time Code Values

Any time a writeable register is shown in the bottom line of the display (usually by being recalled), it can be trimmed as required. There are two types of trimming: *static* and *dynamic*. Dynamic trim is desirable only in certain special situations, and differs from static trim in that the register values are sent to the transport immediately as they are changed. In static trim, register values are sent to the transport at the point where trim mode is exited. Note that Trim mode cancels Jog or Shuttle modes, if active, since Trim, Jog, and Shuttle are mutually exclusive.

To trim the time code in the active register, press TRIM (for static trim) or SHIFT+TRIM (for dynamic trim). The TRIM LED will flash slowly (static trim) or flash quickly (dynamic trim) to indicate trim mode is active. Rotate the Wheel clockwise or press the up-arrow key to increment the time code numbers, or rotate the wheel counterclockwise or press the down-arrow key to decrement the time code numbers.

When the desired value is reached, press TRIM again to exit trim mode. This saves the value as trimmed, while continuing to display the register last trimmed. If you don't want to save the trimmed value, exit trim mode by pressing CLR. This cancels Trim mode and restores the register to its pre-trimmed value.

## Using the Entry Register

In the Normal state, the bottom line of the LCD typically displays the entry register. This register is used for manual time code entry from the keypad. It can be used to update memory registers and the writeable special-purpose registers. Once time code is displayed in the entry register, the MMR-8 can be immediately located to that time by pressing the LOC key. The following methods may be used to enter time code into the entry register while in the Normal state):

- Direct time code entry** Use the numeric keys to type in the time code. The keyed time code will replace any existing time code in the display. Use this method if the time code position is known. Pressing CLR will reset any existing time code in the register to zero, making it easier to enter new time code numbers.
- Capture the time code** Press CAPT during play, record or while stopped. This copies the “play head” time code shown in the top line, at the moment the CAPT key is pressed, to the entry register on the bottom line.
- Recall, Trim, and Store a Register** Recall and trim one of the ten memory registers (using RCL+0 - 9), or one of the special-purpose registers (using RCL+SHIFT+0 - 9), and press the STO key. The register time code value is then copied to the entry register.

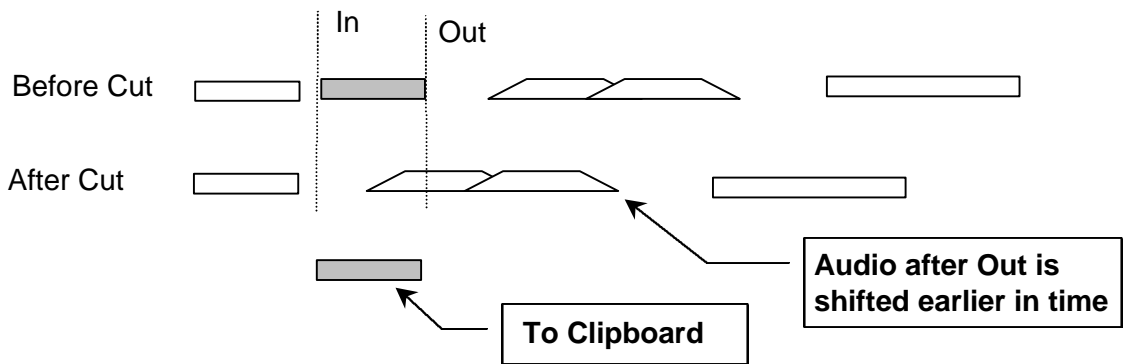
The time code value in the entry register can be trimmed, as required, by using the Wheel or Up/Down arrow keys to increment or decrement the time code before any other action is taken on the time code.

# Editing

The Edit commands activated by the shifted SEL keys perform the indicated edit operation only on those tracks selected while the EDIT key is active. The shifted functions for the SEL keys are *cut* (SHIFT+SEL 1), *copy* (SHIFT+SEL 2), *clear* (SHIFT+SEL 3), *paste* (SHIFT+SEL 4), *insert* (SHIFT+SEL 5), *open* (SHIFT+SEL 6), *undo* (SHIFT+SEL 7) and *redo* (SHIFT+SEL 8). Following are illustrated summaries of these edit operations:

## Cut

*Cut* removes the audio from the selected track(s) between the In point and the Out point and places it into the clipboard, while pulling up (slipping earlier in time) all subsequent events by an amount equal to the length of the cut track segment.

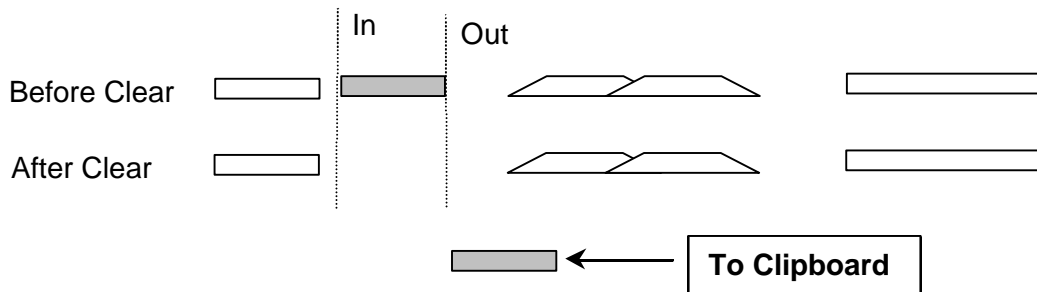


## Copy

*Copy* places a copy of the material that is between the In and Out points on the selected track(s) into the clipboard without altering the audio events on the track(s).

## Clear

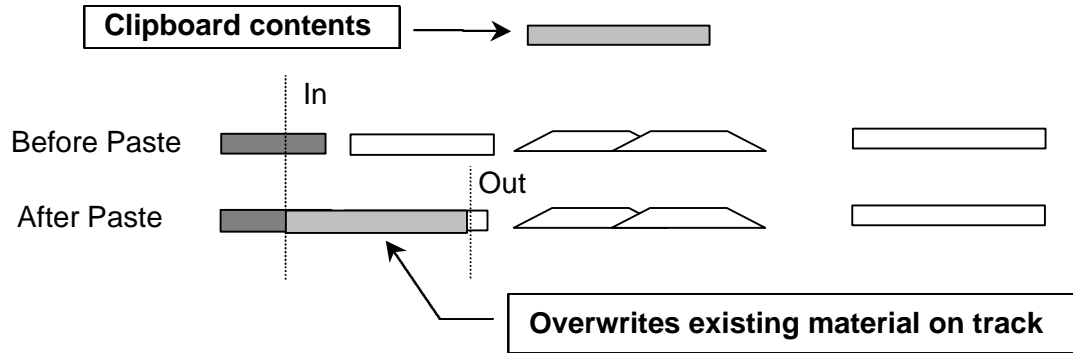
*Clear* removes the events on the selected track between the In and Out points, replacing the audio with silence. It does not affect the position of any other audio material on the track.





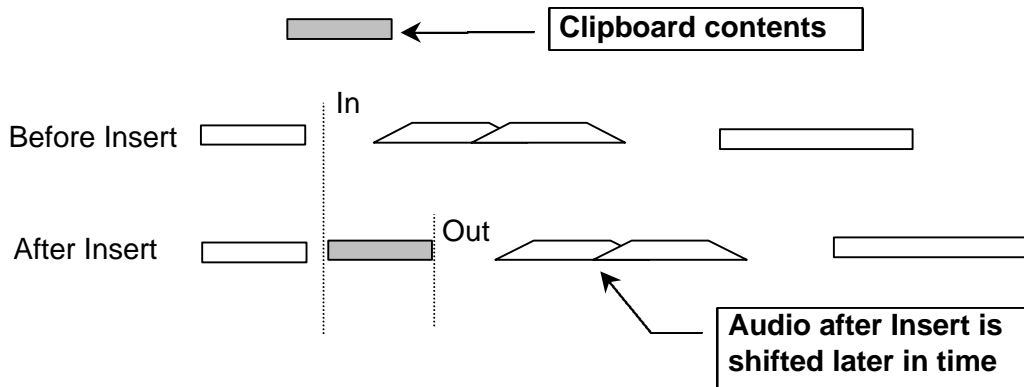
## Paste

*Paste* places the contents of the clipboard into the selected track(s) at the position of the In register and overwrites any existing material on the selected track(s) starting at the In point time and extending for the duration of the clipboard contents. It does not alter the placement of any other material on the track(s).



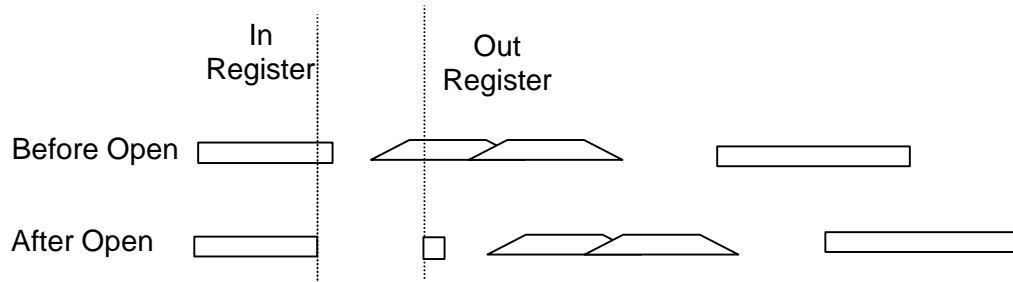
## Insert

*Insert* places the contents of the clipboard into the selected track(s) at the In point time, while moving all subsequent events “down stream” (later in time) by the length of the inserted event(s).



## Open

*Open* places a segment of silence into the selected track(s) equal to the time between the In point register and the Out point register. It functions like an Insert, slipping all subsequent material on the selected tracks downstream in time. Another way to say it is that all material on the selected tracks from the In point onward is moved (or rippled) so that it now begins at the time code location in the Out register. If the In point is within an audio segment on the track, the segment is split at the In point, with material before the In point remaining in place and material after the In point shifted to the position defined in the Out register.



## Undo

*Undo* un-does the last edit operation, which includes undoing the last recording that was ended by pressing the “stop” transport key (only in Non-Destructive Record). There are 100 levels of undo available, accessed by selecting SHIFT and then pressing SEL7 one or more times (while the SHIFT key is active).

## Redo

*Redo* re-does the last undo edit operation, including restoring recordings that were undone (only in Non-Destructive Record). There are 100 levels of redo possible, accessed by selecting SHIFT and then pressing SEL8 one or more times while the SHIFT key is active.

Undo and Redo put the time code registers and Selected tracks to the state they were in before the edit (undo) or after the edit (Redo).

## EDIT

Pressing this key (while in the Normal state) allows the SEL keys to select which track(s) will be later edited (using the SHIFT+SEL edit functions described above). The suggested sequence of keystrokes to follow for editing is:

Press the EDIT key to enter the Edit Track Mode, then the SEL key for the track(s) to be edited.

Set the In and Out points to define the range of material to be affected on the selected track(s).

Press SHIFT + SEL for the desired edit function (Cut, Clear, Copy).

Set the In point to the time code location where the material on the clipboard is to be placed.

While the EDIT key is still enabled (amber LED is on), press the SEL key for the track(s) where the material on the clipboard is to be placed.

Press SHIFT + SEL for the desired edit function (Paste, Insert)

This completes the Edit operation. Note that Open operates differently in that it does not place material from the Clipboard into a track, but instead references the length of time between the In and Out registers and moves the downstream material by that amount.

If material from a single track is placed on the clipboard, but multiple destination tracks are selected, only the first selected track (counting upwards from 1 to 8) will be used as the target for the Paste or Insert.

If multiple tracks are placed on the clipboard, then multiple destination tracks can be selected. Selecting the same number of target tracks as used for the clipboard operation insures the material will be placed on only those tracks. If a different number of target tracks are selected, the Paste or Insert will place the clipboard material consecutively on the selected tracks, starting with the first selected track, up to the limit of the number of tracks selected. For example:

If material is Copied from Track 1, then tracks 3, 4, 6, and 8 are Selected for the target, the Paste operation will only put material on track 3.

If material is Copied from tracks 2, 4, and 6, then tracks 1 through 8 are all selected, the Paste operation will place material on tracks 1, 2, and 3. If only three tracks are selected for the Paste (for example, tracks 3, 5, and 7) then the material will go on those tracks in order.

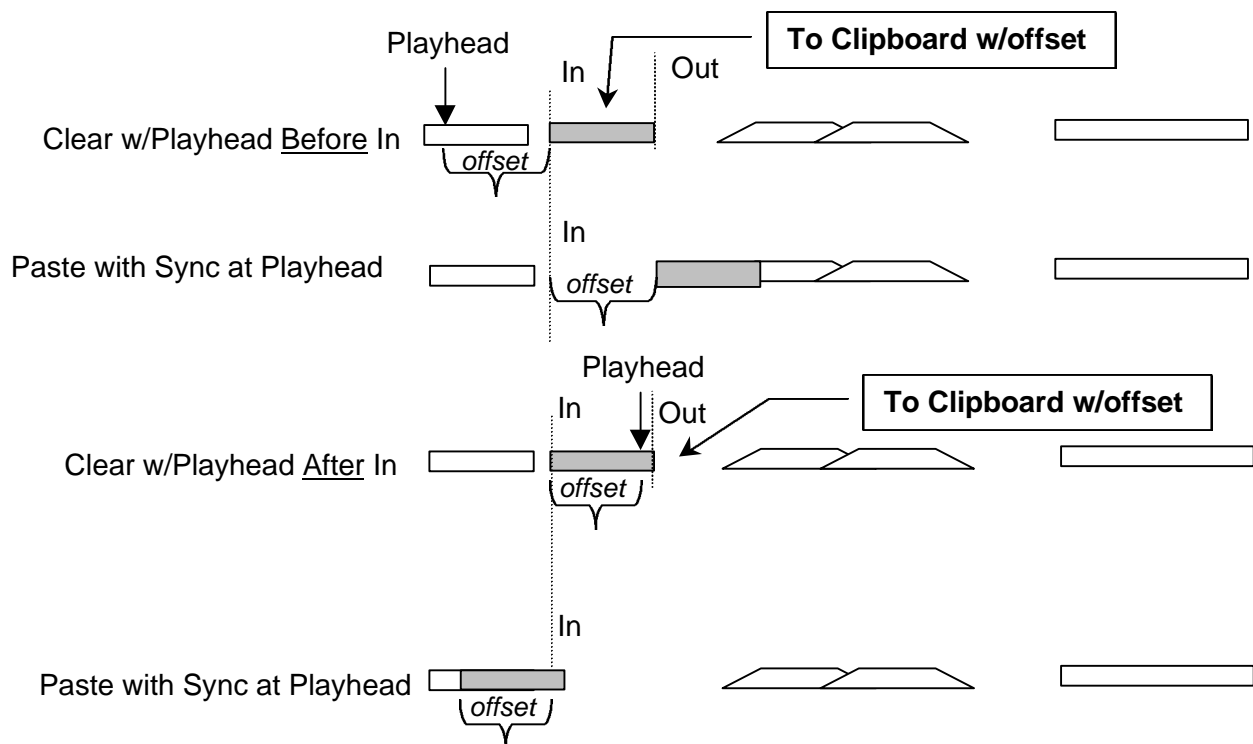
## Edit Sync Mode

The setting chosen in Setup Menu 221 - **Edit Sync Mode** – determines which point in the audio material to be pasted or inserted from the clipboard will be used as the sync reference point for the edit. This is a very important consideration, since the end result of the edit operation may be very different depending on the current setting of this menu parameter when the edit is performed.

The two parameters for this menu are Sync at In Point and Sync at Playhead.

When Sync at In Point is chosen as the Edit Sync Mode, the beginning of the region placed in the clipboard (by executing a Copy, Clear, or Cut operation) will be placed at the current In register time code setting when a Paste or Insert operation is performed. This is the mode illustrated in the graphic representations of the Edit functions shown on the previous pages of this manual.

When Sync at Playhead is chosen as the Edit Sync Mode, the location of the playhead relative to the In register is remembered as an offset when the material is placed on the clipboard (by executing a Copy, Clear, or Cut operation). That offset point (rather than the beginning of the region defined in the clipboard) will be placed at the current In register time code when a Paste or Insert operation is performed. The region defined in the clipboard will be placed at the appropriate location relative to the offset amount defined when the Cut, Copy, or Clear operation was performed. The Playhead offset can be before or after the In point of the material placed on the Clipboard. Here are two examples:



This function is most often used to synchronize a point within an audio segment (for example the point of the Doppler shift in a car drive by) to a specific time code point (the place where the car appears closest in the shot).

## Local & Studio Monitoring

A front panel headphone jack allows the MMR-8 operator to locally monitor one or more tracks, right at the front panel, without affecting the output signals. The rear panel mini-jack output on the PRX card is designed for studio monitoring using a customer-supplied studio monitor amplifier and speaker. The mini-jack level is not controlled by the front panel volume control, and the audio output of the mini-jack always presents a mono sum mix of all tracks according to the track monitor selection chosen on the front panel. Headphone and studio monitoring both follow the Input Monitor selection, so if a track is being monitored and it is switched to Input Monitor, the audio change will be heard in the headphones and studio.

### Headphone Volume (LEVEL)

The headphone monitoring volume is set by the LEVEL control next to the headphone jack.

### Headphone Jack (PHONES)

Even though the Headphone jack is a standard pro-size stereo headphone jack (phone-type), all track monitoring is done in mono. Either low (8 ohms) or high impedance (600 ohms) headphones can be used.

#### HEADPHONE NOTE:

**To prevent hearing damage, always turn the Headphone Level full off before putting on the headphones and leave the Level at a low volume until at least one track has been selected for monitoring.**

## The Lynx Bus

The Lynx bus allows control of the MMP via a TimeLine Lynx Keyboard Control Unit (KCU). Connect the KCU to one of the Lynx bus connectors on the back of the MMP. It is not necessary to have a Lynx 2 module as part of the system, since the MMP behaves as a Lynx synchronizer itself when connected to a KCU. Other Lynx modules may then be connected through the other Lynx bus connector and the entire system (up to a limit of six devices) controlled from the KCU.

To setup the MMP to be controlled from a Lynx KCU, set menu 120 (Lynx Bus) to Slave/KCU and use menu 121 (Lynx Address) to set a valid Lynx address (one not used by any other Lynx device controlled from the KCU). Although normal transport and track arm functions may be controlled from a standard KCU, there is a special version of the Lynx KCU software (version 900) which provides increased support for special MMP functions.

The KCU 900 software provides the following features for controlling the MMP-16 and MMR-8:

- Transport Control
- Track Record Arm/Select (MMR-8 only)
- Slip Track/Region
- Undo/Redo
- Goto Prev/Next Edit
- Goto Head/Tail
- Clear/Paste

Note that No support is provided by the KCU 900 software for the Lynx System Supervisor Unit (SSU)

## Transport Control

The Lynx KCU will recognize the MMP-16 unit and will control all of the normal transport functions of the unit. Note that the KCU does not support reverse play of multiple MMP units. When using the Roll Back key for reverse play, it is first necessary to solo a machine.

## Track Record Arm/Select (MMR-8 Only)

To arm a track for record or to select a track for an edit or goto operation, press the Track key on the KCU and then press the appropriate number key on the calculator keypad to select or arm the desired track. The Slip operation, as well as goto Prev/Next edit, goto Head/Tail, and Clear/Paste will operate only on tracks that have been selected in this manner. If one of these operations is attempted, but a track is not selected, the KCU display will prompt you to select a track first.

## Head/Tail

Hold CLR while pressing the Head or Tail key to set the current time to the beginning or end of the material on the selected track(s). You may then play from that point, or store the value in the desired timecode register (press STO then the appropriate key on the Calculator).

## Slip Track/Region

The K900 KCU software has a Slip key in the place of the key previously labeled END PT in the Special Functions section of the KCU. Pressing this key puts the KCU in a “Trim” mode to allow slipping the selected material forward or backward in time. The selection is defined as all material located between the In and Out timecode registers on tracks that have been armed/selected as described above (see Track Record Arm/Select). Upon pressing Slip, the – and + keys will highlight and the Wheel will be in Trim mode. Use the Wheel or keys to enter a trim value to indicate how far the selected region will be slipped. To end the operation and complete the Slip, press either the Trim key or the Slip key. Note that slipping material within a track will automatically overwrite any previous material on the selected track(s) at the new location.

To slip an entire track, use the goto Head/Tail commands (Hold CLR while pressing the Head or Tail key) to set the current time and then store the value in the appropriate register (press STO then the In or Out key on the Calculator) before executing the Slip command. To slip a single edit in an EDL, use the PREV and NEXT keys in a similar fashion to locate the beginning and end of the Edit on the desired track and store the time value for the beginning and end of the edit region in the In and Out registers before executing the Slip command.

## Prev/Next

Hold CLR while pressing the PREV and NEXT keys to set the current time to the beginning or end of an edited region on the desired track. You may then play from that point, or store the value in the desired timecode register (press STO then the appropriate key on the Calculator).

## Undo/Redo

Hold CLR while pressing the Undo or Redo key to undo or redo the previous edit operation. The MMP-16 supports ten levels of Undo and Redo. The MMP display will indicate which level of Undo or Redo is affected by the operation, up to the maximum or ten.

## **Clear/Paste**

Hold CLR while pressing the Clear or Paste keys to perform these edit operations on the selected material. Clear will remove audio from the selected tracks between the In and Out times, replacing it with silence and will place the material into the MMP clipboard memory. Paste will place the material from the Clipboard memory at the time set in the In timecode register on the selected track.

## The MMR Bus

The operation of multiple MM Units may be synchronized by using the supplied 15-pin sync cable to connect the MM units together via the MMR bus sync connection (the two 15-pin connectors on the SYNC card). Since this bus is self-terminating, simply daisy chain all the MM Units together in any order. The MMR bus supports four independent Sync Groups, so any machine on the MMR bus can be assigned to any of the four groups at any time without changing the physical connections. Also, since the MMR bus carries system-wide frame and sample references, no other connections are required between the various MM Series units to provide sample accurate synchronization lock between them.

Each MMR/MMP Sync Group on the MMR bus must have a Master MMR or MMP unit, with the rest of the units in the Sync Group acting as Slaves to the Master unit. It is only necessary for the Master unit to receive incoming synchronization signals from external sources (digital clock, video sync, SMPTE/EBU, biphasic, etc.) since the remaining units on the associated MMR bus Sync Group will slave only to the Master unit. This allows up to 100 units to work synchronously and sample accurately together as one large machine without having to feed duplicate sync reference signals independently to each unit.

Once the units to be linked using the MMR bus have been physically connected via the MMR bus connection, their transports can be operated together as one large system. There are several Setup menus which are used to govern how each unit behaves within the system. These are described here.

Menu 110 (MMR Bus Request) allows each MMR/MMP to request to be Master, Slave, or off the MMR bus altogether. Only one MMR/MMP per sync group can act as master. If multiple units are set to request master status through this menu, the MMR Bus system will automatically choose the unit with the lowest serial number among those making the request to be set as the master for the sync group. The appropriate MAST or SLAVE LED will light on the front panel to show the unit's status on the MMR bus.

Menu 111 (Ident Request) allows each unit to request an individual identity on the MMR bus. If no other unit is requesting the same ID, the system will set the unit ID to the requested number and that number will be displayed in the Ident window on the front panel of the MMP. If another unit has requested the same ID, the system will resolve the conflict and automatically assign each unit a unique ID on the bus. If an ID other than that requested is assigned due to a conflict, this field will not change, and the machine will continue to request this ID whenever it is powered up or added to an MMR bus chain.

Menu 112 (Ident Assigned) is an information display only (data cannot be entered) that shows the currently assigned identity for this unit on the MMR bus. This number may be different than the ID requested if there is a conflict on the MMR bus and the system has assigned the unit a different ID.

To synchronize a slave unit to the master unit on the bus once the above settings are confirmed, place the slave unit online (press the ONLINE key on the transport).



# Chapter 5 MMR-8 Setup Menus

## The Setup State & the Setup Menus

Setup menus allows individual MMR-8 parameters to be changed, and if desired, saved to one of the ten User settings files. Parameters can also be changed within the current session without saving them to a specific User settings file. Changes made in this way are automatically stored in a system init file and will still be remembered even if the MMR-8 is powered down and restarted.

To enter the Setup state, press SETUP. To exit the Setup state and return to the Normal state, press the SETUP key again, or press CLR. While in the Setup state, a display of various Setup menus and their parameters takes the place of the time code display shown in the LCD in the Normal state.

When the Setup state is activated for the first time after power-up, Setup menu 000 (the Control Mode selection menu) is displayed in the LCD. The Setup menus are divided into ten banks, grouped according to their common functions (see Table 4-1). Scroll through the various Setup menus by rotating the Wheel or using the Up/Down arrow keys. Clockwise (CW) rotation or up-arrow incrementally scrolls upward through the menus, while counterclockwise (CCW) rotation or down-arrow scrolls downward through the menus. The scrolling wraps around at the end of the list (thus menu 990, the highest menu in the 900 bank, is displayed when the wheel is rotated CCW from menu 000, and vice versa). Jump directly to any menu bank by pressing a numeric key while in Setup. For example, pressing 2 will jump the display to menu 200 (Record Mode), which is the first menu in the 200 bank.

BANK #	BANK DESCRIPTION
000	Basic Setup (Control Mode, frame/sample reference, etc.)
100	Bus Control (sync group, MMR/Lynx bus, interlock)
200	Transport Control (Record modes, Loop modes, pre/post roll, etc.)
300	Biphase (pulse rate, motion limits, start/end limits, acceleration)
400	Remote Control (parallel remote)
500	Audio parameters (input source, calibration, reference level & tone)
600	Digital I/O (format, delays, sample rate conversion & reference tracks)
700	Disk (recording file type, formatting, cleanup, archive)
800	Tracks & Projects (project name, track prefix)
900	System (store/recall settings, date & time, LED brightness, serial #)

### The Ten Setup Menu Banks

The JOG and SHTL (Shuttle) keys above the Wheel take on their alternate reversed text-labeled functions (left and right arrows) when pressed during Setup. Note that these are not shifted functions, but alternate functions that occur in the Setup or Track states. These keys typically affect window scrolling, but in some cases move a cursor to different points in displayed information.

When trimming is active (press TRIM), rotating the Wheel or pressing the Up/Down arrow keys scrolls through the available selections for the current menu. These selections also usually “wrap around.” If the menu requires a single numeric value, the wheel or arrow keys will increment or decrement the numeric value, but it will not “wrap around” once the top or bottom of the range is reached. For character and time code items, the left/right arrow keys usually control the position of the cursor (and therefore which character or digit is changed), rather than horizontally scrolling the window.

## Setup Operation

There are various types of Setup menu items, each with its own particular behavior. Many scroll through a set of multiple-choice selections; others simply display information that cannot be altered, such as a version or serial number. The top line of the LCD in Setup lists the menu number and name, while the bottom line shows the current menu item value. Here’s a typical example:

01234567890123456789	LCD character positions (left to right)
<b>000 Control Mode</b>	(Setup Menu Item number and name)
<b>*Biphase Chase</b>	(The current parameter choice)

The asterisk (\*) directly before the item value indicates that the displayed value is the currently selected value.

To scroll through the parameters in a menu of this type, press the TRIM key (the LED above TRIM will turn on) and then rotate the Wheel or press the up/down arrow keys. Each choice will be sequentially displayed. Once the desired parameter is shown in the display, press STO (the Store key). This activates that choice, placing an asterisk in the display, and exiting trim mode. At this point, rotating the Wheel or pressing the arrow keys will again scroll through the menus. To stop scrolling through the parameter list without saving any changes, press TRIM again. To exit Setup and return to the Normal state, press SETUP or CLR. Exiting Setup does not save a value, but exits without changing the current menu item’s value. Exceptions to this are the few menu items that update dynamically as they are changed, such as LED brightness (menu 920).

The next pages provide a chart of all of the MMR-8 menus and the parameter choices for each menu item. Following the chart, some of the menus and the parameter choices they present are discussed in more detail.

## Setup Menu Chart

The following chart shows all MMR-8 Setup menus and parameters, Note that \* indicates the default selection.

MENU #	MENU NAME	PARAMETERS
000	Control Mode	Local/MMR* Time Code Chase Biphase Chase Serial Transport Editor Varispeed
001	Frame Reference	Automatic* Video
002	Sample Reference	Automatic* AES/EBU Input Ext Wordclock
003	Time Code Type	24/24 25/25 29.97/DF 29.97/NDF 30/DF 30/NDF*
004	Sample Rate	42294 (44x23/25) 42336 (44x24/25) 44056 (44100-) 44100 44144 (44100+) 45938 (44x25/24) 45983 (44x25/23) 46034 (48x23/25) 46080 (48x24/25) 47952 (48000-) 48000* 48048 (48000+) 50000 (48x25/24) 50050 (48x25/23)
006	Varispeed Rate	100% * (range 88.5% to 104.3%)
100	Sync Group	1* 2 3 4

MENU #	MENU NAME	PARAMETERS
110	MMR Bus Request	Master Off* Slave
111	Ident Request	Auto Assign* 01 (Range 01-100)
112	Ident Assigned	01* (Range 01–100 read-only display)
120	Lynx Bus	Off* Slave/KCU Master
121	Lynx Address	1* Range: 0 through 127
122	Lynx V500 Mode	Off* On
200	Record Mode	Non-Destructive* TapeMode
201	All Safe	Off* On
202	Record Key	Record+Play* Record
203	Rehearse key	Rehearse+Play* Rehearse
210	Loop Mode	Play Repeatedly* Play once and Cue Play once and Stop
211	Loop Record	Repeat Record* Record Once Only Repeat w/Unload
212	Pre-Roll	00:00:05:00*
213	Post-roll	00:00:02:00*
220	Next/Prev Mode	Event* Cue
221	Edit Sync Mode	Sync at In Point* Sync at Playhead
230	TapeMode Start	01:00:00:00* (Range 00:00:00:00 to 23:59:59:29)
231	TapeMode Length	00:10:00:00* (Range 00:00:00:00 to 23:59:59:29)

MENU #	MENU NAME	PARAMETERS
240	Dailies Mode	Off* On
250	Slip Commit	All Tracks* Track 1 [lists all tracks through Track 8 on MMR-8, Track 16 on MMP-16] Track <i>N</i>
300	Biph Frame Rate	24 fps* 25 fps 30 fps
301	Biph Pulse Rate	2 ppf 4 ppf 10 ppf* 20 ppf 25 ppf 50 ppf 100 ppf
302	Biphase Input	Biphase* Tach + Dir Tach + Inverse Dir
400	Editor Device	TASCAM MMR-8* Sony PCM-7030 Sony BVU-950
401	Editor Auto EE	Off* On
402	Editor Edit Fld	Auto* Field 1 Field 2
403	Editor Trk Arm	Digital Audio* Analog A1-A4 Local Local [enbl=A1] Local [enbl=A2] Local [enbl=A3] Local [enbl=A4]
404	Editor Chase	Disabled * Timecode Biphase
410	Parallel Trk Arm	Pulse (toggle)* Pulse w/ Auto Rec Hold Hold w/ Auto Rec Pulse In + Out
420	MIDI Device Id	74* (Range 1 to 127)

MENU #	MENU NAME	PARAMETERS
500	Input Source	Analog* Digital Rate Converter
501	Auto Input	Rec Only Rec or Non-Play* Rec or Rec-Ready
510	Crossfade	10 ms* Range: 0 through 100
520	Meter Ref Level	-20 dBFS* Range: -15 through -24 dBFS
521	Meter Calibrate	Off* On
522	Clip LED on Play	Off* On
530	Reference Tone	Off* 1kHz
540	Gapless Punchout	On* Off
550	Remote Meter Source	MMR Bus* Local
600	Digital In Ref Track	1* 3 5 7
602	Digital In Delay	Internal* Number of Samples (Range:1 through 255 Samples)
610	Digital Out Delay	Internal* Number of Samples (Range:1 through 255 Samples)

MENU #	MENU NAME	PARAMETERS
700	Disk Encoding	WaveFrame 16-bit* WaveFrame 24-bit Pro Tools 16-bit Pro Tools 24-bit
701	Record Disk	SCSI Disk 0* [Shows SCSI Disk ID Number (Range 0 to 7)] None
710	Disk Initialize	Press STO
711	Disk Low Format	Press STO
720	Disk Cleanup	Press STO
790	Drives Mounted	[shows list in format: 0,1,2,3,4,5,6]
800	Project Name	MMR Project*
810	Track Prefix	MMR Trk*
900	Store Settings	User 1 [through] User 10
901	Recall Settings	Default User 1 [through] User 10 Previous
910	Set MM:DD:YY	Date: __:__:__
911	Set HH:MM:SS	Time: __:__:__
912	Change Password	Press STO
920	LED Brightness	8* Range: 0 through 15
940	Machine Name	Unnamed machine*
950	IP Address	000.000.000.000
951	IP Netmask	255.255.255.255
952	IP Gateway	000.000.000.000
980	Serial Number	Read – only display
990	Software Version	Read – only display
995	Load Software	Press STO key

## 000 Basic Setup

This menu bank has settings for the most fundamental settings governing how the MM series machine responds to external clocks and control. The items in this bank are:

- Control Mode
- Frame Reference
- Sample Reference
- Timecode Type
- Sample Rate
- Varispeed Rate

## 000 Control Mode

The MMP-16 will always operate in one of six Control modes. The default Control mode, which is how the MMP-16 starts up when the unit is first installed, is called the Local/Bus Control Mode.

To change the Control mode, select Setup menu 000 (press SETUP to display the Setup menus). Whenever the MMP-16 is powered up, the first menu displayed will always be menu 000 (“Control Mode”). Afterwards, the menu displayed when entering Setup mode is the last menu displayed. Once Setup menu 000 (“Control Mode”) is displayed, press TRIM to change the Wheel and the Up/Down arrow keys to scroll through the seven menu choices under Setup menu 000. Once the desired operating mode is displayed, press STO (the Store key) to select that choice. This immediately switches the various parameters to the new control mode, typically causing several LEDs to change status according to the new parameters. To exit Setup mode, press SETUP or the CLR (Clear) key.

Following is a more detailed description of the six control modes that are supported by the MMP-16:

### Local/Bus

In local mode (offline) the MMP-16 functions like other stand-alone digital playback devices. No external sync signals are required. The front panel transport keys offer direct control over system audio playback. When placed into bus (online) mode, the MMP-16 can function as either a master or a slave to other MMR bus or Lynx bus devices, as set through Setup menu 110 (MMR Bus) and menu 120 (LYNX bus).

### Time Code Chase

In Time Code Chase, the MMP-16 will slave to the time code coming from the time code input on the rear panel when it is placed Online. In this mode the time code input must have valid time code in order for the MMP-16 to chase, lock, and synchronize itself to the incoming time code. Pressing any of the transport keys will take the MMP-16 off-line and allow local control at any time. Placing the MMP-16 back online will cause it to lock to and chase the selected time code once again.

### Biphase Chase

In Biphase Chase, the MMP-16 chases, interlocks, and synchronizes to a biphase or tach/dir. signal on one of the four Biphase Inputs (the active input is determined by the Sync Group number set in menu 100). The system locks and plays audio at speeds from 0 to 1.5 times play speed in both forward and reverse directions. The MMP-16 can then serve as a master for other devices on the MMR or Lynx buses.



## **Serial Transport**

This mode allows the MMP-16 to control an external audio or video transport connected to the 9-pin serial Transport connector. Video and audio decks using the P2 protocol can be controlled (including models from Accom, Alesis, Ampex, Fostex, JVC, Otari, Panasonic, Sony, and TASCAM). When in Serial Tran mode, the MM series unit will output transport commands to external serial devices through the 9-pin serial Transport output using Sony P-2 protocol. The unit will then lock to the external serial device via linear timecode coming from the device through the MM unit's timecode input (not through serial timecode).

## **Editor**

Using the Editor connector (and Sony P2 protocol) a video editor or other non-Lynx synchronizer can control the MMP-16 transport functions when the MMP-16 Control Mode is set to Editor. When in Editor mode, the MM series unit will respond to transport and track arming commands coming in to the 9-pin serial Editor port. This setting is typically used with traditional video edit controllers.

## **Varispeed**

Varispeed mode allows for setting playback speed within a range of 87.5% to 112.5% of nominal play speed. This range varies according to the sample rate selected. Varispeed varies the playback frequency as well as the digital sample clock on the digital output.

## **Serial Editor Port Details**

There are a number of important details to note about the Serial Editor port as noted below.

### **Record Ready Tallies**

Record ready tallies issued over the 9-pin serial Editor port now include tracks armed at the MMR-8 front panel or MM-RC, and not just those tracks armed by serial command. This allows an external Serial device to know when a track has been armed for recording, regardless of the source of the track arm command.

### **Sony P2 Chase and Offset Commands**

Sony P-2 protocol Chase and Offset commands are accepted by the MMR/MMP. Setup Menu 404 allows for setting the chase source to either Timecode, Biphase, or Disabled.

### **Serial Editor Port Active When Not ONLINE**

The MMR/MMP unit will follow transport, track arm, and record commands given on the 9-pin serial Editor port even when the unit is not ONLINE.

### **Automatic ONLINE**

The MMR/MMP unit will automatically be placed in the ONLINE state when placed in Chase via the serial 9-pin Editor port.

### **Local Machine Response to Serial Record Commands**

Serial record arm and punch in/out commands are honored locally on each machine, regardless of whether it is acting as an MMR Bus slave or master machine. These commands are not propagated across the

MMR Bus to other machines, and serve only to activate the machine to which the Serial control device is directly connected.

### **Program Speed Play**

The MMR/MMP responds in a very controlled way to Sony Program Speed Play commands. The status response during Program Speed Play indicates Play mode, with the VAR bit set in byte 2 of the Sony Status array.

### **Editor Mode Operation Without Video Reference**

The Editor Control Mode (set via Setup Menu 000) will not force the Frame Reference (Setup Menu 001) to Video, and will allow operation of the MMR/MMP without a valid video sync reference source attached to the MMR/MMP. It is highly recommended to have such a source when operating in this mode, and to set the Frame Reference Setup Menu to Video, but the system does not require it and will allow operation even if no such source is detected. If the controlling device is synchronizing the MMR/MMP via the serial Editor port, it is essential to provide a video reference to insure correct operation and synchronization.

### **Hybrid Protocol on Serial Editor Port**

The MMR/MMP internal communication protocol (TimeLine's Hybrid Protocol) can be accessed via the serial 9-pin Editor control port. This is most useful for companies which want to exercise remote control (from some other device) of MMR/MMP features not supported via any of the other standard remote interfaces. Requests for Hybrid Protocol information and documentation should be directed to the Marketing Director at TimeLine Vista, Inc. at (760)761-4440, or via email request to: [TimeLine@digaudio.com](mailto:TimeLine@digaudio.com).

## **001 Frame Reference**

These settings determine the source of the MM unit's video frame reference signal.

### **Automatic**

Sets the unit to automatically use an internal video reference if no external reference is available. This is the default value.

### **Video**

When set to Video, the MM unit will reference the video signal coming into the Video In port on the back of the machine.

## **002 Sample Reference**

These settings determine the source of the MM series unit's digital sample clock reference signal.

### **Automatic**

Sets the unit to automatically use an internal word clock reference if no external reference is available. This is the default value.

### **AES/EBU Input**

When set to AES/EBU Input, the MM machine will reference the digital sample clock of the AES/EBU signal coming in on the machine's Digital In port.

## Ext Wordclock

When set to external word clock Input, the MM machine will reference the digital sample clock of the external word clock signal coming in on the machine's external word clock BNC connector.

## 003 Timecode Type

The following timecode types are provided as choices in this setting:

- 30ND (default)
- 30DF
- 25/25
- 24/24
- 29ND
- 29DF

## 004 Sample Rate

The following digital sample rates are provided as choices in this setting:

- 42294 (44x23/25)
- 42336 (44x24/25)
- 44056 (44100-)
- 44100
- 44144 (44100+)
- 45938 (44x25/24)
- 45983 (44x25/23)
- 46034 (48x23/25)
- 46080 (48x24/25)
- 47952 (4800-)
- 48000 (default)
- 48048 (4800+)
- 50000 (48x25/24)
- 50050 (48x25/23)

## 006 Varispeed Rate

This setting allows for setting a varispeed playback rate. This function allows playback of audio over a range of speeds from 88.5% to 112.5% of nominal play speed. This range varies according to the sample rate selected. Varispeed varies the playback frequency as well as the digital sample clock on the digital output. The precise speed can be set from ViewNet in increments of .01% over the entire range.

This function works by changing the sampling rate of the unit and this is reflected in the sample rate of the digital audio output stream from the MMR/MMP, which will vary according to the speed set in this menu. This is different from the jog/shuttle mode because that mode produces a constant sample rate output while scrubbing audio off speed. Note that the Varispeed Mode is mutually exclusive with Timecode Chase or Biphase Chase and thus the unit cannot be synchronized to an external source while in this mode.

The default value is 100%.

## 100 Bus Control

### 100 Sync Group

Sets the MMR Bus sync group assignment for the MM series unit. Default is 1.

### 110 MMR Bus Request

Sets the status request for the MM series unit on the MMR Bus.

- Off      The MM unit will not be active on the MMR Bus (default).
- Slave    The MM unit will request to be a Slave on the MMR Bus.
- Master   The MM Unit will request to be the Master on the MMR Bus.

### 111 Ident Request

Sets the unit ID (Ident) request for the MM series unit on a particular MMR Bus sync group. This value can be any number between 00 and 99, or can be set to Auto. When Auto request is on, the system will assign ID numbers based on when units become active on the bus and their unique serial numbers. The recommended practice is to assign units to unique individual ID numbers and to avoid using the Auto setting. If a conflict arises, the system will automatically resolve it and will not allow duplicate ID numbers. Default is auto assign.

### 112 Ident Assigned

This setting shows the Ident assigned for the MM series unit on the MMR Bus. Since there can be no duplicate ID numbers on the MMR Bus Sync Group, it is possible that some units will be assigned a status other than that requested.

### 120 Lynx Bus

Sets the MM series unit's status on the TimeLine Lynx bus.

- Off      The MM unit will not be active on the Lynx Bus (default).
- Slave    The MM unit will request to be a Slave on the Lynx Bus.
- Master   The MM Unit will request to be the Master on the Lynx Bus.

### 121 Lynx Bus Address

Sets the Lynx bus address for the selected MM series machine. The default is 1.

### 122 Lynx Bus V500 Mode

Sets the MM series machine to work with TimeLine Lynx V500 software. The default value is off.

# 200 Transport

## 200 Record Mode

### Non-Destructive

When Non-Destructive record mode is active, each new recording operation (punch in/out) records the material into new audio files on the disk, and does not delete any previously existing audio material on the disk. Each punch in/out operation creates a new audio segment in the Project EDL and each will appear as a separate audio element if the project is loaded into a digital audio workstation for later editing.

In a mix situation where the MMR punches in many times over the same area of the project (typical for a post production mix), disk space will be used up by multiple recordings which may not need to be kept. To reclaim disk space used by recordings that are no longer needed, use menu 720 (Disk Cleanup) to reclaim the disk space used up by audio that is no longer referenced in the EDL.

### Tape Mode

Tape Mode functions very much like a linear tape recorder. Each track is viewed as a single continuous piece of audio recording media and new recordings will directly overwrite existing material. This mode does not allow for undoing a recording once it is made. Tape Mode is more efficient when punching in and out across multiple tracks, and is recommended for use in post production mix applications.

When using Tape Mode, a start time for the tape must be set in menu 230 (Tape Mode Start). The “length of the tape” is limited by the amount of available disk space and also limited because the WaveFrame file system used by the MMR for recording has a single file (track) size limit on the drive of 1 GB. This means that, unlike the other record modes, it is not possible in Tape Mode to scatter audio recordings anywhere within a 24 hour span of time on the timeline while recording. Setting an appropriate start time is important since the length of the “tape” is limited to a range of approximately three hours total. Thus, if a project is to be created so that it will lock to incoming timecode that starts at 6 hours, for example, choosing a Tape Mode start time of 1 hour will make this impossible unless a machine offset is used. Choose a start time that will allow the usable “tape” to fall within the confines of project time code settings. The default Tape Mode start time is 1 hour. Attempting to record past the allowable file length will produce the error message “SFFS Length Exceeded”. There is approximately two minutes of “tape pre-roll” available for recording before the tape start time. Attempting to record before this time produces the error message “Punch In before Tape Start”.

Editing is not allowed while in Tape Mode. To edit a project created in Tape Mode, set the Record Mode (menu 200) to Non-Destructive. Once a Tape Mode project has been edited, it may not be recorded into again using Tape Mode (it is now a non-Tape Mode project).

Recording new audio into a Tape Mode project while the Record Mode is set to Non-Destructive turns the Tape Mode project into a non -Tape Mode project. Once changed in this fashion, the mode cannot be reset to Tape Mode for this project. It is also not possible to set the Record Mode to Tape Mode if a non-Tape Mode track is loaded into any of the track indexes. Note that it is possible to convert a non-Tape Mode project into a Tape Mode project with the MMR Backup function by using the Tape Mode Convert option. This is accessed by pressing LOAD TRACK, choosing the project to be backed up, then pressing SHIFT + SLIP to enter the Backup state. Choose Tape Mode Convert from the backup menu to rewrite the chosen project as a Tape Mode project on the target drive. When Tape Mode is set as the Record Mode in menu 200, the Destructive machine status LED will light.

## 201 All Safe

Sets all tracks to record-safe mode. Tracks cannot be armed for recording when this setting is on. The default is off.

## 202 Record Key

Allows for setting the Record function to work by pressing only the Record key, or by pressing PLAY + RECORD.

## 203 Rehearse Key

Allows for setting the Rehearse function to work by pressing only the Rehearse key, or by pressing PLAY + REHEARSE.

## 210 Loop Mode

Sets the behavior of the MM series machine when the Loop function is active. The choices are:

- |                    |  |
|--------------------|--|
| Play Repeatedly    | Loops until the transport is stopped (default).  |
| Play Once and Cue  | Plays once from pre-roll before In to post-roll after Out then cues to pre-roll before In point and stops. |
| Play Once and Stop | Plays once from pre-roll before In to post-roll after Out then stops at end of post-roll.                  |

## 211 Loop Record

Sets the behavior of the MM series machine during Loop Record operation. Choices are:

- |                  |  |
|------------------|--|
| Repeat Record    | Loop Record until the transport is stopped (default).  |
| Record Once Only | Records once from In to Out then cues to pre-roll before In point and stops.   |
| Repeat w/Unload  | Record from In to Out then unloads track and records new track. Loop record continues, creating a new track with every loop until stopped. |

## 212 Pre-roll

Sets the amount of time before the In point (called the pre-roll amount) used for loop play and record functions. The default value is 00:00:05:00.

## 213 Post-roll

Sets the amount of time after the Out point (called the post-roll amount) used for loop play and record functions. The default value is 00:00:02:00.

## 220 Next / Previous Mode

Sets which type of edit is used to determine the location of the next and previous edit points when working with WaveFrame projects only. These edit points are used in the Go to Next or Go to Previous edit commands in the transport control section of the ViewNet interface. The default value is Event.

- |       |  |
|-------|--|
| Event | Moves the playhead to the next or previous WaveFrame Event. See the WaveFrame documentation for information on events. |
| Cue   | Moves the playhead to the next or previous WaveFrame Cue. See the WaveFrame documentation for information on cues.     |

## 221 Edit Sync Mode

This setting affects where a clip will be pasted during an edit operation.

- In point Sets the paste to place the beginning of the region stored in the clipboard at the In point. (default value)
- Playhead Sets the paste to place the contents of the clipboard to the selected edit tracks in the same position relative to the Playhead as those contents occupied when the material was placed on the clipboard.

## 230 Tape Mode Start

TapeMode requires a start time to use as a time stamp for the audio files. Set the TapeMode start time using this setting. The default value is 01:00:00:00.

## 231 Tape Mode Length

TapeMode requires a defined project length. Recording is not permitted past the end of the project. Set the TapeMode length using this setting. The default value is 00:10:00:00.

## 240 Dailies Mode

When Dailies Mode is on, and the MMR is ONLINE in Timecode Chase Mode, the MMR will record audio on armed tracks whenever incoming timecode is present. To initiate recording it is necessary to arm at least one track, lock the MMR to external timecode, and to put the MMR-8 into the record state. When timecode stops, the MMR-8 transport will stop, but the unit will remain in a record ready state until timecode is received again. When valid timecode is again present, the MMR will automatically locate to the incoming timecode position and go into record. All files will be “stamped” with the timecode location at which the recording is made. The default value is off.

## 250 Slip Commit

The Track Slip function on the MMR/MMP works by changing the value of a track offset register. This slip offset is volatile and will be cleared when a new Project or track is loaded. When a track slip is committed using this setting, the amount of the slip for the selected track(s) is incorporated into an edit operation which changes the track EDL to reflect the new timecode location for all audio events on the track. This change is automatically saved to disk for WaveFrame and Pro Tools projects (not for other formats since they cannot be saved to disk) and the EDL is immediately updated.

The Slip Commit menu allows for committing all tracks which have a slip offset, or of choosing only a specific track. The default value is to commit all track slips.

## 300 Biphase

These settings are used to control the behavior of the system while in Biphase Chase control mode.

### 300 Biphase Frame Rate

Sets the frame rate used when the system is in Biphase Chase mode. Frame Rate choices are:

- 24 Frames per second (default value)
- 25 Frames per second
- 30 Frames per second

## 301 Biphase Pulse Rate

Sets the frame rate used when the system is in Biphase Chase mode. Frame Rate choices are:

2	Pulses per frame (ppf)
4	ppf
10	ppf (default value)
20	ppf
25	ppf
50	ppf
100	ppf

## 302 Biphase Input

Sets the type of Biphase input signal required for operation in Biphase mode. Choices are:

Biphase Input (default value)
Tach and Direction
Tach and Inverse Direction

## 400 Remote

These settings are used to control the behavior of the system while being remotely controlled by other devices or controllers.

## 400 Editor Device

Sets the Sony 9-pin control personality while in the Edit control mode.

## TASCAM MMR-8

This is the default setting. The TASCAM MMR-8 is the only setting which allows arming of all eight digital tracks on the MMR. This is the default setting.

## Sony PCM-7030

Emulates operation of a two-channel DAT machine. Only tracks one and two can be armed for recording via the 9-pin port. All tracks can be armed locally or via the TASCAM MM-RC Remote Control Unit.

## Sony BVU-950

Emulates operation of this ¾" video deck. Only tracks one and two can be armed for recording via the 9-pin port. All tracks can be armed locally or via the TASCAM MM-RC Remote Control Unit.

## 401 Editor Auto EE

This setting allows input monitoring when the MM series unit's transport is in Stop. The default value is off.



## **402 Editor Edit Field**

This setting allows the choice of three insert modes, Auto, Field 1 and Field 2.

### **Auto**

The MM series unit will insert the edit at the field number in which the record command is received. This is the default setting.

### **Field 1**

The MM series unit will insert the edit in the first (odd) field depending on the selection.

### **Field 2**

The MM series unit will insert the edit in the second (even) field depending on the selection.

## **403 Editor Track Arm**

This setting allows the choice of several different track-arming modes.

### **Digital Audio**

Used with devices that have digital track arming capability. This is the default setting.

### **Analog A1-A4**

Only tracks 1 through 4 may be armed remotely.

### **Local [enbl+any]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on any video or audio channel.

### **Local [enbl+Aud]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on any audio channel.

### **Local [enbl+A1]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on audio channel 1.

### **Local [enbl+A2]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on audio channel 2.

### **Local [enbl+A3]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on audio channel 3.

## **Local [enbl+A4]**

All tracks may be armed locally, and unit will follow serial track record or rehearse commands coming in on audio channel 4.

## **404 Editor Chase**

This allows for setting the only P-2 protocol chase source to either Timecode, Biphasic, or Disabled. This governs how the MM series unit responds to Sony 9-pin Chase and Offset commands. The default setting is disabled.

## **410 Parallel Track Arm**

This sets the method used to arm tracks from the parallel tracks port on the MMR-8. The choices are:

- Pulse (Toggle) (default setting)
- Pulse w/Auto record
- Hold
- Hold w/Auto record
- Pulse In+Out

## **Parallel I/O Details**

There are a number of details to note regarding the operation of the Parallel I/O functions.

### **Dedicated Record/Rehearse ON/OFF pins**

Two pins will initiate Record ON and Record OFF commands on the Parallel Transport port. The pins activated for these commands are pin #1 for Record ON and pin #2 for Record OFF. These pins differ from the Record pin (pin #35) in that they have no connection to the MMR motion control unit, do not require the concurrent activation of the Play pin, and will not affect the ONLINE status of the MMR-8. Rehearse mode may be achieved by holding the Preview pin (pin #36) low while pulsing the Record ON pin (pin #1). A chart showing the complete pin assignments for the Parallel Tracks and Parallel Transport connectors is given in Appendix D at the end of this document.

### **Lock Tally Out**

A system lock tally is provided on pin #28 of the Parallel Transport port. This active low lock tally signal is provided when the system transport achieves lock status as indicated by the >L indication in the LCD window and illumination of the LOCK LED.

### **Record Punch to Local Only**

Record punch in and out commands will only be honored on the machine to which they are directed, and will not cause other machines which may be connected via the MMR Bus to respond to these commands. This means punching via the parallel port on the MMR Bus Master machine, will only affect that machine and will not propagate via the MMR Bus to any Slave machines.

## **420 MIDI Device ID**

The sets the MM series unit's MIDI device ID for use with MIDI machine control devices. The MMR/MMP responds to MIDI Machine Control (MMC) messages received on the unit's MIDI In port. To set the MMC address, go to Setup Menu 420, press Trim and set the appropriate MIDI Device ID number for as required by the device transmitting the MMC messages to which the MMR/MMP will respond. The range of available MIDI device ID's is 1 to 127, with the system default being 74.

## 500 Audio

These settings are used to control the behavior of the system audio functions.

### 500 Input Source

This sets the ports and processes used for audio input sources.

Analog	Input is from the analog audio input connector (default)
Digital	Input is from the digital audio input connector
Rate Converter	Input is from the analog audio input connector on channels 1 and 2 and then passes through the MMR-8 digital sample rate converter

### 501 Auto Input

This sets the conditions under which the MMR-8 will switch to input monitor for tracks which are armed. This setting is not available on the MMP-16.

Record Only	Switch only when in record
Record or Non-play	Switch when in record or not playing (default)
Record or Record-Ready	Switch when in record or record ready

### 510 Crossfade

This sets the crossfade amount used at punch in/out and edit points. The range is 0 to 100 ms in 1 ms intervals. The default value is 10 ms.

### 520 Meter Reference Level

This sets the meter reference level in decibels for the front panel meters of the MM series unit. The default value is  $-20\text{dB}$ .

### 521 Meter Calibrate

The switches on the meter calibration function used to calibrate the analog input stage of the MMR-8. For detailed instruction on the calibration procedure, see the MMR-8 owner's manual. The default value is off. The setting is not present on the MMP-16.

### 522 Clip LED on Play

This setting determines whether or not the Clip LED on the MM-RC Remote Control Unit will illuminate when clipping is detected on a playback track. The default value is off.

### 530 Reference Tone

This activates the internal 1kHz reference tone in the MM series unit. To hear the tone, the unit must be in play. The default value is off.

## 540 Gapless Punchout

This setting toggles the gapless punchout feature. Gapless punchout allows underlying audio material to be heard immediately when a record punchout occurs on a track. This process takes some processing power, so turning this feature off will allow extra recording bandwidth. Turning off gapless punchout can be especially useful if a “media too slow” message occurs when recording in non-destructive mode. The default value for gapless punchout is on.

## 550 Remote Meter Source

This sets the source of the signals sent to an MMU-16 meter bridge. The default setting is MMR Bus.

- MMR Bus     Signals are sent over the MMR bus and should go through an MM-RC remote before being passed on to the MMU-16.
- Local        Signals are sent directly from the UIB port (remote control port) to an MMU-16 unit.

## 600 Digital I/O

### 600 Digital Input Ref Track

This sets the track to be used for the AES digital signal reference clock. The choices are: 1 & 2, 3 & 4, 5 & 6, or 7 & 8. The default value is digital inputs 1 & 2.

### 602 Digital Input Delay

This sets an amount by which incoming digital signals will be delayed. The range for this setting is 1 to 255 samples in 1 sample increments.. The default value is internal (no delay).

### 610 Digital Output Delay

This sets an amount by which digital output signals will be delayed. The range for this setting is 1 to 255 samples in 1 sample increments. The default value is internal (no delay).

## 700 Disk

### 700 Disk Encoding

This sets format used for recording on the MMR-8. This setting is not available for the MMP-16. The default value is WaveFrame 16-bit. The choices are:

- WaveFrame 16-bit
- WaveFrame 24-bit
- Pro Tools 16-bit
- Pro Tools 24-bit

### 701 Record Disk SCSI ID

This sets the SCSI volume ID to which recording will be made. Note that if a track from a different disk than the one set here is loaded, recordings on that track will be made to the disk from which the track was loaded. This setting is not available for the MMP-16. The default value is SCSI ID 0.

## 710 Disk Initialize

Initializes the disk as a WaveFrame drive.

## 711 Disk Low Format

Performs a low level format on the drive. The drive must be initialized for recording after low format.

## 720 Disk Cleanup

The Disk Cleanup function looks at all available project files (EDLs) on the SCSI volume defined in the Target ID field and compares these to the audio files found on the disk. All unreferenced media files are then deleted (cleaned up) to regain disk space. This is a direct command, not a setting. This function is often used in conjunction with the Delete command found in the File Utilities window. After a project or track is deleted, Cleanup can be used to delete the media that was referenced by the deleted EDL. A warning prompt is shown if anything exists in the clipboard or undo list when a Disk Cleanup is performed. This warning insures users will be aware that the clipboard will be emptied by the Disk Cleanup process.

01234567890123456789	20 position LCD character positions
<b>721 Disk Cleanup</b>	Top: (Menu Item)
<b>OK to Clear Undo List?</b>	Bottom: (Warning Prompt)

To clear the clipboard and perform the Disk Cleanup, press STO. To cancel the Disk Cleanup operation, press RCL (No). The LCD will then show the following message.

01234567890123456789	20 position LCD character positions
<b>721 Disk Cleanup</b>	Top: (Menu Item)
<b>No Files Deleted</b>	Bottom: (Message)

## 790 Drives Mounted

This is an information display which shows the SCSI volume IDs of all mounted drives.

## 800 Tracks/Project

### 800 Project Name

This field is used to set the name for a new project. Once a new project name is applied, the existing project will be unmounted and a new blank project with the project name indicated here will be created as soon as some audio is recorded into one track of the project. The default name is MMR Project.

Another way to start a new project is to choose New project from the file menu. Using the New project function also enters the project name into this field.

### 810 Track Prefix

This field is used to set the track prefix used for any newly created tracks. The default name is MMR Trk.

# 900 System

## 900 Store Settings

This menu allows for storing and recalling the current settings as a user settings file in the MMR-8 or MMP-16. When using ViewNet to control the MM series machine, ViewNet settings files provide a better way to create, save, and recall users settings. To save a customized setting, select Setup Menu 900 (press SETUP, then the 9 key). Press the TRIM key, and rotate the Wheel or use the arrow keys to select the User settings file number (1 - 10) desired. Press STO. This saves all of the current Setup parameters to disk in the target User settings file. These settings are retained by the MMP-16, independently of even the usual automatic-save, automatic-restore sequence, and may be recalled when desired.

## 901 Recall Settings

This menu allows for recalling any of the 10 user settings saved in the MM series machine. To recall a previously stored User setting, select Setup Menu 901 (press SETUP, the 9 key, and rotate the Wheel CW or use the arrow keys to locate menu 901, "Recall Settings"). Select the desired User settings file from the list (press TRIM to change the Wheel and arrow key function to scroll through the Menu selections). It is not possible to name the User settings files, nor is it possible to back them up to floppy disk or to restore them to hard disk. It is possible to create and save named settings files using the ViewNet Audio graphical interface. Note that Setup Menu 901 also allows the operator to select the last User setting that was used ("Previous" option) as well as reset the MMP-16 to the factory defaults ("Default" option). Most Control modes require that certain synchronization signals appear on one or more MMP-16 sync inputs. If these signals are not present, the MMP-16 will fail to respond correctly. The following configuration information is divided into the three main application areas of the MMP-16 (video, film, and audio-only). Typical signal connections and Setup Menu selections are covered.

## 910 Set MM:DD:YY [Date]

This sets the date used by the system. Whenever a recording is made, the current date and time are used to "time stamp" the recorded files.

## 911 Set HH:MM:SS [Time]

This sets the time used by the system. Whenever a recording is made, the current date and time are used to "time stamp" the recorded files.

## 912 Change Password

Use this Menu to change the system password which protects user settings.

## 920 LED Brightness

The menu allows for setting the brightness of the LEDs on the front panel. The range is 0 – 18.

## 940 Machine Name

This field sets the name of the MM series machine. This information is stored as part of the system init file on the hard disk of the MM machine. This name can also be set using the Machine Information window available in the Machine menu. The machine name is shown in the Network and Project View screens of ViewNet Audio.

## 950 IP Address

The IP (Internet Protocol) address for each machine must be entered manually at the front panel of the MM series machine before that machine can be seen by the network and appear as a machine to the ViewNet Audio software application. To set the IP address, press Setup on the front panel of the MMR, and use the wheel or arrows to move to Setup menu 950.

### Setting the IP Address

Enter the value for each of the four segments by using the wheel, up/down arrows, or by entering the number on the keypad. To move to the previous or next segment (byte) of the address, press the left or right arrow keys to move the cursor to that segment of the address. Use a leading 0 for two digit numbers.

### Format of IP Addresses

The format of an IP address is 32 bits, divided into four bytes separated by periods. Each byte has eight bits, so the maximum decimal numerical value of each of the four segments of the address is 255 (which, starting at 0 gives a total of 256 or  $2^8$  values). IP addresses thus theoretically run from 000.000.000.000 to 255.255.255.255.

IP addressing is based on the concept of hosts and networks. A host is any device on the network that is capable of receiving and transmitting IP data packets such as a personal computer, MM series machine (which is also a computer), or a router. The hosts are connected by one or more networks. The IP address of any host consists of its network address plus its own host address on the network.

## 951 IP Net Mask

Use this field to enter the IP Net mask. Set this value to 255.255.255.000 unless your network administrator advises that you should use a different setting.

## 952 IP Gateway

Use this field to enter the IP Gateway if the ViewNet network is part of a larger network which uses a Gateway. If there is no Gateway in use, there is no need to enter any data in this menu.

## Important Rules for IP Addresses

It is important to make sure all host devices on the network have the same network IP addresses but have unique host addresses within the network. Put simply, the first three bytes of the IP address should be the same for all host machines on that network, and **the final byte should set to a number which is unique for each device on the network.**

This rule is very important and bears repeating in another way – **no two host devices on the same network should have identical IP addresses.** If the address of two host devices on the network are identical, it may cause serious problems for the network, including causing the whole network to stop working properly until the duplicate address problem is remedied.

If the MM series machine is to be used in a facility where IP addresses are managed by a network administrator, that person should assign and log the IP addresses for each MM series machine and ViewNet computer according to the address scheme for the facility. IP addresses for MM series machines can always be changed by using MMR/MMP Setup menu 950.

## **980 Serial Number**

This sets the time used by the system. Whenever a recording is made, the current date and time are used to “time stamp” the recorded files.

## **990 Software Version**

This sets the time used by the system. Whenever a recording is made, the current date and time are used to “time stamp” the recorded files.

## **995 Load Software**

This sets the time used by the system. Whenever a recording is made, the current date and time are used to “time stamp” the recorded files.



# Chapter 6 File Format Support

## Show Project Format

The file format of any project available for loading on the MMR/MMP is indicated by a two letter code in brackets at the end of the project name.

01234567890123456789	20 position LCD character positions
<b>File</b>	Top: (File Item)
<b>Rons Project [PT]</b>	Bottom: (Indicates Pro Tools project)

The codes used for currently supported file types are:

[PT]	Pro Tools
[WF]	WaveFrame
[AK]	Akai
[DV]	DEVA (Broadcast Wave)
[OM]	OMF/SDII
[SS]	Sonic Solutions
[FL]	Fairlight

## Show Track Format, Drive ID

Once a track has been loaded, pressing VIEW TRACK will show the name of the selected track followed by brackets around a number which indicates the drive ID and format type of the track.

01234567890123456789	20 position LCD character positions
<b>Track Contents:</b>	Top: (Track contents)
<b>1 MMR Trk1_00837 [0,PT]</b>	Bottom: (Indicates drive ID and Format for track)

## Formatting Macintosh Disks

The MMR-8 and MMP-16 cannot format disk drives as Macintosh HFS volumes, so a drive must first be formatted as a Macintosh HFS volume using a Macintosh computer before the drive can be used with the MMR-8 or MMP-16. If a non-Macintosh formatted drive is mounted, the MMR/MMP will not allow Pro Tools or OMF as a choice for recording, backup, or file export to that disk. Users are advised to follow the recommendations of Digidesign for formatting disk drives for use with the Pro Tools system and with the MMR-8 and MMP-16.

## Delete and Disk Cleanup for Macintosh Volumes

The Project Delete function (accessed by using SHIFT + LOAD TRACK) and the Disk Cleanup function (Setup Menu 720) work for Macintosh HFS disks. The Delete command will Delete the selected Session or OMF file from a Macintosh volume. The Disk Cleanup command will delete all Sound Designer II files that are not being referenced by a Pro Tools Session or an OMF Composition. This command will also delete all linear fade files created by a ProTools Session. Users should make sure there are no other SDII files that they wish to keep (such as raw SDII sound libraries not referenced by an EDL) on a Macintosh disk before using this command. **Warning:** this command cannot be undone.

## Macintosh File System Errors

Various types of file errors and inconsistencies can sometimes accumulate on a Macintosh drive. Although the MMR-8 and MMP-16 can read and write data on Macintosh HFS volumes, it is of critical importance that any Macintosh disk used be free of file and format errors. When the MMR/MMP unit scans the SCSI bus for available drives and sees a Macintosh volume, it will look for file errors on the disk. If errors are found, the volume may not load at all. In some cases, the volume may load but only a few files will show up in the drive directory. If a disk is found to have file system errors, the MMR-8 will not allow recording, backup, or export to that disk and track arming will be disallowed.

Fortunately, commercially available disk repair utilities such as Norton Disk Doctor can locate, and in many cases (although not all) can repair the disk and rectify the errors. If a Macintosh disk connected to an MMR-8 or MMP-16 has problems such as:

- disk volume will not mount
- files appear to be missing
- the MMR-8 will not go into record

then connect the disk to a Macintosh computer and use a Macintosh disk repair utility to locate and repair any errors. If the errors cannot be fixed by the disk repair program, then the drive will need to be re-formatted on a Macintosh computer before it can be used on the MMR/MMP. A list of possible Mac file system errors and their error codes is given at the end of this document.

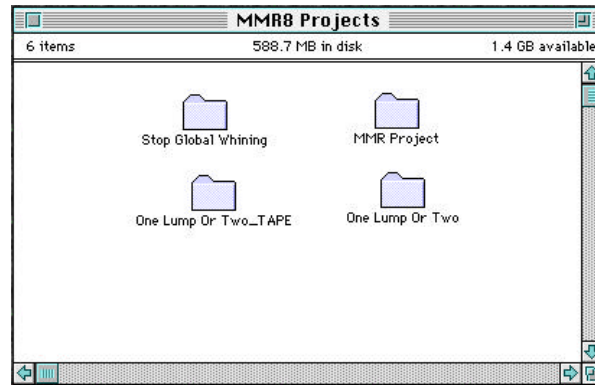
## Macintosh Files Created by the MMR

Whenever a Macintosh disk is mounted on an MMP-16, a series of file folders are created so that the system is ready to hold recordings, backup files, or edits made by the MMR-8 or MMP-16. These folders and files are created according to the hierarchy explained here. A folder called MMR8 Projects is automatically created at the root level of the disk drive mounted on the MMR-8 or MMP-16.



The other files and folders created are stored within this folder. Any Pro Tools Sessions recorded on the MMR-8 (and their attendant sub-folders and audio files) will be automatically placed in this folder by the system.

Inside the MMR8 Projects folder, another folder is created with the name of the Project (as defined in setup menu 800 when the recording was first made). In the case of a Macintosh disk which is simply mounted on an MMR or MMP, a default Project folder called MMR Project is created. A new folder labeled with the name of the Project will be created for each new Session recorded on the MMR-8. Here is an example of several Project folders nested inside the MMR8 Projects folder:



Each of these folders contains the Pro Tools Session file and Audio File and Fade File folders for that Session, as explained on the following page. Note that Sessions created on the Pro Tools system may be placed elsewhere within the disk filing system. Sessions created on the MMR-8 will always be placed here. Inside the Session folders, the system automatically creates two new folders labeled Audio Files and Fade Files. If a Pro Tools Session has been recorded, there will also be a Pro Tools Session file. The contents of a typical project file folder created when a Session is recorded to an MMR-8 would look like this:



All sound designer II files recorded for this Session will be placed in the folder labeled Audio Files. The Fade Files folder is automatically created so that Pro Tools has a place to store any fade files the system may create. The MMR does not create Pro Tools fade files, but will play them back. The MMR does generate the proper fade file descriptor so that Pro Tools can later generate appropriate fade files. When opening a Session on Pro Tools that was created on the MMR, Pro Tools will alert the user that fades are missing. The user can then choose Skip All from the Pro Tools dialogue and Pro Tools will generate the missing fade files. The MMR-8 and MMP-16 will also perform default fades in real time according to the default fade settings in setup menu 510. If any fade files are missing from a Session created using Pro Tools, the MMR and MMP will simply play a real-time linear crossfade of the appropriate length in place of the missing fade file.

## Support for Pro Tools® Session Files

The MMR-8 and MMP-16 support playback of version 3.2 as well as version 4.0 and higher of Digidesign's Pro Tools Session file format.

## **Pro Tools Features Supported**

The MMR-8 and MMP-16 will recognize and play back Pro Tools Session files (and all Sound Designer II audio files referenced by the Session file) created as version 3.2 or 4.x Sessions on a 16-bit or 24-bit Pro Tools system. The name of all recognized Session files on all mounted volumes will appear in the list of projects shown in the LCD display after the Load Track key is pressed. If fade files are present, the MMR/MMP will play them. If fade files are missing, the unit will play back a linear fade of the correct duration in real time. Any playback mutes or volume automation that is part of the Session will be followed by the MMR/MMP, and the audio material programmed to mute will not play back. If audio mutes or volume automation have been applied in error, the material must be un-muted using the Pro Tools system before it will play back on the MMR/MMP.

## **Pro Tools Features Not Supported**

The TASCAM MMR-8 and MMP-16 are designed to be able to play back edited audio files and fades from Pro Tools Session files and other workstation file types, but they do not have all of the complex DSP and routing/mixing capabilities of a full-fledged digital audio workstation. There are therefore some capabilities of such systems that do not translate when files are played back on the MMR/MMP. For post production sound editing, this need not pose a problem if these limitations are understood and material is prepared with the capability of the MMR/MMP in mind. This section details some features of the Pro Tools system and Session file format which are not directly supported on the MMR/MMP.

### **Dynamic Voice Allocation**

The Pro Tools system has special features for assigning dynamic voice allocation utilizing virtual tracks and track priority. The MMR-8 and MMP-16 software does not recognize or respond to these parameters in a Session file.

### **TDM Plug-Ins**

One of the most impressive features of the Pro tools system is the number and variety of third-party DSP plug-in effects available for the system. These effects rely on special DSP hardware in the Pro Tools system to perform various digital audio processes in real time. These real-time effects are not supported by the MMR/MMP since there is no equivalent processing power or software. Another class of Pro Tools effects called AudioSuite plug-ins work by actually applying the effect and changing the audio data on the disk. In this case, the files will play back just as they have been processed, since the processing has been made part of the file.

## **Voice Output Assignments**

Since Pro Tools has extensive mixing capabilities, it also allows tracks to be freely assigned to various outputs for playback. The MMR/MMP units are designed to assign Pro Tools tracks directly to audio output channels on the MMR/MMP unit on a one-to-one basis and do not follow the output mapping of Pro Tools session. When editing material on Pro Tools for eventual playback on an MMR/MMP, it is best to place the material on the track where it should play on the MMR/MMP. Track assignments can be changed locally on the MMR/MMP and any track can be assigned to play out of any MMR/MMP channel output, but the default assignment when loading a Session will be to the tracks as numbered in the Pro Tools Session, not the voice assignment patching.

## **Restrictions When Using the Pro Tools Session Format**

Both the TASCAM MMR-8/MMP-16 and Digidesign Pro Tools have features for which there is no equivalent function in the other system. This leads to certain restrictions the user should be aware of when moving material between these two systems.

### **Pull Up / Pull Down**

ProTools only supports a Pull Up from 30fps and a Pull Down from 29.97fps. The MMR/MMP supports these and other frame rates. If something other than the standard frame rates or the above mentioned pull-up / pull-downs are set in a recording made on the MMR-8, the ProTools Session file created will not save that property in the Session file since that format has no way to store this data.

### **Frame and Sample Rates in Tape Mode**

When creating TapeMode ProTools projects, be sure to pick a supported frame rate/sample rate combination (see above) before recording. Once the TapeMode Session file has been created, altering the frame rate will cause the Session to be regarded as a regular Non-Destructive Session and not a TapeMode Session. This is due to the fact that the Session format does not store sample based start times, but frame based start times. TapeMode very much depends on the Project or Session start time, which cannot be altered if TapeMode capability is to be retained.

### **Limitations on Number of Tracks**

ProTools 4.2 supports a maximum of 43 tracks per Session. This track number limitation affects how many times tracks may be unloaded on the MMR-8/MMP-16. Once the maximum number of tracks has been reached the unit will no longer be able to unload tracks for that Session. Note that this will also affect the Loop Mode (menu 211) when the Repeat w/Unload option is chosen. Once the unload limit is reached, the transport will stop with an error message indicating that the maximum number of tracks has been reached. The same restriction will prevent exporting WaveFrame Projects or OMF Compositions to ProTools if the maximum number of channels is exceeded. A future software revision of the MMR/MMP will use the alternate tracks feature of ProTools to permit unlimited unloading of tracks and eliminate this restriction.

### **Session Start Time Restrictions**

When recording additional audio on existing projects created originally with ProTools, audio punch-in before the start time defined in the project is not allowed. Pro Tools has the same restriction. If it is necessary to punch in on a track before the Session start time, use the Pro Tools system to re-set the session start time as appropriate. The MMR-8 has no provision to set the start time, except for tape mode. Non-TapeMode ProTools sessions generated on the MMR-8 always use a start time of 0 and hence will have no punch in restriction. A TapeMode project has its own TapeMode start time for all formats, set in menu 230.

## Using TapeMode with ProTools Sessions

The MMR-8 has two record modes, Non-Destructive and TapeMode. Non-Destructive Record Mode works the same way as Pro Tools in that each recording makes a new audio file on the disk and does not over-write any existing material. In TapeMode, each track is considered to be a single continuous audio file and successive recordings will destructively over-write any existing audio on the same track when a punch-in is made. This is a useful way to record on the MMR-8 because it makes the most efficient use of disk space when recording mix tracks that will have a lot of record punch-in and out passes over the same part of the track. It is also more efficient in operation and will make the MMR-8 much less susceptible to “media too slow” errors when punching in and out across many tracks simultaneously, particularly when recording 24-bit files.

Although Pro Tools has a destructive record mode, it does not work the same way as the MMR TapeMode, so some of the rules for using TapeMode on the MMR-8 do not have an equivalent on the Pro Tools system. It is important to understand some of the consequences of using TapeMode when recording in the Pro Tools Session file format, since there are differences between the way TapeMode recording works with WaveFrame files and how it works with Pro Tools Sessions.

If the Record Mode (menu 200) is set to TapeMode when recording a Pro Tools Session, the MMR will automatically allocate all disk drive space between the TapeMode Start Time (menu 230) and the time where audio is recorded in each track. For example, in a TapeMode Session with a TapeMode Start time of 01:00:00:00, if audio is recorded beginning at one hour, then only the audio actually recorded will take up space on the disk. If the TapeMode start time is set to one hour and the current time location of the MMR-8 is set to two hours and recording begins, the system will automatically allocate one track-hour of disk space for each track in record. It is possible to verify that this is so by checking the Free Time on the disk (press Shift + 3). This behavior is different from the way WaveFrame TapeMode projects work. The WaveFrame file system allows continuous files to have “holes” in them but still be considered a single file. The Macintosh Hierarchical File System has no way to do this, so a recording made after the start time of a TapeMode Session will cause the system to automatically see all disk space between the TapeMode start time and the last bit of audio recorded on a particular track as being allocated to that audio file. This means that it is very important to set an appropriate start time when using TapeMode to make sure disk space is not wasted or used unnecessarily. For example, successive reels of a film will quite often carry a time code hour number that is the same as the reel number. If this method is being used and reel 3 is being recorded (mixed) to an MMR-8, be sure the time code for the TapeMode start time is set to 03:00:00:00 and not to 01:00:00:00, or the disk may show that it is full immediately as soon as recording is started at the beginning of the reel (at the 03:00:00:00 time code) since all space between one hour and three hours is allocated for the recording on all armed tracks. If this happens in error, you must cut the unwanted material and perform a disk cleanup to delete the audio files and regain use of the allocated disk space.

Another distinction between the file system of Macintosh disks versus WaveFrame disks is that Mac disks make different data block sizes on different volumes, depending on the capacity of the disk, whereas the WaveFrame file system has a fixed data block size. One effect of this is that when a backup is made of a Pro Tools TapeMode Session, the Session created will only be a TapeMode Session if made to a disk which is formatted with exactly the same data block size, otherwise it will be backed up as a Non-Destructive Record Mode project.

## Pro Tools Volume and Mute Automation

The MMR-8 and MMP-16 support Digidesign Pro Tools volume (gain) and mute automation data on playback.

### Volume Automation

The MMP-16 software supports playback of volume automation inserted in the Digidesign Pro Tools system. Pro Tools volume automation allows an audio track to have a volume overlay which determines the audio gain at user-specified break points on the track. The slope defined by the line between breakpoints will translate as a change in audio level over time as the track is played. There is no capability to perform direct editing of volume automation data or recording of volume automation data on the MM series unit.

Volume automation data will always be played if present in the track. MM series units will always faithfully play the track in the same way as if the track were being played on a Pro Tools system. If tracks which contain volume automation data are edited using the edit capabilities of the MM series unit, the automation data will always be included in the edit operation. Volume automation can only be disabled using a Pro Tools system.

### Mute Automation

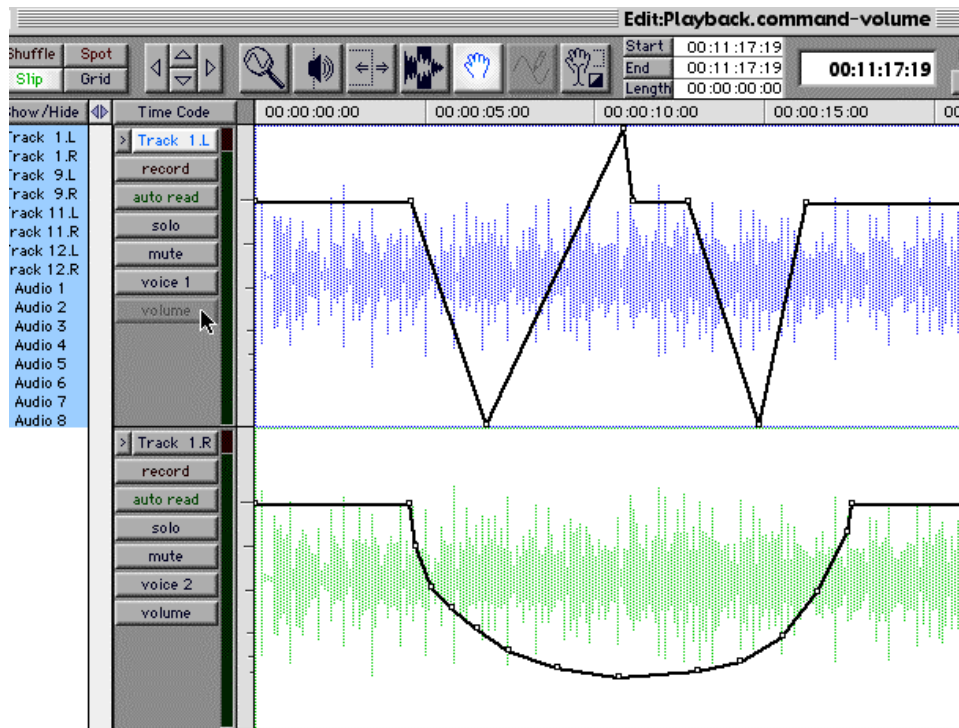
The MMP-16 software supports playback of mute automation data inserted using the Digidesign Pro Tools system. Pro Tools Mute Automation allows an audio track to have a volume overlay which determines segments of the audio track where audio gain will be muted (attenuated) between user-specified break points on the track. There is no capability to perform direct editing of mute automation data or recording of mute automation data on the MM series unit.

Mute automation data will always be played if present in the track. The MM series unit will always faithfully play the track in the same way as if the track were being played on a Pro Tools system. If tracks which contain mute automation data are edited using the edit capabilities of the MM series unit, the mute automation data will always be included in the edit operation. Mute automation can only be disabled using a Pro Tools system.

## Disabling Pro Tools Volume Automation

Volume (gain) automation can only be disabled using a Pro Tools system – it cannot be disabled directly on the MM series unit. To disable ProTools volume Automation:

- Go to the Edit Window in Pro Tools
- Press the "command" key (the one with the apple on it) and click on the volume automation selector.
- This will cause the volume selector to gray out as in Track 1.L below.
- Gray out each audio track volume automation selector on which you desire to have volume automation disabled.
- Press save. The volume automation is disabled.



In the example above: Track1.L will not play back any volume automation moves on the MMR/MMP while Track 1.R will.

## Audio File Time Stamp Support

A time code “stamp” is saved as an attribute of all recorded files. This time code stamp represents the time code location of the MMR unit when the recording was made. This data is now recorded as part of the audio file data. This information will be retained when files are Backed Up, Converted, or Exported to a different format. Many Digital Audio Workstations can use this information to place audio at its recorded time code location for editing.



## AIFF File Support

Pro Tools and OMF EDLs may reference standard AIFF (Audio Interleaved File Format) files for playback or file utility (export) operations. To be recognized, these audio files must end in one of the following suffixes: .aiff, .AIFF, .aif, or .AIF. No mixed case suffixes may be used (e.g. Aiff). Both AIFF files and Sound Designer II (SDII) files can be recognized and played in the same EDL, even in the same track. Note that the MM series machines will only read or play back AIFF files, and will not export or record to the AIFF format. If a Pro Tools track containing AIFF files is loaded, any new recording made to that track on the MMR-8 will be made in the SD II format.

To properly play back on the MM series unit, the file which has the .aiff suffix must actually be a real AIFF audio file. On the Pro Tools system, a Macintosh system file identifier is used by the software to understand the true identity of a file. Thus, if a Sound Designer II file is erroneously named xxxx.aiff, the Pro Tools application will understand that it is actually an SDII file and will play it back correctly. This is a service provided by the Macintosh operating system. This is not the case for an MM series machine. If a file which is not an actual AIFF audio file is named xxxx.aiff, the MM unit will try to play it as a true AIFF audio file. The result will be “garbage” audio because of the difference between the actual file type (e.g. SD II) and the .aiff file that the MM series machine is attempting to play. File names are important in this regard, particularly the suffix after a period. Do not rename files without regard to this fact.

## OMF Files

The TASCAM MM Series machines can playback and export OMF composition (EDL) files which reference external Sound Designer II or AIFF audio files. Only sample accurate OMF files conforming to version 1.0 of the OMF specification can be played or exported. To be recognized by the MM series machines as a valid OMF file, it is required that the OMF composition follow the naming convention xxx.omf, where xxx is any file name, and the suffix .omf is all lower case. Files which do not have the .omf suffix will not be recognized as valid OMF files and will not be displayed in the list of available files for loading or file utility operations. Frame accurate exports such as those created by the Avid Media Composer are not directly supported. For more information on working with OMF files and moving files between OMF compliant applications and the TASCAM MM series machines, see the technical support page on the TimeLine web site at <http://www.timelinevista.com>.

## Zaxcom DEVA Broadcast Wave File Support

TASCAM MM Series units support playback of Projects and audio files created on the Zaxcom DEVA hard disk recorder. This is a field recorder which records digital audio to an internal hard drive and can immediately mirror recordings to an external SCSI device such as an Iomega Jaz disk. The MMR/MMP can read DEVA files which have been recorded as mono sound files in the Broadcast Wave format to an external SCSI drive formatted as a DOS volume. Only DEVA files recorded in precisely this way can be read by the MMR/MMP. Polyphonic sound files (stereo or more tracks interleaved) can not be read, nor can Sound Designer II files recorded to a DOS disk. Projects and Track Names of files recorded on a DEVA unit will show the designation [DV] at the end of the name when it is displayed in the MMR/MMP LCD window. Support is also provided for Export of DEVA files to the WaveFrame, Pro Tools, and OMF/SDII formats.

## DEVA Files Naming Conventions

Audio files created by the Zaxcom DEVA hard disk field recorder can be played on the TASCAM MM Series machines. These must be in the EBU standard Broadcast Wave format on a DOS-FAT16 formatted disk in a directory labeled /ZFILES. The name of the DEVA track files must conform to the naming conventions used by the DEVA recorder. The format is six characters, followed by either a dash or underscore, followed by a track number (which must be 1, 2, 3, or 4), followed by the .BWF suffix. For example: take17\_1.BWF or take17-1.BWF. Previous to Version 4.0, only the underscore character was recognized but Version 4.0 software and above adds support for names using a dash as well.

## Akai DD-8 Support

The MMP-16 provides support for the Akai DD-8 digital dubber and other Akai products which use the identical disk file systems and audio formats. These include the Akai DR-8, DR-16, and DD-1500. Support is limited to playback of Akai files and export of Akai files to WaveFrame, Pro Tools, and OMF/SDII formats. Support does not include recording in the Akai format on the MMR-8. To identify files in the Akai format, the MMR/MMP will show [AK] at the end of any Akai Project or Track name when these names are displayed in the LCD.

## Playback

Playback of Projects created on the Akai DD-8 digital disk recorder is now supported on the MMR-8 and MMP-16. This includes audio and projects created on the original DD-8 format as well as the newer DD-Plus format using either 16-bit or 24-bit audio files. All files recorded on an Akai DD-8 will play on the MMR/MMP, with the following exceptions:

- 1) The Akai DD-8 20-bit recording mode is not supported on the MMR/MMP.
- 2) The MMR/MMP do not support playback of audio files recorded at 96kHz sample rate.

## Export

Akai DD-8 format projects can be exported to WaveFrame, Pro Tools, and OMF/SDII formats on the MMR-8 and MMP-16. To Export an Akai file to one of these other formats, first press LOAD TRACK and scroll through the display until it shows the name of the desired Akai file (the end of the file name will show [AK] when an Akai file is recognized). Then press SHIFT+SLIP (Backup) to show the Backup Menu. Scroll through the menus and choose either WaveFrame Export, Pro Tools Export, or OMF Export and use the normal export procedure. The Project file (EDL) and audio files will be copied to the designated SCSI target device in the format specified. Files can not be exported from any other format into the Akai format because the MMR/MMP do not currently support writing the Akai format.

## Editing File Formats not Written by The MM Series

Akai DD-8, Sonic Solutions, Fairlight, and DEVA files can be edited on the MMR/MMP, but all edits are held in RAM memory only and not written back to the disk. This is because the MMR-8 and MMP-16 do not write these formats. Edits in these formats will not be retained in the Project EDL.

## Sonic Solutions File Support

Software for the MMR-8 and MMP-16 provides support for files created on the Sonic Studio workstation from Sonic Solutions. The Sonic Studio digital audio workstation uses a proprietary disk file system, a specially modified version of the AIFF audio format, and a proprietary EDL format. Sonic Solutions is in the process of moving toward using the newest version of Apple's Hierarchical File System instead of their proprietary Media Optimized File System (MOFS). For this reason, TASCAM supports Sonic audio media files and EDLs only after they have been copied to a Macintosh HFS formatted disk volume, and will not recognize a Sonic MOFS volume directly. The MMR/MMP system will only read Sonic files copied to a Macintosh HFS volume, and does not write Sonic audio or EDL files.

### Using Sonic Lightspeed

The preferred method for copying Sonic files to a Macintosh HFS volume is by using Sonic's Lightspeed program. Lightspeed enables Sonic MOFS volumes to be mounted on the Mac SCSI bus and accessed on the Macintosh desktop. While on the Mac SCSI bus, the Sonic Studio system cannot record to this MOFS drive. Lightspeed in this case is only used as a means to transfer files from the MOFS volume to the Mac volume. The Lightspeed Toolkit program and a Macintosh system extension called Sonic Lightspeed are available from Sonic Solutions.

To copy Sonic files from the MOFS volume to the Mac HFS volume using Lightspeed, unmount the Sonic MOFS volume from the Sonic SCSI chain and mount it on the Mac SCSI chain. If the Lightspeed application and system extension are properly installed, the MOFS drive should mount automatically on the Macintosh. If it does not mount automatically run the Lightspeed Toolkit program, select the drive to be mounted and click on "Mount".

Drag the root folder of the MOFS drive onto the root folder of the Mac formatted drive. Since the Sonic EDL is dependent on the full path name to a file, do not copy a sub folder or file from the MOFS volume. Do not choose a target folder on the Mac drive - drop the file onto the drive itself (root folder). Once the file is on the Macintosh HFS volume, it can be recognized directly by the MMR-8 or MMP-16 unit.

### Sonic SSP, USP, and HD System Support

Over the years, Sonic has shipped several different audio processor cards (SSP, USP, and HD) for their Sonic Studio system. The MMR/MMP only support 16-bit files from Sonic SSP-based systems. Both 16- and 24-bit files are supported for Sonic USP- and HD-based systems.

### Sonic Fade Files

The Sonic Studio system can play various types of complex fades in real time. The MMR/MMP will play any non-rendered fades as linear fades of the length specified by the EDL, but these units cannot reproduce complex fade types unless they are rendered in advance by the Sonic system. The MMR/MMP will always play a linear fade for all non-rendered fades.

## Format Chart

The following chart shows the Matrix of formats supported and the various Backup, Export, and TapeMode Conversion operations available as of Version 4.1 of the MMR-8 and MMP-16 software.

<b>File Compatibility Chart</b>	<b>TO</b>	<b>Wave Frame</b>	<b>WaveFrame TapeMode</b>	<b>OMF/SDII</b>	<b>Pro Tools</b>	<b>ProTools TapeMode</b>
<b>FROM</b>						
<b>WaveFrame</b>		Backup	Convert to TapeMode	Export	Export	Convert to TapeMode
<b>WaveFrame TapeMode</b>		Backup	Not Permitted	Export	Export	Convert to TapeMode
<b>OMF/SDII</b>		Export	Convert to TapeMode	Backup	Export	Convert to TapeMode
<b>Pro Tools</b>		See Note*	See Note*	Export	Backup	Convert to TapeMode
<b>Pro Tools TapeMode</b>		See Note*	See Note*	Export	Backup	Backup *
<b>Akai DD8</b>		Export	Convert to TapeMode	Export	Export	Convert to TapeMode
<b>DEVA (DOS disk)</b>		Export	Convert to TapeMode	Export	Export	Convert to TapeMode
<b>Sonic Solutions (Mac HFS)</b>		Export	Convert to TapeMode	Export	Export	Convert to TapeMode
<b>Fairlight MFX 3</b>		Export	Convert to TapeMode	Export	Export	Convert to TapeMode

*Table of Backup, TapeMode Conversion, and Export Paths*

*Note:* Any file format that can be played on the MMR/MMP can also be written (exported) to any written format supported by the MMR. Written formats are WaveFrame, Pro Tools, and OMF/SDII. The sole exception is that Digidesign Pro Tools files may be written as OMF files, but not as WaveFrame files (shown as *Not Permitted* in the chart above). To convert Pro Tools to WaveFrame, first export Pro Tools to OMF on the same disk, then use that OMF file for export to WaveFrame (one extra step).

*\* This is true only if the Mac HFS disk being copied to is formatted identically (same block size), otherwise Backup to a Mac volume with a different block size will yield a non-destructive project. In this case, use Convert to Tape Mode to insure the project remains a TapeMode project after being copied to the new disk.*

Fairlight MFX3 support is provided in MMR Version 4.1 and higher. Support is for files exported in ML format only, not DL format from the MFX3.

# Chapter 7 MMR-8 System Applications

This chapter offers more detailed information for using the MMR-8 with film and video applications. Setup Menu parameter selections, technical background information, and block diagram connections are also covered.

## Film Post Production

A standard method of synchronizing a film transport with external audio devices (like the MMR-8) is to use the pulse-interlock signal, or as it is more commonly known today--the biphasic control signal, as a method of generating time code from the film's movement to drive the various audio devices.

The biphasic control signal consists of two 5 volt or 12-volt pulses (called phase A and phase B) that are generated from the sprocket drive motor on the film transport. The phase relationship between the two pulses indicates the transport direction (when phase A leads phase B by 90° the film is moving forward), while the pulse frequency indicates the relative film speed (the nominal pulse rate indicates play speed, with higher rates indicating wind speed and slower rates indicating crawl speed).

It is only through knowing exactly how many pulses are generated per frame, and then keeping track of the total number of pulses that have been received (while subtracting pulses for when the film is moving in reverse), that the MMR-8 can constantly translate the biphasic signal into the correct feet & frames or SMPTE/EBU time code numbers for the film frames. Since there are several "standard" biphasic pulse rates used by the various film transport manufacturers, there is no one nominal frequency of the biphasic signal for normal film play speed (pulse frequencies of 48 Hz up to 2400 Hz are used per frame). For the MMR-8 to interpret and lock onto a biphasic signal, and to generate the correct time code numbers, it must be given the correct Setup parameters for the type of transport that it is following (Setup Menu 301). Table 5.1 lists the biphasic pulse rates the MMR-8 can lock to and some examples of the equipment for each rate.

Biphase Pulse Rate	Biphase Play Frequency	Transport Type	Acceleration / fast wind speed	Notes
2 ppf	48 Hz	DIN standard	32 / 15x	Also used by Westrex
4 ppf	96 Hz	Westrex	8 / 5x	Alternate DIN standard
10 ppf	240 Hz	MTE	8 / 5x	
20 ppf	480 Hz	RCA	8 / 5x	
25 ppf	600 Hz	RCA	8 / 5x	
50 ppf	1200 Hz	RCA	8 / 5x	Biphase only
100 ppf	2400 Hz	MTM	8 / 5x	Biphase only

ppf = pulse per frame

### Biphase Pulse Rate Settings

On older film transports that use a tach and a direction signal, the phase A connection comes from the direction signal and the phase B connection comes from the tachometer output. Setup Menu 302 allows the default setting (which is biphase) to be changed to tach+direction. If the transport controls seem to be “backwards” (i.e. Play runs the film in reverse), select tach+inverse direction from Setup Menu 302.

Both menus 301 and 302 are used to set the MMR-8 as a slave to the biphase device (where the MMR-8 will be generating time code or feet & frame numbers off the biphase signal from the film transport). Using the MMR-8 in this way requires that the Biphase Chase operating mode be selected and that the MMR-8 be placed online (the online button is lit up).

## Biphase Setup Menus

Once the biphase operating mode is selected, the 300 bank Setup Menus (Table 5.2) can be used to verify and set the parameters for the specific film transport being used with the MMR-8. For most applications, the acceleration (Menu 320) and fast wind speed (Menu 321) defaults can be used since they correspond to the pulse rate selection (Menu 301). Thus, if they must be changed, they must be changed after the pulse rate has been set, otherwise they will be changed back to the default setting for the new pulse rate.

300 Menu Item	Selection	Choices
300 Biphase Frame Rate	film frame rate	24, 25, 30 fps
301 Biphase Pulse Rate	pulses per frame	2, 4, 10, 20, 25, 50, 100 ppf
302 Biphase I/O	biphase or tach+direction	Biphase, Tach+Direction, Tach+Inverse Direction

### Biphase Setup Menus

Menu 300 is used to set the Biphase Frame Rate. In most applications in the USA the film frame rate will be set to 24 fps (the default setting). For some European applications this may need to be set for 25 fps, and for specialized film for video applications there is also the 30 fps rate available.

Menu 301 is used to set the Biphase Pulse Rate. The number of pulses per frame is determined by the model of film transport or dubber that is being used with the MMR-8. See Table 5.1 for a list of transport types and the pulses per frame they use. If the model that will be connected to the MMR-8 is not listed consult the film transport manual for the specification. It is normally listed under the specifications as the ppf for nominal play speed. If this setting is incorrect then all time code and feet & frame calculations made by the MMR-8 will be off since they are derived from the pulse rate.

Menu 302 is used to choose the Biphase I/O setting. In the majority of applications biphase control will be used so Menu 302 is normally left at the default setting of biphase.

## MMR-8 Film Connections



Although the MMR-8 can only be controlled by one film transport bus at a time, there are four film transport connections (biphase input) on the UI/B card on the rear panel. These connections allow a single MMR-8 to be switched between up to four projection/mix-down rooms when it is placed into a main machine room. The biphase input that the MMR-8 follows is set using the Sync Group menu 100. The four inputs are grouped together in the lower part of the UI/B card and are numbered 1 - 4 (top to bottom) to match Sync Groups 1 - 4 (selected through menu 100). **Not intended for public telecommunication network connection.**

All biphase connectors use standard 6-pin modular telephone plugs (RJ12, the same type used on 3-line telephone systems) so that up to 1,000 feet of standard 6-wire phone wiring can be run to the various film transports. A terminal strip (or a 6-wire surface mount jack) can be used to adapt the film transport connector wiring to the MMR-8 wiring.

These connections are normally done for post production final mixing sessions. Other post production duties, such as ADR and Foley would use the same connections if a film transport or dubber was to be involved. In both of these applications the MMR-8 would be set up to record the dialog and Foley sounds directly to the disk that would be moved back to the original DAW editor.

As in all uses of the MMR-8, the Lynx and/or MMR buses can be used by the MMR-8 to control any number of additional audio and video equipment even though that MMR-8 is being controlled by the film transport.

## Video Post Production

In video post production the MMR-8 is typically slaved to a video tape recorder. In this use the VTR's time code output is the time code reference for the MMR-8. If the VTR is connected to a house sync signal, then the MMR-8 should also be connected to house sync (through the Video In connector) and should use that signal as the frame reference. In lieu of house sync, the VTR's video output would connect to the MMR-8's Video In for the frame reference source. The MMR-8, although time code slaved to the VTR, typically also functions as a master for any other audio devices on the Lynx and/or MMR buses.

## The Lynx Bus

The Lynx Bus is an asynchronous communications bus that transmits a frame clock as well as time code and motion commands between the MMR-8 and other devices using an RS-422 serial communications bus operating at 38.4 KBaud. Up to 1,000 feet of cabling can be used in the bus system with each device connecting via 9-pin D-sub connectors. All that is required to build-up a Lynx bus is to daisy-chain each Lynx bus device to the next one in line along with a separate house sync connection. Each Lynx-2 box has two Lynx bus loop-through connections just like each MMR-8. A Lynx-2 interface is necessary to connect each remote controllable audio or video device to the Lynx bus. A Lynx Keyboard Control Unit KCU can also be connected directly to the Lynx bus to allow independent and grouped remote control of up to six Lynx bus connected machines. For more information, see *Chapter 5 MMR-8 Setup Menus*.

# Chapter 8 Maintenance & Service

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The MMR-8 requires little maintenance other than ensuring adequate airflow through the interior of the unit. Do not use alcohol or other common studio chemical cleaners on the front panel keys. If a build-up of dust occurs, vacuum and/or brush off the fan opening area of the power supply

## System Input Level Calibration Using the Meter LEDs

The LED meters are factory aligned for +4 dBu analog operating levels. Thus a +4 dBu input level will yield a 0 VU indication. There are no meter calibration trim pots in the MMR-8, only trim pots for setting the analog input and output signal levels.

The LED meters can be set to indicate various headroom operating levels, however. The industry de facto standard (and MMR-8 default setting) is for 0 VU to indicate an absolute level of -20 dBFS (20 decibels below digital full scale). This setting determines the amount of headroom in the system before digital clipping occurs. This setting is adjustable from -15 dBFS to -24 dBFS. Use Setup Menu 520 to select the meter reference level.

For in-system calibration of the input signal levels, there is a calibration mode that uses the meter LEDs to indicate input level in steps of .333 dB, 1.0 dB, or 3 dB. Setup Menu 521 sets the MMR into this calibration mode. The default setting is Off for a normal meter display. To monitor the input level, use Menu 521 to set the calibrate mode ON. At the source, adjust the input source levels so that the meter LEDs up to and including the 0 LED are on, indicating an input level of +4 to +4.33 dBu. Once calibration is complete be sure to restore Setup Menu 521 back to Off for regular meter indication. The input and output calibrations can be checked with the MMR-8 rack mounted, but to actually adjust the input or output trim pots the MMR-8 must be removed from the rack and the top cover removed.

## MMR Input and Output Level Calibrations

Use the following procedure to calibrate the MMR-8 Input Converter board (MIC), and the MMR-8 Output Converter board (MOC). This procedure assumes that both of these cards are in the unit. It is assumed that an electronics technician who has experience operating audio measurement equipment is performing the calibration.

The following equipment is required to perform calibration adjustments:

1. A Low distortion, accurate balanced input/output audio analyzer/generator (Audio Precision System 2 or equivalent). A digital multi-meter with AC rms volts measurement capability, in conjunction with a function generator with a sine wave output as a signal source may also be used. However, the AP equipment will provide more accurate measurements, and the settings/displays will be in the proper units
2. Plastic Potentiometer Adjustment screwdriver/tweaker.
3. Input and Output cables compatible with the MMR-8 analog Audio In/Out connectors (equivalent to TASCAM DA-88 analog audio cables).

The MMR-8 has a built-in 1 kHz oscillator to check that the output levels are calibrated. To check the output levels, select Setup Menu 530 and select the 1 kHz setting. Press STO to turn on the internal oscillator. Make sure no tracks are selected in the Input mode, and then press the Play switch. Measure the output levels and verify that they match the calibration settings (+4 dBu nominal=1.228Vrms, measured at XLR pin 2(+) and 3(-) pins). If calibration is required continue to the MOC Calibration Procedure.



## MOC Calibration Procedure

Follow this step-by-step procedure to calibrate the MMR-8 Output Converters (MOC).

1. Turn off power and remove the top cover of the MMR.
2. Connect the audio analyzer input to the Output connector at the rear of the MMR.
3. Turn on the MMR. Wait for the software to load.
4. Generate the MOC calibration tone, a 1 kHz, -20 dBFS (of the digital bus) sine wave. To do this, Press SETUP, and go to menu 530 by turning the Wheel. Press TRIM then turn the Wheel to select the 1 kHz tone. Press STO to enable generation of the tone. Make sure no tracks are selected in the Input mode. Press the PLAY (>) switch to start tone generation.
5. Set up the audio analyzer input to measure the output level on Output channel 1. Standard Calibration level is digital full scale = +24 dBu. Pot adjustment range is digital full scale = +17 dBu to +25 dBu.(If there are special level requirements, those levels must be substituted for the levels in the following steps.)
6. Locate the MIC and MOC card cage. Note on its cover that the Output board is identified, as well the pot associated with each channel.
7. Using a plastic tweaker (supplied with the MMR-8), adjust the Output Ch1 pot to +4 dBu, +/-0.025 dB (= -20 dBFS.)
8. Move the audio analyzer input to the next MMR output channel. Repeat step 7. Continue until all 8 channels are calibrated.

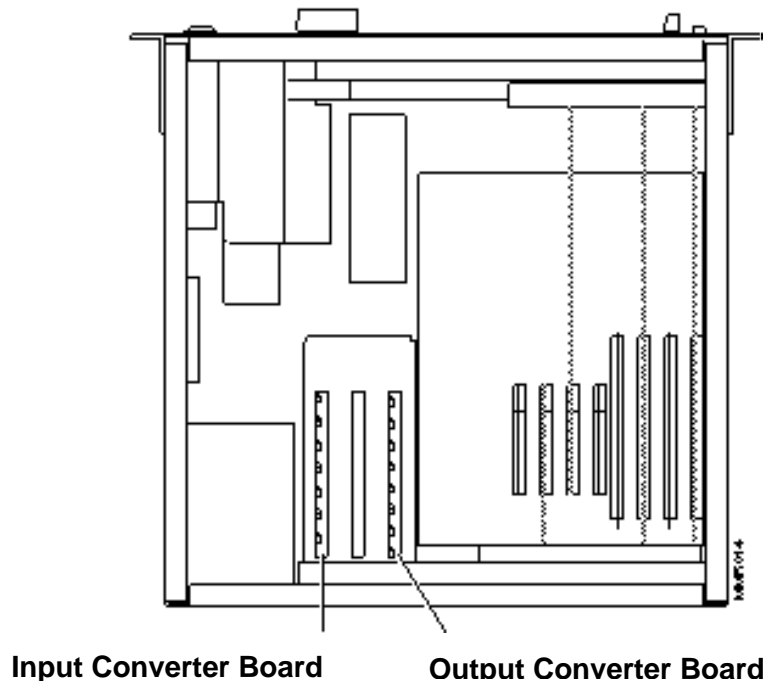
End of the analog output level calibration procedure.

## MIC Calibration Procedure

Follow this step-by-step procedure to calibrate the MMR-8 Input Converters (MIC).

1. Get out of the Reference Tone mode by pressing the SETUP key. Go to menu 530. Press TRIM and use the Wheel to select the Off menu selection. Press STO to turn off the tone. Press the STOP switch. Press CLR to exit Setup mode.
2. Press INPUT and turn on all channels for monitor input by pressing SEL on each track (all eight Input LEDs should be turned on).
3. Connect a cable from the audio analyzer output to MMR Input connector, channel 1, at the rear of the unit. Set the audio analyzer output to be a sine wave with a level of +4 dBu. Also connect the audio analyzer input to MMR Output channel 1. (The next step assumes the user wants a unity system gain with an input clip level of +24 dBu. The full scale (CLIP) adjustment range is from +9 dBu to +25 dBu. )
4. While monitoring the channel 1 output level, adjust the Input board channel 1 trimpot for an output level reading of +4 dBu (+/- .05 dB). This equals 1.228 Vrms (+/- .025 Vrms) measured at XLR pin 2(+) and 3(-) pins.
5. Move the audio analyzer output and input to the next channel. Repeat step 4 for each channel
6. Turn off the power. Replace the top cover on the MMR. Remove the calibration cables.

End of the analog input level calibration procedure.



**Analog Converter cards location within the MMR-8 chassis (top view).**

## Adding External Drives to the System

Up to five additional SCSI drives can be added to each MMR-8. The drives must be assigned unique SCSI ID numbers. Two SCSI ID numbers (7 and 0) are already taken by the MMR-8 SCSI controller card and the removable drive in the internal Kingston carrier of the MMR-8. The external drives should be added to the system while the MMR-8 is powered down (off).

## Formatting Disks

The MMR-8 can use the WaveFrame disk format for recording, so disks from that system are compatible with the MMR-8, and disks can be formatted on the MMR-8 for use with the WaveFrame. There are two formatting options: Disk Initialize (menu 710), which is the typical formatting option; and Disk Low Format (menu 711), which would be used on a brand new (unformatted at the factory) disk, a (software) damaged disk, or a disk that has been formatted for use on a non-Intel based system using an incompatible formatter.

When a new disk is added to the system, and you wish to initialize it, place the disk into the default system disk location. Go to Setup menu 710, and press STO to select Disk Format. A warning message will show in the display, asking if you wish to format the disk. Press STO to answer yes (or RCL to answer no, returning you to Setup Menu 710). A further message will appear, asking if you are sure. Again, use STO for yes, RCL for no. If a password has been set, then the Enter Password: message will be displayed and you will have to enter the password to continue with the format.

On disks that have been (software) damaged, or incompatibly formatted, repeat the above operation using menu 711 instead. Keep in mind that a low-level format can take from 20 minutes to an hour, during which time the MMR-8 cannot be used for normal operation.

## Using Removable Media

The MMR-8 currently supports two types of removable media: SCSI hard drives, and SCSI MOs (Magneto Optical) drives. The only type of SCSI hard drives that should be used are those specifically recommended by TASCAM, or drives and media that have been specified for use with high-demand applications such as audio/video systems. These disks typically have faster access times (12 ms or faster average seek time is required), larger storage capacities (2.4 GB or larger), and thermal compensation that is only active when the drive is not being accessed. A list of approved removable media drives is given in Appendix B of this manual. Contact TASCAM for the most current list of recommended SCSI hard drives for the MMR-8. This list is also available on the TASCAM Web site at [www.TASCAM.com](http://www.TASCAM.com).

For archiving and for transferring 4-track reels between the WaveFrame editor and the MMR-8, the Tahiti 3 or similar optical drive may be used. The MMR-8 can format, backup to, or play back up to four tracks off of 620 MB, 1.3 GB, or 2.6 GB MO media. The latest generation of LIM/DOW optical drives (such as the Nikon Beluga A/V drive) offer the best removable optical disk performance.

# Chapter 9 Technical Support

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For technical support on the MMR-8 product line contact:

TASCAM  
7733 Telegraph Road  
Montebello, CA 90640  
Tel (213) 726-0303 Ext 617  
Fax (213) 727-7632  
E-mail: [tascamsupport@teac.com](mailto:tascamsupport@teac.com)

Technical assistance is only available to registered owners of MMR-8 products. Be sure to write down your serial number before installation for future reference, as you will need it, along with the software version you are currently running, when contacting technical support. You can write your serial number here:

MMR-8 serial #: \_\_\_\_\_

Information on software updates, technical support, and TASCAM products is also available via the TASCAM World Wide Web site at:

<http://www.tascam.com>

## MMR-8 System Software

The MMR-8 operates using an industry-standard operating system and program files that run on a Pentium microprocessor chip. The system software comes pre-installed onto the internal hard drive in the MMR-8. When the MMR-8 is turned on, all necessary software is loaded automatically. The version of software that is currently running can be displayed using Setup menu 990, which displays the current revision level of the software.

Software updates are supplied on one or more floppy disks. To install the software update, insert the floppy disk (or Disk 1, if multiple disks are received) into the front panel floppy drive while the unit is operating normally. Access Menu 995 (Load Software) and press STO. The system will ask "Are you sure?" Confirm the floppy is properly inserted and press STO again to confirm. If multiple disks are supplied, the operator will be prompted via the display to remove Disk 1 and place Disk 2 into the drive. After the software update is installed, the system will display a message that the update is complete, and will display a checksum number (written on the floppy update disk for reference) to verify that the installation has been successful. Remove the floppy disk and recycle the power to operate the unit with the new software installed. All system floppy disks should be kept in a secure location in case they may be needed in the future.

## Appendix A: Control Panel Command Summary

### Transport Group

<b>ONLINE</b>	Toggles between offline and online. When lit, indicates unit is online.
<b>ONLINE+□ (Stop)</b>	Unmounts all drives so they can be removed from the MMR-8.
<b>&lt;&lt; (Rewind)</b>	Moves all tracks in reverse at a high rate of speed with no audio playback.
<b>&lt; (Play Backwards)</b>	Plays audio backwards at the normal play speed.
<b>□ (Stop)</b>	Stops audio playback; re-mounts drives after an unmount operation.
<b>&gt; (Play)</b>	Plays the audio at the normal play speed.
<b>&gt;&gt; (Fast Forward)</b>	Moves all tracks forward at a high rate of speed with no audio playback.
<b>REH (Rehearse)</b>	Used to practice a punch-in / punch-out before actually recording.
<b>REC (Record)</b>	Records into armed tracks (may need to press Play plus REC to engage, depending on REC key setting in Setup Menu 202)

### Setup and Wheel Group

<b>SETUP</b>	Enters Setup Mode.
<b>SHIFT+SETUP</b>	Changes the algebraic sense of time code entry (+/-).
<b>DOWN ARROW</b>	Performs decrement action, according to mode.
<b>SHIFT+DOWN ARROW</b>	Displays/hides subframes
<b>UP ARROW</b>	Performs the increment action, according to mode.
<b>SHIFT+UP ARROW</b>	Switches display of time code position between time code and feet/frames format
<b>TRIM</b>	Trims the time code value in the display's bottom line.
<b>SHIFT+TRIM</b>	Dynamically trims the time code value in the display's bottom line.
<b>JOG</b>	Wheel rotation plays the audio either forwards (CW) or backwards (CCW) up to play speed.
<b>SHTL</b>	Wheel rotation shuttles the audio from stop to play forwards (CW) or stop to play reverse (CCW).

## Keypad keys

<b>CLR</b>	Clears the time code in the bottom line of the display; cancels most operations
<b>7</b>	Enter digit, or selects 700 menus (in Setup)
<b>SHIFT+7</b>	Locate to “In point”
<b>STO+7</b>	Stores time code in bottom line of display into Memory register 7.
<b>RCL+7</b>	Recalls the time code in Memory register 7.
<b>8</b>	Enter digit, or selects 800 menus (in Setup)
<b>SHIFT+8</b>	Locate to “Head of tape” – follows SEL key selection in EDIT mode
<b>STO+8</b>	Stores time code in bottom line of display into Memory register 8.
<b>RCL+8</b>	Recalls the time code in Memory register 8.
<b>9</b>	Enter digit, or selects 900 menus (in Setup)
<b>SHIFT+9</b>	Locate to “Next Edit” point
<b>STO+9</b>	Stores time code in bottom line of display into Memory register 9.
<b>RCL+9</b>	Recalls the time code in Memory register 9.
<b>SHIFT</b>	Modifies function of most keys
<b>CAPT</b>	Captures the current time code and places it in the bottom line (active register).
<b>SHIFT+ CAPT</b>	Time (Feet & Frames local zero) register
<b>4</b>	Enter digit, or selects 400 menus (in Setup)
<b>SHIFT+4</b>	Locate to “Out point”
<b>STO+4</b>	Stores time code in bottom line of display into Memory register 4.
<b>RCL+4</b>	Recalls the time code in Memory register 4.
<b>5</b>	Enter digit, or selects 500 menus (in Setup)
<b>SHIFT+5</b>	Locate to “Tail of tape” - follows SEL key selection in EDIT mode
<b>STO+5</b>	Stores time code in bottom line of display into Memory register 5.
<b>RCL+5</b>	Recalls the time code in Memory register 5.
<b>6</b>	Enter digit, or selects 600 menus (in Setup)

- SHIFT+6** Locate to Previous Edit point
- STO+6** Stores time code in bottom line of display into Memory register 6.
- RCL+6** Recall Previous Edit time into the bottom line of display.
- STO** Used with the number keys to store the bottom line time code into another register; loads tracks in Track mode, selects in Setup mode, affirmative response in other modes
- 0** Enter digit, or selects 000 menus (in Setup)
- SHIFT+0** Lynx sync register
- STO+0** Stores time code in bottom line of display into Memory register 0.
- RCL+0** Recalls the time code in Memory register 0.
- 1** Enter digit, or selects 100 menus (in Setup)
- SHIFT+1** Offset register (shows machine MMR Bus offset when slave on MMR bus)
- STO+1** Stores time code in bottom line of display into Memory register 1.
- RCL+1** Recalls the time code in Memory register 1.
- 2** Enter digit, or selects 200 menus (in Setup)
- SHIFT+2** Time Code Reader register
- STO+2** Stores time code in bottom line of display into Memory register 2.
- RCL+2** Recalls the time code in Memory register 2.
- 3** Enter digit, or selects 300 menus (in Setup).
- SHIFT+3** Free time register
- STO+3** Stores time code in bottom line of display into Memory register 3.
- RCL+3** Recalls the time code in Memory register 3.
- RCL** Used to recall a memory register (used with number keys); provide negative response to query
- LOOP** When active, loops the transport from the In time to the Out time until Stop is pressed.
- LOC** Locates the transport to the time code location in the active register.

## Track Select Keys

<b>Red 1 - 8</b>	Record enable for Tracks 1 - 8
<b>EDIT+SEL (1 - 8)</b>	Select Edit Mode for Tracks 1 - 8
<b>MON+SEL (1 - 8)</b>	Select Headphone Monitor, Tracks 1 - 8
<b>INPUT+SEL (1 - 8)</b>	Monitor Inputs 1 - 8
<b>LOAD TRACK</b>	Enter Load Track mode
<b>TRACK</b>	Enter View Track mode
<b>SLIP</b>	Enter Slip Tracks mode
<b>SHIFT+SEL (1)</b>	Cut
<b>SHIFT+SEL (2)</b>	Copy
<b>SHIFT+SEL (3)</b>	Clear
<b>SHIFT+SEL (4)</b>	Paste
<b>SHIFT+SEL (5)</b>	Insert
<b>SHIFT+SEL (6)</b>	Open
<b>SHIFT+SEL (7)</b>	Undo
<b>SHIFT+SEL (8)</b>	Redo
<b>SHIFT+EDIT</b>	Sets in and Out times to beginning and end of event under play head on track currently selected for editing
<b>SHIFT+MON</b>	Enters Slip In/Out mode
<b>SHIFT+INPUT</b>	Toggles all tracks between Input and Repro
<b>SHIFT+LOAD TRACK</b>	Delete
<b>SHIFT+TRACK</b>	Unload
<b>SHIFT+SLIP</b>	Backup



## Appendix B:

## TASCAM MMR-8 Drive Compatibility Chart

### Approved SCSI Drives

The following disk drives have been approved for use with the MMR-8 as of July 19, 1999:

Drive Manufacturer	Drive Model	Firmware Version
Seagate	ST118273LW	6246
Seagate	ST19101W	0014
Seagate	ST318203LW	0001
Seagate	ST318275LW	0001
Seagate	ST32272N	0876
Seagate	ST34371N	0484
Seagate	ST34573N	5958
Seagate	ST34573W	5764
Seagate	ST39102LW	0005
Seagate	ST39173N	5764
Seagate	ST39173W	5764
Seagate	ST39173LW	6264
Nikon*	DD53-SIP Beluga AV	Unknown
IBM	DCHS09F	2222

Manufacturers frequently release new drive models and obsolete other drive models. The most current list of approved drives can be found on the TASCAM web site at <http://www.tascam.com>.

\* Users should be aware these drives do not perform as well as hard drives. Test results with the NIKON Beluga drive with 1K/sector media show 8 tracks of record and playback in 16- or 24-bit TapeMode is generally reliable. Non-destructive mode performance is less reliable, especially with heavy edit density.

## TASCAM MMR-8 Approved Drives

The TASCAM Web site at <http://www.tascam.com> has the latest information on approved drives for use with the MMR-8. Use this page of the Owner's Manual to note new drives that have been added to the approved drives list.

<i>MANUFACTURER</i>	<i>MODEL</i>	<i>MODEL NO.</i>	<i>FIRMWARE</i>	<i>DATE</i>	<i>COMMENTS</i>

## Appendix C: WaveFrame Compatibility

This section contains information on using the MMR-8 in the film post production environment that heretofore has relied on a WaveFrame/StudioFrame system for playback on the mix stage.

There are a number of considerations necessary to ensure compatibility between the MMR-8 and existing WaveFrame/StudioFrame projects. WaveFrame/StudioFrame systems require at least one fixed drive on the 'A' SCSI bus. On many StudioFrame systems, all drives are configured as "fixed" (i.e., non-removable). However, fixed drives in the StudioFrame system do not hold edit information, only the track audio. To store the edit information with the audio on the same drive requires that the drive be set up as a "removable" drive. The MMR-8, therefore, will work only with drives that have been configured by the workstation as "removable", since it relies on edit information being present on those drives. In addition, WaveFrame/StudioFrame systems place a maximum of four playable tracks of audio (per project/reel/dub) on each disk volume.

The optimal configuration for a WaveFrame/StudioFrame system that is intended for use with the MMR-8 is as follows: The workstation would have the one required fixed drive on the 'A' SCSI bus, with enough additional drives for holding all tracks. The additional drives would all be configured as "removable" drives. Tracks 1-4 would be recorded onto drive 1A (the first removable drive), tracks 5-8 would be recorded onto drive 1B (the second removable drive), and so on for any further groups of four. Although this is the best MMR-compatible configuration, earlier projects may have been created under other StudioFrame configurations using fixed drives. In these cases, a conversion procedure is necessary in order to use the MMR-8 with the pre-recorded disk volumes. The following outline describes the procedure for turning "fixed" StudioFrame drives into removable drives that can then be moved to the MMR-8, with both track edits and audio information intact.

As an example, suppose we wished to make two drives "removable" that were attached as fixed drives to the 'A' SCSI bus on the workstation. To make the fixed drives removable, you must first edit your Autoexec.bat file to include this line somewhere in the file (for example, as the last line):  
SET NFREMOVEID=4

(To edit your Autoexec.bat file select File, Run and type SYSEDIT in the dialog box. Click on the Autoexec.bat window and type in the new command (SET NFREMOVEID=4) on a new line. Select File, Quit. Select Save to save the changes you made to the Autoexec.bat file.) Changing the Autoexec.bat file requires rebooting for the change to take effect. You could also exit Windows, type the 'set' command above on the command line, and re-start Windows, if you do not wish to reboot. You would, however, have to do this every time the system was restarted.

To the WaveFrame/StudioFrame, this will signal that all SCSI drive addresses equal to or higher than four (4) are to be considered "removable" drives (lower numbers than 4 may be used, but be careful not to over-step any other lower addresses in use on the bus). Before re-starting your system, you must physically change the SCSI addresses of the two drives to SCSI id's 4 and 5, or 5 and 6. The SCSI id's must not be duplicated by any other drive on the SCSI bus.

StudioFrame Configuration Example A: 8-8-8 (8 track layout, tracks are in stereo pairs, on two fixed drives). Sound was recorded to the F1 drive group.

Edit your Autoexec.bat file and (perhaps) change the SCSI address of your drives as described above. Restart the system, launch StudioFrame, and mount the now-removable drives. Disregard the "missing edits" message at startup (fixed disks do not have the edits stored on them, whereas removable drives do).

Go into the Track Rack. Move all left channel tracks to the '1B' drive and move all right channel tracks to the '1A' drive. Rebuild the database on both drives.

StudioFrame Configuration Example B: 8-8-8 (8 track layout, tracks are in stereo pairs, two fixed drives). Sound was recorded as Tracks 1-4 to FA, Tracks 5-8 to FB.

Edit your Autoexec.bat file and change the SCSI address of your drives as described above. Launch StudioFrame and mount the now-removable drives. Disregard the "missing edits" message at start up (fixed disks do not have the edits stored on them, whereas removable drives do).

Go into the Track Rack. Move tracks 1-4 to the '1A' drive and move tracks 5-8 to the '1B' drive. Rebuild the database on both drives.

In each of the above examples, you will now have two removable drives with four tracks of audio (along with their edits) on each drive. If you have an external drive housing to hold a second drive, the two drives, with four tracks each, can be used on a single MMR-8. If not, the MMR-8 can handle playing all eight tracks from one drive. To do this on the WaveFrame/StudioFrame, you must copy the tracks from either drive to the other drive using the Track Rack. This procedure will, as you know, require some time to copy all the actual sound files.

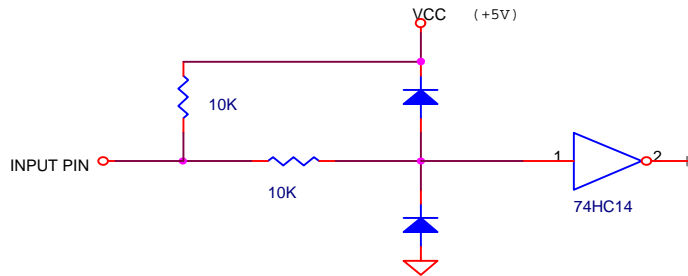
If you moved all eight tracks to one drive and then need to bring the tracks back into StudioFrame from the MMR-8, you must mount the drives, go into the Track Rack, and swap the tracks onto the editor, making sure that you assign only four tracks per drive. Note: these swapped tracks will now be mono, and will need to have their pans re-set (if they contained that information). If the audio was recorded in mono and had a pan value set, the pan value will be lost as well.

# Appendix D: MMR-8 Cable Information

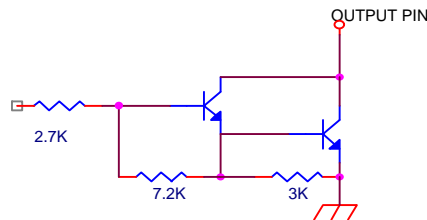
## Parallel Tracks and Parallel Transport Connector Pinout

Connectors are 37-pin D male. I/O on connectors share same logical ground. Electrical characteristics are:

TYPICAL INPUT



TYPICAL OUTPUT



DARLINGTON OUTPUT STAGE OF ULN2803A  
MAX RATINGS: 50V @ 500MA

<u>Tracks</u>		<u>Tracks</u>		<u>Transport</u>	
Switch	Tally	Switch	Tally	Switch	Tally
1. Trk 1 Input	21.	9. Trk 1 Rec	29.	1. Record ON	
2. Trk 2 Input	22.	10. Trk 2 Rec	30.	2. Record OFF	
3. Trk 3 Input	23.	11. Trk 3 Rec	31.	Locked	28.
4. Trk 4 Input	24.	12. Trk 4 Rec	32.	9. Online	29.
5. Trk 5 Input	25.	13. Trk 5 Rec	33.	10. Rewind	30.
6. Trk 6 Input	26.	14. Trk 6 Rec	34.	11. Rev Play	31.
7. Trk 7 Input	27.	15. Trk 7 Rec	35.	12. Stop	32.
8. Trk 8 Input	28.	16. Trk 8 Rec	36.	13. Play	33.
				14. FFwd	34.
				15. Record	35.
				16. Preview *	36.

**Pins Common to Both Connectors**

19. +12VDC                      20. GRD                      37. GRD

*\*When preview is grounded, all record functions will invoke rehearse.*

## MIDI IN/THRU/OUT Connector pinout

PIN #	Signal Description (IN, OUT, & THRU)
1	n/c
2	n/c
3	n/c
4	Signal +
5	Signal -

- NOTES:
1. DIN-5 connector - shield tied to case.
  2. Signals are MIDI specification compliant.

## LYNX (Remote Controller) Connector pinout

PIN #	MSTR Signal	SLAVE Signal	Pin #	MSTR Signal	SLAVE Signal
1	Frame ground	Frame ground	6	Frame ground	Frame ground
2	Receive -	Transmit -	7	Receive +	Transmit +
3	Transmit +	Receive +	8	Transmit -	Receive -
4	Frame ground	Frame ground	9	Frame ground	Frame ground
5	Frame clock	Frame clock			

- NOTES:
1. 9-pin D-subminiature female connector (DB-9).
  2. Signals are RS422 Compatible Frame clock is open collector driver.
  3. The two connectors allow parallel connection of the Lynx Bus. Each pin is paralleled internally between the two connectors. The signal description indicates master / slave signals.

## EDITOR Connector pinout

PIN #	MSTR Signal	SLAVE Signal	Pin #	MSTR Signal	SLAVE Signal
1	Frame ground	Frame ground	6	Frame ground	Frame ground
2	Receive -	Transmit -	7	Receive +	Transmit +
3	Transmit +	Receive +	8	Transmit -	Receive -
4	Frame ground	Frame ground	9	Frame ground	Frame ground
5	Spare Fr Ck	Spare Fr Ck			

- NOTES:
1. 9-pin D-subminiature female connector (DB-9).
  2. Signals are RS422 Compatible. Frame Clock spare should not be used.
  3. The two connectors allow parallel connection of the Lynx Bus. Each pin is paralleled internally between the two connectors. The signal description indicates master / slave signals.

## TRANSPORT (Sony 9-pin) Connector pinout

PIN #	MSTR Signal	SLAVE Signal	Pin #	MSTR Signal	SLAVE Signal
1	Frame ground	Frame ground	6	Frame ground	Frame ground
2	Receive -	Transmit -	7	Receive +	Transmit +
3	Transmit +	Receive +	8	Transmit -	Receive -
4	Frame ground	Frame ground	9	Frame ground	Frame ground
5	Spare Fr Ck	Spare Fr Ck			

### NOTES:

1. 9-pin D-subminiature female connector (DB-9).
2. Signals are RS422 Compatible Frame Clock spare should not be used.
3. The two connectors allow parallel connection of the Lynx Bus. Each pin is paralleled internally between the two connectors. The signal description indicates master / slave signals.
4. Signal Descriptions are MMR Output / Transport (Input). Signals are of Protocol-2 (P-2) standard, which is also known as Sony 9-pin

## ANALOG INPUT & OUTPUT Connectors pinouts

PIN #	Signal Description	PIN #	Signal Description
1	Channel 8 + signal	14	Channel 8 - signal
2	Channel 8 ground	15	Channel 7 + signal
3	Channel 7 - signal	16	Channel 7 ground
4	Channel 6 + signal	17	Channel 6 - signal
5	Channel 6 ground	18	Channel 5 + signal
6	Channel 5 - signal	19	Channel 5 ground
7	Channel 4 + signal	20	Channel 4 - signal
8	Channel 4 ground	21	Channel 3 + signal
9	Channel 3 - signal	22	Channel 3 ground
10	Channel 2 + signal	23	Channel 2 -signal
11	Channel 2 ground	24	Channel 1 + signal
12	Channel 1 - signal	25	Channel 1 ground
13	No connection		

### NOTES:

1. 25-pin D-subminiature female connector (DB-25). The pinouts follow the TASCAM DA-88 configuration. Each input is differential with the (+) inputs being the non-inverting input and the (-) being the inverting input.
2. Input impedance is 10k ohm.
3. Output impedance is 75 ohm.
4. Max load 12.28 VRMS

## BIPH (Biphase) Connectors pinout

PIN #	Signal Description
1	Ground
2	Phase-A
3	Phase-B
4	Phase-B
5	Phase-A
6	Ground

### NOTES:

1. RJ12 compatible Modular Plug, 6 Position, 6 Conductor.: Flat Wire - Stranded. Round Wire - Stranded. DataComm Warehouse (<http://kerry.warehouse.com/>) can supply these parts, however, many other sources available.
2. The four Biphase Inputs are selected one-at-a-time by the Sync Group setting.
3. Not intended for public telecommunication network.





## DIO (AES/EBU Digital Audio) Connector pinout

PIN #	Signal Description	PIN #	Signal Description
1	Digital Output 4 (ch 7&8) + signal	14	Digital Output 4 (ch 7&8) - signal
2	Digital Output 4 (ch 7&8) ground	15	Digital Output 3 (ch 5&6) + signal
3	Digital Output 3 (ch 5&6) - signal	16	Digital Output 3 (ch 5&6) ground
4	Digital Output 2 (ch 3&4) + signal	17	Digital Output 2 (ch 3&4) - signal
5	Digital Output 2 (ch 3&4) ground	18	Digital Output 1 (ch 1&2) + signal
6	Digital Output 1 (ch 1&2) - signal	19	Digital Output 1 (ch 1&2) ground
7	Digital Input 4 (ch 7&8) + signal	20	Digital Input 4 (ch 7&8) - signal
8	Digital Input 4 (ch 7&8) ground	21	Digital Input 3 (ch 5&6) + signal
9	Digital Input 3 (ch 5&6) - signal	22	Digital Input 3 (ch 5&6) ground
10	Digital Input 2 (ch 3&4) + signal	23	Digital Input 2 (ch 3&4) - signal
11	Digital Input 2 (ch 3&4) ground	24	Digital Input 1 (ch 1&2) + signal
12	Digital Input 1 (ch 1&2) - signal	25	Digital Input 1 (ch 1&2) ground
13	No connection		

NOTES: 25-pin D-subminiature female connector (DB-25).

## SYNC (MMR-Bus) Connector pinout

PIN #	Signal Description	PIN #	Signal Description
1	CAN_BUS+	9	CAN_BUS-
2	CCLK_BUS0+	10	CCLK_BUS0-
3	CCLK_BUS1+	11	CCLK_BUS1-
4	CCLK_BUS2+	12	CCLK_BUS2-
5	CCLK_BUS3+	13	CCLK_BUS3-
6	+12 TERM PWR	14	Frame ground
7	CAN LEFT TERM	15	CAN RIGHT TERM
8	N/C		

NOTES:

1. 15-pin D-subminiature female connector (DB-15). The two connectors are paralleled in the MMR-8 and either can be used as an input or output.
2. TASCAM supplies a 3 foot interface cable, 70447. The differential signals should be routed on twisted pairs of wires.

## TIMECODE IN Connector

PIN #	Signal Description
TIP	Time Code Reader +
Ring	Time Code Reader -
Sleeve	Ground

### NOTES:

1. 1/4" TRS Phonejack
2. 10K Ohm input impedance. Differential input.

## TIMECODE OUT Connector

PIN #	Signal Description
TIP	Time Code Reader +
Ring	Time Code Reader -
Sleeve	Ground

### NOTES:

1. 1/4" TRS Phonejack
2. Differential op-amp output circuit.

## WORD CLOCK IN Connector

### NOTES:

1. BNC, 75 Ohm Terminated. TTL logic levels.

## WORD CLOCK OUT Connector

### NOTES:

1. BNC, 75 Ohm Drive Capability. TTL logic levels.

## VIDEO IN/OUT Connector

### NOTES:

1. BNC, Video is connected in parallel between connectors.
2. 1K Ohm input impedance. Supports Composite, Color Bars, Black Burst. Should be 75 ohm terminated if at end of cable.

## **SERIAL CONNECTORS**

### NOTES:

1. These connectors are for factory diagnostics only.
2. 9-pin D-subminiature female connector (DB-9), connected to COM1 on the motherboard.
3. 25-pin D-subminiature female Connector (DB-25), connected to COM2 on the motherboard.

## **SCSI Connector**

### NOTES:

1. SCSI-2 Compliant.

## **PRX Connector**

### NOTES:

1. 3.5 mm Stereo Phonejack.
2. Same audio signal as on Headphone Monitor, but audio on tip (left channel) only.

## Appendix E: MMR-8 Glossary

Abbreviations and Terms	Definitions
<b>24 frames</b>	The standard film frame rate per second.
<b>25 frames</b>	The standard PAL and SECAM video frame rate per second.
<b>29.97 frames</b>	The standard NTSC video frame rate for color broadcasting per second.
<b>30 frames</b>	The standard audio-only and black and white video frame rate per second.
<b>AES/EBU</b>	Audio Engineering Society/European Broadcasting Union. The two main organizations that set the standards for audio production. Digital audio connections are often referred to as AES/EBU since these organizations standardized the digital audio interconnection methods.
<b>Autolocator</b>	An analog tape function to position the transport to previously marked locations that is emulated in the MMR-8 using the LOC key and a register or memory location to instantly locate the “play head.”
<b>Biphase</b>	The two-pulse sync signal generated by a film transport that the MMR-8 uses to generate time code or feet & frames timing.
<b>Bus</b>	Any signal that is daisy chained between multiple devices. In the case of the MMR-8, there are two main buses: the MMR bus and the Lynx Bus.
<b>Calibrate</b>	Adjusting a signal to match a reference or standard. The MMR-8’s inputs can be calibrated so that a +4 dBu signal will correctly drive the MMR-8, and the outputs can be calibrated for a +4 dBu output from the MMR-8. In these cases the calibration references are the level meters.
<b>Capture</b>	During play or stop saves the current time code into the bottom line of the LCD display for subsequent saving to a memory or position register.
<b>Chase</b>	The process whereby one device controls another device to synchronize their playback. Chase implies there is both a synchronization signal as well as a device control signal.
<b>Clear</b>	A function to remove audio between the In and Out times on one or more tracks of audio.
<b>Clip</b>	Indicates the maximum signal level has been exceeded going into the analog-digital converter. Typically this will cause severe distortion (popping, snapping, crackling sounds) in the output signal.
<b>Control Mode</b>	The mode (menu 000) which sets how the MMR-8 is being controlled.

<b>Abbreviations and Terms</b>	<b>Definitions</b>
<b>Control Track</b>	The VTR speed control signal recorded onto the tape. It typically also has time code recorded in it.
<b>DF</b>	Drop Frame. A type of time code that compensates for color video tape (which runs at 29.97 frames per second) having 108 less frames per hour than black and white video (which uses 30 frames per second). Since most video productions are in color, 108 frames must be “dropped” each hour from the audio in order to keep audio and video in sync. 29.97 DF is the normal time code used in the majority of video applications.
<b>Dubber</b>	An audio transport that uses film sprockets as its timing device.
<b>Edit</b>	The process of modifying the tracks in a project using the EDIT key and one of the edit functions (cut, copy, paste, clear, insert, open).
<b>Error</b>	An LCD display that indicates a problem with the MMR-8 or with the last operator key entry.
<b>Frame</b>	Each image on a film strip is a frame. In video, a frame consists of two interlaced fields. In film there are 24 frames per second (fps). In video there are 25 fps in the PAL and SECAM systems (European broadcasting) and 29.97 fps in the NTSC system (USA and Japan). Older black and white video and audio-only applications use 30 fps.
<b>Frame Reference</b>	The timing signal for each frame of video.
<b>Groups</b>	There are four Sync Groups in the MMR-8. This allows multiple MMR-8s to be shared between up to four film transports or video systems.
<b>HH:MM:SS:FF</b>	SMPTE/EBU time code stated as Hours:Minutes:Seconds:Frames.
<b>Head</b>	The start of a project.
<b>Input Monitor</b>	Applies the MMR-8 track Input to the Output in lieu of the audio from the hard drive. Typically used to check Input levels before recording.
<b>Interlock</b>	Refers to synchronizing film transports, audio dubbers and audio transports via the biphasic bus.
<b>Jam Sync</b>	When discontinuous time code is found on a tape, jam sync will ignore the gaps to create continuous time code on another tape.
<b>Jog</b>	Also called scrub, this function uses the Wheel to manually control the speed of forward and reverse play.
<b>KCU</b>	Keyboard Control Unit. TimeLine’s external machine controller. Provides remote control for up to six machines (MMR-8s or tape machines).

**Abbreviations  
and Terms****Definitions**

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<b>LCD</b>	Liquid Crystal Display. The twenty character by two line display used on the MMR-8 to display time code, Setup Menus, or machine status.
<b>LED</b>	Light Emitting Diode. Front panel indicators used to identify machine or key status.
<b>Local</b>	When the MMR-8 is Off-line it is said to be in local mode.
<b>Locate</b>	Jumps the MMR-8 (and any controlled machines) to a new time code location using the LOC key and one of the registers or memories.
<b>Loop</b>	Plays the project between the In and Out time code points according to the Loop Mode setting selected in Setup Menu 110.
<b>LTC</b>	Longitudinal Time Code. Time code that is recorded on audio tape or using one of the audio tracks or the control track on videotape.
<b>Lynx</b>	TimeLine's machine controller interface bus that is compatible with the MMR-8, Lynx-2 Interface, the KCU, and Micro Lynx controllers.
<b>Lynx Master</b>	The Lynx device that is the master for the Lynx bus. If one or more MMR-8s are tied to the Lynx bus only one can be the master on the Lynx bus.
<b>Lynx Sync</b>	The Lynx bus frame clock.
<b>Machine</b>	Any audio, video or film playback device.
<b>Machine Control</b>	Remote control commands for positional control and operational control of a device. In the case of the MMR-8, machine control commands can come from the MIDI input, the Lynx or MMR buses, the Editor input or the parallel remote input.
<b>Master</b>	The device that is in positional control of one or more slave devices.
<b>MIDI</b>	Musical Instrument Digital Interface. A serial data connection originally used to communicate key and voice parameters between music synthesizers. The MMR-8 will respond to MMC (MIDI Machine Commands) but will ignore any other signals transmitted on the MIDI bus.
<b>MMR Bus</b>	An asynchronous bus that ties multiple MMR-8s together to relay motion control commands and timing references from the master machine to the slave machines. The MMR bus supports up to four Sync Groups with their own timing references and motion control commands.
<b>MMR Master</b>	The MMR-8 that is in control of a particular Sync Group on the MMR bus.
<b>Mixdown</b>	The process of bringing together the multiple tracks of dialogue, FX, Foley, and music to create a finished soundtrack for a film or video production.

Abbreviations and Terms	Definitions
<b>Monitor</b>	The process of selecting one or more tracks to listen to in the headphones or rear panel studio monitor output.
<b>Motion Controls</b>	The “transport” keys on the MMR-8.
<b>MTC</b>	MIDI Time Code. Time code that is transmitted as part of a MIDI signal. Because there is not enough room for the complete time code to be sent at once, MTC counts in two frame increments.
<b>Multitrack</b>	A tape or solid state device that can record and/or playback more than one track of audio at a time.
<b>NDF</b>	Non-Drop Frame. A type of time code that uses full frames for timing. It is used in audio-only applications and with black and white video.
<b>NTSC</b>	National TV Standards Committee. The television and video format used in the USA and Japan. The basic frame rate is 30 fps for monochrome and 29.97 fps for color transmissions and recording.
<b>Offset</b>	The amount of difference between the program time code and an event. Tracks and entire machines can be offset. Offsets are sometimes added to correct for incorrect time code numbers on a tape or to compensate for timing delays between machines.
<b>Operating State</b>	There are eight operating states of the MMR-8, Normal, Setup, Load Track, View Track, Slip Track, Backup, Verify, and Error. These are distinguished by the nature of the information displayed in the LCD window and by the keys that are available while in each state.
<b>PAL</b>	Phase Alternating Line. The main European broadcasting standard that uses a 25 fps rate.
<b>Phase Lock</b>	The process where a machine is locked to reference signal (or to another machine’s reference signal) so that its reference signal can be matched in phase by controlling the speed of the machine compared to the other machine or to a speed reference signal.
<b>RAM</b>	Random Access Memory. To convert audio from analog into digital, or vice versa, a RAM buffer is required to allow the continuous analog audio to be converted into “chunks” of digital data and the chunks of data from the hard drive to be converted back into continuous analog audio.
<b>Rate</b>	How many ticks per second of some clock or other counter. There are various rates used in the MMR-8 include fps (frames per second), ppf (pulse per frame, biphasic), word clock (samples per second)
<b>Reference</b>	The master clock. The MMR-8 uses two reference signals: a sample reference

<b>Abbreviations and Terms</b>	<b>Definitions</b>
	for the audio and a frame reference to keep the audio timed correctly to the video or film frame.
<b>Register</b>	A memory that holds a time code position or other number. There are 11 dedicated registers (to hold such numbers as the Head, Tail, In and Out points, etc.) plus 10 memory registers (0 -9) in the MMR-8.
<b>Reshape</b>	The process of regenerating incoming time code so that the time code output is clean and free of noise or other signal distortions.
<b>Resolving</b>	The process of regulating the playback speed of a machine through phase locking a recorded signal on the tape to a fixed reference signal.
<b>Safe</b>	No recording can take place since all record enables are locked out.
<b>Sample Reference</b>	The reference for the digital audio sample clock in the MMR-8. It can come from a digital input, from the word clock input, or from the frame reference.
<b>SCSI</b>	Small Computer System Interface. The bus that connects external removable drives to the MMR-8.
<b>Setup Menus</b>	The method through which operating parameters are changed and set in the MMR-8. To bring up the Setup Menus on the LCD display press the Setup key.
<b>Shuttle</b>	Manual control over the machine transport from stop to play to fast forward and from stop to reverse play to rewind through using the Wheel.
<b>Slip</b>	The process of adding slight timing offsets to individual tracks.
<b>SMPTE</b>	Society of Motion Picture & Television Engineers. The organization that developed and approved the video time code that is often referred to as SMPTE or SMPTE/EBU code.
<b>Sync Group</b>	Each MMR-8 can be placed into one of four Sync Groups, or groups of machines that can be controlled together. The Sync Group also selects the biphasic input that is being used.
<b>Sync Word</b>	Part of the SMPTE/EBU time code, the sync word indicates the end of the time code word. It can also be used to determine the direction the transport is moving as well as for phase locking.
<b>TC</b>	Time Code. The 80 bit biphasic-encoded code that marks the time on a video or audio tape in hours:minutes:seconds:frames:subframes. It also identifies the type of code being used (DF or NDF). It can be recorded longitudinally along the edge of a tape or recorded within the vertical interval on a video tape. Time code can also be encoded onto film, although in most applications the time code will be generated from the film transport biphasic signal.



<b>TC Generator</b>	Time Code Generator. A device to create the 80 bit time code signal for recording onto a video or audio tape. The MMR-8 contains a built-in generator which is always sending out TC when the MMR-8 is playing.
<b>TC Reader</b>	Time Code Reader. The circuit in the MMR-8 that reads incoming time code from the time code inputs. Typically used to slave the MMR-8 to another time code generator's output.
<b>Tail</b>	The end of the track's audio.
<b>Track</b>	Can refer to one of the audio channels in the MMR-8, but typically it refers to the edited audio for one track of audio on the reel.
<b>Track Select</b>	The process of selecting which tracks an action affects through using the SEL key for that track.
<b>Transport</b>	A generic reference to any audio, video, or film device that mechanically "moves tape" or electronically plays audio or video.
<b>Trim</b>	The process of adjusting the time code using the Wheel.
<b>Unmount</b>	The process of releasing the removable hard drive from the MMR-8 so that it can be removed.
<b>User Settings</b>	When any MMR-8 Setup parameters have been changed, the new settings can be saved in a User Settings File (menu 900). Ten User Settings are available.
<b>Video Sync</b>	Also known as house sync, it is generated by an extremely stable video source and consists of black burst, sync bars, or composite video. It's used as a timing reference to synchronize video devices throughout a video facility.
<b>Virtual Tracks</b>	Audio tracks that are "stacked" on top of one another so that alternate takes can be kept at hand. Only the track on top will actually play back.
<b>VITC</b>	Vertical Interval Time Code. SMPTE/EBU time code that is recorded within the video signal on a VTR. VITC can be read during fast searches and even when the video machine is paused since the rotating VTR heads are always reading the video portion of the tape. Not supported on the MM Series.
<b>VSO</b>	Variable Speed Oscillator. Indicates that the audio is not being played back at a "standard" playback speed, but is rather playing back at an off-speed for an effect or to compensate for incorrect timing between devices.
<b>Word Clock</b>	The digital audio clocking signal (44.1 or 48 kHz most commonly used) used to synchronize audio devices.
<b>Wheel</b>	The rotary encoder on the MMR-8 front panel that can be used to trim, jog, and shuttle audio, in addition to being used to scroll through the Setup Menus and menu choices.

## Appendix F: Disk Time Chart

### Disk Time Chart

TASCAM MMR-8 and MMP-16 System

<b>MMR-8 Available Rec. Time</b>	<b>48 kHz - 8 Channels</b>						<b>48 kHz - 1 Channel</b>					
Sampling Rate (kHz)	48	48	48	48	48	48	48	48	48	48	48	48
Word Length (bits)	16	16	16	24	24	24	16	16	16	24	24	24
Hard Drive Capacity (GB)	2	4	9	2	4	9	2	4	9	2	4	9
Number of Channels	8	8	8	8	8	8	1	1	1	1	1	1
Record Time (mins.)	43	87	195	29	58	130	347	694	1562	231	462	1041
Record Time (hours:mins)	:43	1:27	3:15	:29	:58	2:10	5:47	11:34	26:02	3:51	7:42	17:21

<b>MMR-8 Available Rec. Time</b>	<b>44.1 kHz - 8 Channels</b>						<b>44.1 kHz - 1 Channel</b>					
Sampling Rate (kHz)	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1
Word Length (bits)	16	16	16	24	24	24	16	16	16	24	24	24
Hard Drive Capacity (GB)	2	4	9	2	4	9	2	4	9	2	4	9
Number of Channels	8	8	8	8	8	8	1	1	1	1	1	1
Record Time (mins.)	47	94	213	31	63	142	377	755	1700	251	503	1133
Record Time (hours:mins)	:47	1:34	3:33	:31	1:03	2:22	6:17	12:35	28:20	4:11	8:23	18:53

<b>MMR-8 Available Rec. Time</b>	<b>48 kHz - 2 Channels</b>						<b>48 kHz - 4 Channel</b>					
Sampling Rate (kHz)	48	48	48	48	48	48	48	48	48	48	48	48
Word Length (bits)	16	16	16	24	24	24	16	16	16	24	24	24
Hard Drive Capacity (GB)	2	4	9	2	4	9	2	4	9	2	4	9
Number of Channels	2	2	2	2	2	2	4	4	4	4	4	4
Record Time (mins.)	174	347	781	116	231	521	87	174	391	58	116	260
Record Time (hours:mins)	2:54	5:47	13:01	1:56	3:51	8:41	1:27	2:54	6:31	:58	1:56	4:20

<b>MMR-8 Available Rec. Time</b>	<b>44.1 kHz - 2 Channels</b>						<b>44.1 kHz - 4 Channel</b>					
Sampling Rate (kHz)	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1
Word Length (bits)	16	16	16	24	24	24	16	16	16	24	24	24
Hard Drive Capacity (GB)	2	4	9	2	4	9	2	4	9	2	4	9
Number of Channels	2	2	2	2	2	2	4	4	4	4	4	4
Record Time (mins.)	189	378	850	126	252	567	94	189	425	63	126	283
Record Time (hours:mins)	3:09	6:18	14:10	2:06	4:12	9:27	1:34	3:09	7:05	1:03	2:06	4:43

<b>MMR-8 Available Rec. Time</b>	<b>44.1 kHz - 16 Channels</b>						<b>48 kHz - 16 Channel</b>					
Sampling Rate (kHz)	44.1	44.1	44.1	44.1	44.1	44.1	48	48	48	48	48	48
Word Length (bits)	16	16	16	24	24	24	16	16	16	24	24	24
Hard Drive Capacity (GB)	2	4	9	2	4	9	2	4	9	2	4	9
Number of Channels	16	16	16	16	16	16	16	16	16	16	16	16
Record Time (mins.)	24	47	106	16	31	71	22	43	98	14	29	65
Record Time (hours:mins)	:24	:47	1:46	:16	:31	1:11	:22	:43	1:38	:14	:29	1:05

**Note: There is a single file limit of one Gigabyte (about 3 tracks hours) for WaveFrame files**

This means no individual contiguous sound file can be longer. This restriction applies only to WaveFrame files. The MMR Reserves 10% of total formatted disk space as a reserve - up to a maximum of 250 MB. This reserve disk space is not figured into the above calculations - actual record time may vary slightly.

## Appendix G: Macintosh File System Error Messages

There are a number of possible file system errors that can occur when attempting to load a Macintosh formatted disk drive. In this case, the top part of the display will be the standard display for the particular mode or state of the MMR/MMP when the error occurred. Some of these messages are longer than the 20 character width of the LCD screen. In this case, to read the rest of the error message, press the right arrow key to scroll the message. Here is a list of error messages that can be displayed by the MMR-8 or MMP-16 and the cause of the error. If any of these error messages occur, check the drive on a Macintosh computer by using a disk repair utility such as Norton Disk Doctor.

01234567890123456789	20 position LCD character positions
<b><i>Standard State Display</i></b> <b>Mac Disk at ID <i>N</i> has Errors, set to Read-Only. Repair on your Mac first please</b>	Top: (Mode Display) Bottom: (Error Message) Cause: MMR detects file system errors on Mac SCSI target ID <i>N</i> while mounting

01234567890123456789	20 position LCD character positions
<b><i>Standard State Display</i></b> <b>MacOpen (exists) failure</b>	Top: (Mode Display) Bottom: (Error Message) Cause: Error opening existing project file. Record or playback.

01234567890123456789	20 position LCD character positions
<b><i>Standard State Display</i></b> <b>MacOpen (create) failure</b>	Top: (Mode Display) Bottom: (Error Message) Cause: Error creating new project file.

01234567890123456789	20 position LCD character positions
<b><i>Standard State Display</i></b> <b>MacCommit Err: <i>N</i></b>	Top: (Mode Display) Bottom: (Error Message where <i>N</i> is Mac error code) Cause: Error while recording data. Record did not complete. Possible file system errors.

01234567890123456789	20 position LCD character positions
<b><i>Standard State Display</i></b> <b>MacRead Err: <i>N</i></b>	Top: (Mode Display) Bottom: (Error Message where <i>N</i> is Mac error code)

	Cause: SCSI Read Error on drive N
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01234567890123456789	20 position LCD character positions
<b>Standard State Display</b> <b>MAC project creation failure</b>	Top: (Mode Display) Bottom: (Error Message) Cause: Could not create project folders for current project.

01234567890123456789	20 position LCD character positions
<b>Standard State Display</b> <b>MAC audio folder creation failure</b>	Top: (Mode Display) Bottom: (Error Message) Cause: Could not create audio folder for current project.

01234567890123456789	20 position LCD character positions
<b>Standard State Display</b> <b>MAC folder creation failure</b>	Top: (Mode Display) Bottom: (Error Message) Cause: Could not create Fade Files folder for current project.

## Macintosh File System Error Codes

The following error codes are used to indicate the various types of Apple Macintosh file system errors. This list is given here to provide information which may be useful in resolving a Macintosh file system error using standard Macintosh file repair utilities. The MMR-8 and MMP-16 do not format Macintosh disks and cannot repair Macintosh file system errors. Please contact the vendor or manufacturer of the disk drive exhibiting the problem for technical assistance with drive problems.

## Volinfo errors

<b>Error Name</b>		<b>Error #</b>
<b>Comment</b>		
READVIFFAILED	-1	Failed to read volume info block
WRITEVIFFAILED	-2	Failed to write volume info block
READVIOUTOFMEM	-3	
WRITEVIOUTOFMEM	-4	
NOTHFSDISK	-5	

## Readwrite errors

<b>Error Name</b>		<b>Error #</b>
<b>Comment</b>		
READSECTFAILED	-10	Couldn't read *any* sectors
WRITESECTFAILED	-11	Couldn't write *any* sectors
INITREADWRITEFAILED	-12	Couldn't init read/write pkg.
INVALIDSTATERECD	-13	Trying to read/write a mountrecord which has not had initreadwrite sucessfully run on it.
CLOSEREADWRITEFAILED	-14	Could not shutdown read/write
WRITESECTUNBUFFAILED	-15	could not perform unbuffered write or sync mount record

## Volume Bitmap errors

<b>Error Name</b>		<b>Error #</b>
<b>Comment</b>		
READVBMcantREAD	-30	Can't read volume bit map
READVBMOUTOFMEM	-31	ran out of mem reading vol bmap
WRITEVBMcantWRITE	-32	can't write volume bit map
CHKVBMAPBADVIBINFO	-33	Volume bitmap is inconsistent
FREECsBADRANGE	-34	Trying to contiguously allocate a bad range
ALLOCSOUTOFMEM	-35	Contiguous allocation ran out of memory
The following result from allocation failing and not being able to rollback the changes that have already been done		
ALLOCScantDEALLOC1	-36	Deallocation failed at stage 1
ALLOCScantDEALLOC2	-37	Deallocation failed at stage 2
ALLOCScantDEALLOC3	-38	Deallocation failed at stage 3
ALLOCSOUTOFBOUNDS	-39	Internal error happened - the allocator returned more space than asked for

## Mac ReadWrite Errors

<b>Error Name</b>		<b>Error #</b>
<b>Comment</b>		
MACREADEXTNOTFOUND	-80	Could not find an extent
GENEDLISTOUTOFMEM	-81	Generate Extent List ran out of memory

GENEDLISTINTERNALERR	-82	Gen extent list had internal err
GENEDLISTBLOCKNOTFOUND	-83	Gen extent list could not a logical block of the file
MACREADOUTOFMEM	-84	read ran out of memory
CANTREADALLOCBLOCK	-85	readsects failed to read a block
MACREADOUTOFBOUNDS	-86	Internal problem -
macread discovered that		
MACREADNOTENOUGHEDS	-87	it read more blocks than were requested there weren't enough extents on the edlist to complete the read
MACWRITECANTGROWFILE	-88	macwrite couldn't expand the file
MACWRITEOUTOFMEM	-89	macwrite ran out of memory
MACWRITECANTREAD	-90	macwrite couldn't read a block
MACWRITECANTWRITE	-91	macwrite couldn't write a block
FILEISNOTWRITABLE	-92	you're trying to write a file that was not opened writeable
FILEISNOTREADABLE	-93	you're trying to read a file that was not opened readable
BADWHENCE	-94	macseek was passed a bad whence
MACWRITEOUTOFBOUNDS	-95	
CANTWRITEALLOCBLOCK	-96	

#### BTREE ERRORS

Error Name		Comment	Error #
BT_MANYEXTENTS	-100	Btree has more than 3 extents	
BT_NODENOTFOUND	-101	Looking for an inexistent node	
BT_BADCATALOGTYPE	-102		
BT_UNIMPLEMENTED	-103		
BT_BADKEY	-104		
BT_FOUNDLESS	-105	The Btree is empty	
BT_NOTFOUND	-106	The key was not found	
BT_BADTREE	-107	A data structure error	
BT_BIGTREE	-108	Don't want to extend the tree	
BT_BADRECORD	-109		
BT_BUG1	-110		
BT_NOTALLOC	-111		
BT_BADNODE	-112		
BT_BUG2	-113		
BT_TOOHIGH	-114	The Btree is higher than BT_MAX_DEPTH	
BT_WRITE_NODE_FAILED	-115		
BT_BADHEADER	-116		
BT_CHECK	-200	CheckBTree	

200 --> 300 reserved for BT\_CHECK

#### Catalog Support Errors

Error Name		Comment	Error #
OPENROOTNOSUCHFILE	-450	Opening the root failed-there is a serious problem with the FS	
PCROUTOFMEMORY	-451	The path resolver ran out of memory	
PCRBADPATHELEMENT	-452	path has a bad element in it	
PCRNOSUCHPATHELEMENT	-453	path has a nonexisting element	
PCRGOTFILENOTDIR	-454	path resolver encountered a file when it was expecting a dir	
PCRCWDNOTDIR	-455	relative path search with a non directory current working dir was attempted	

PCRUNEXPECTEDTYPE	-456	path resolver encountered a thread record
CLOSEFAILED	-470	Unable to close file
MACDIROUTOFMEM	-473	mdirentries ran out of memory
MACDIRTRYDECLWESTFN	-474	Internal error in m/macdirentries
MACCREATEFILEOUTOFMEM	-475	create file ran out of mem
MACCREATEFILECANTDEALLOC	-476	create file failed and then rollback failed
MACCREATEFILENOSPACE	-477	no available space to create file
MACCREATEFOLDOUTOFMEM	-478	create folder ran out of mem
MACCREATEFOLDCANTDEALLOC	-479	create folder failed and then
NOSUCHFOLDER	-480	function could not find folder
MACDELFILEFAILED	-490	macdel couldn't delete a file
MACDELNOSUCHFOLDER	-491	macdelfolder on nonexistent fold
MACDELNOTAFOLDER	-492	macdelfolder on nonfolder
MACDELBADFOLDER	-493	Folder without thread record
MACDELCANTDELTHREADREC	-494	Couldn't delete thread record
MACDELCANTDELFFOLDER	-495	Couldn't delete folder
MACDELNOSUCHFILE	-496	macdelfile on nonexistent file
MACDELNOTAFILE	-497	macdelfile on non-file
MACDELNOTHREADREC	-498	macdelfolder couldn't find thread thread record
CANTCREATEINNONDIR	-499	try to create a file in someplace that is not a folder

<b>Error Name</b>		<b>Error #</b>
<b>Comment</b>		
BADFILEORFOLDERNAME	-500	Illegal file or folder name
MACDELFOLDERNOTEMPTY	-501	try to del nonempty folder
NAMETOOLONG	-502	bad name - too long
MOVENOTFOLDER	-503	movefolder on nonfolder
MOVENOTHDREC	-504	movefolder couldn't find thread record
MOVECANTMODIFYTHDREC	-505	movefolder couldn't modify thread record
MOVECANTDELFFOLDREC	-506	movefolder couldn't del old folder record
MOVECANTPUTNEWFFOLDREC	-507	movefolder couldn't put new folder record
MOVECANTDELFFILERE	-509	movefile couldn't del file rec
MOVECANTPUTNEWFFILERE	-510	movefile couldn't put new file rec
MOVENOTFILE	-511	movefile on non file
MOVEWOULDVERWRITE	-512	move would overwrite something
MOVENOTFILEORFOLDER	-513	move on nonfile/nonfolder
TOOMANYOPENFILES	-514	open failed because catrectable is full
MOVEPARENTINTOCHILD	-515	Try to move parent folder into child folder failed
MOVEINTERNALERROR	-516	Move encountered internal error
MOVEFAILDURINGFAIL	-517	Move failed, then failed during rollback - bad
CANTFINDTHDREC	-518	Couldn't find a thread record
MGROWDOESNTTRUNC	-519	Trying to truncate using mgrowfile
MGROWNOTENOUGHSPACE	-520	mgrowfile could not find enough space to grow to desired size
MGROWCANTFINDLASTER	-521	mgrow could not find last extent record of the file
MGROWCANTWRITELASTER	-522	mgrow couldn't write the last extent record of a file
MGROWGREWTOWRONGSIZE	-523	mgrowfile internal error file grew to incorrect size
FILEISGONE	-524	This means that you are trying to read, write, or close an open file which someone deleted/moved out from under you.
CANTUPDATEDIR	-525	Could not update directory times and

BADPATH	-526	valence was given a bad path
CANONLYOPENFILES	-527	Try to macopen a non-file
TRUNCTONONZEROSIZE	-528	Tried to truncate to nonzero size
CANONLYTRUNCFILES	-529	Tried to truncate a nonfile
CANTOVERWRITEDIR	-530	Tried to overwrite a folder
CREATEFOLDWOULDWRITE	-531	Creating the folder would overwrite an existing item
MACREADCANTREAD	-550	macreadblocks failed in mread
FILEISNOTOPEN	-551	Tried to close nonopen file
INVALIDMFILE	-552	The MFILE you passed is garbage
CANTSETNONFILEFINDERINFO	-553	We only do files right now...
CANTGETNONFILEFINDERINFO	-554	We only do files right now...
CANNOTCREATEFILE	-555	Only create files with absolute path
FILEISINUSE	-556	Cannot delete open files

### Partition Errors

Error Name	Error #	Comment
PARTOUTOFMEM	-600	Ran out of memory
PARTCANTREADSECTZERO	-601	Couldn't read the device map
UNRECOGNIZEDTYPE	-603	Doesn't have valid device map
PARTCANTREADPARTMAPSECT	-604	Couldn't read partition map
BADPARTITION	-605	Asked to mount a non MAC HFS partition
Error Name	Error #	Comment
NOTMACHFSPART	-606	It looked like a MAC HFS part, but after reading vib, we don't think so
ALLOCSBITMAPFULL	-607	No more room left on disk
FOLDERNAMETOOLONG	-608	safeguard in create/delete folder routines
INVALIDOFFSET	-609	offset not madgetsector too big.
NOTSECTORALLIGNED	-610	offset to macgetsector not sector aligned
SECTOR_SIZE_MISMATCH	-611	Sector size gotten from device does not match sector size in partition table



## Appendix H: MMR/MMP MIDI Machine Control Protocol

All numerical values are hexadecimal, unless otherwise noted. For descriptions of the following commands and responses, please refer to the MIDI Machine Control 1.0 specification, subtitled MIDI 1.0 Recommended Practice RP-13, January 1992.

MMC Commands:	Comments
01 STOP	
02 PLAY	
03 DEFERRED PLAY	
04 FAST FORWARD	
05 REWIND	
06 RECORD STROBE	( RECORDER ONLY )
07 RECORD EXIT	( RECORDER ONLY )
09 PAUSE	
0B CHASE	( requires time code input)
0D MMC RESET	
40 WRITE	
41 MASKED WRITE	( RECORDER ONLY )
42 READ	
44 LOCATE	
45 VARIABLE PLAY	( defaults to shuttle )
46 SEARCH	( defaults to shuttle )
47 SHUTTLE	
4C MOVE	
52 GROUP	
54 DEFERRED VARIABLE PLAY	

Note: In all velocity commands and information fields, the MMR-8 and MMP-16 support multiples of play speed from +/- 20 with 1/1024 fractional resolution.

## MMC Information Fields

Hex	Field	Read / Read Write
01	SELECTED TIME CODE	r
02	SELECTED MASTER CODE	r
03	REQUESTED OFFSET	RW
04	ACTUAL OFFSET	r
05	LOCK DEVIATION	r
08	GP0/LOCATE POINT	RW
09	GP1	RW
0A	GP2	RW
0B	GP3	RW
0C	GP4	RW
0D	GP5	RW
0E	GP6	RW
0F	GP7	RW
21	short SELECTED TIME CODE	r
22	Short SELECTED MASTER CODE	r
23	Short REQUESTED OFFSET	r
24	short ACTUAL OFFSET	r
25	short LOCK DEVIATION	r
26	short GENERATOR TIME CODE	r
28	Short GP0/LOCATE POINT	r
29	Short GP1	r
2A	Short GP2	r
2B	Short GP3	r
2C	Short GP4	r
2D	Short GP5	r
2E	Short GP6	r
2F	Short GP7	r
45	TIME STANDARD	RW
48	MOTION CONTROL TALLY	r
49	VELOCITY TALLY	r
4C	RECORD MODE	RW ( RECORDER ONLY )
4D	RECORD STATUS	r ( RECORDER ONLY )
4E	TRACK RECORD STATUS	r ( RECORDER ONLY )
4F	TRACK RECORD READY	RW ( RECORDER ONLY )
50	GLOBAL MONITOR	RW ( RECORDER ONLY )
51	RECORD MONITOR	RW ( RECORDER ONLY )
53	TRACK INPUT MONITOR	RW ( RECORDER ONLY )
58	CONTROL DISABLE	RW
5A	CHASE MODE	r

RW - indicates read / write    r - indicates read only

## MMR-8 MMC Signature

2E,	count = n
01, 00, 00, 00,	vi vf va vb
14,	<count_1>
7E, 5D, 00, 00, 00,	c0 c1 c2 c3 c4
00, 00, 00, 00, 00,	c5 c6 c7 c8 c9
71, 31, 50, 00, 00,	c10 c11 c12 c13 c14
00, 00, 00, 00, 00,	c15 c16 c17 c18 c19
14,	<count_2>
7E, 7E, 03, 00, 00,	r0 r1 r2 r3 r4
7E, 7E, 03, 00, 00,	r5 r6 r7 r8 r9
25, 66, 0F, 28, 04,	r10 r11 r12 r13 r14
00, 00, 00, 00, 00,	r15 r16 r17 r18 r19

## MMP-16 MMC Signature

2E,	count = n
01, 00, 00, 00,	vi vf va vb
14,	<count_1>
7E, 5D, 00, 00, 00,	c0 c1 c2 c3 c4
00, 00, 00, 00, 00,	c5 c6 c7 c8 c9
71, 31, 50, 00, 00,	c10 c11 c12 c13 c14
00, 00, 00, 00, 00,	c15 c16 c17 c18 c19
14,	<count_2>
7E, 7E, 03, 00, 00,	r0 r1 r2 r3 r4
7E, 7E, 03, 00, 00,	r5 r6 r7 r8 r9
25, 66, 0F, 28, 04,	r10 r11 r12 r13 r14
00, 00, 00, 00, 00,	r15 r16 r17 r18 r19

## MIDI Inquiry Message

General Response: F0 7E <channel> 06 02 mm ff ff dd dd ss ss ss ss F7

The MMR-8 and MMP-16 engineering development is done by TimeLine Vista, Inc. The MIDI inquiry response codes are therefore those of TimeLine and not TASCAM.

The MMR-8 responds to a MIDI Inquiry message as follows:

mm	TimeLine manufacturer system exclusive ID	00 00 49
ff ff	Device Family Code	04 00 (LSB First)
dd dd	Device Family Member Code	00 00 (LSB First)
ss ss ss ss	Software Revision Level	00 00 xx xx (e.g. 03 00)

The MMP-16 responds to a MIDI Inquiry message as follows:

mm	TimeLine manufacturer system exclusive ID	00 00 49
ff ff	Device Family Code	04 00 (LSB First)
dd dd	Device Family Member Code	01 00 (LSB First)
ss ss ss ss	Software Revision Level	00 00 xx xx (e.g. 03 00)

# Index

---

## 2

24-BIT REC LED .....	49
----------------------	----

---

## A

<b>AC Power Cord</b> .....	22
Active Mode/Key Indicators.....	48
AES/EBU connection.....	14
AES/EBU Digital Audio Connector.....	145
AES/EBU Sample Rate.....	30
AIFF File Support.....	121
AIO.....	13
Akai DD-8 Support.....	122
All Safe.....	102
<b>Analog I/O Cables</b> .....	25
Analog In/Out Connections.....	28
Analog Input & Output Connectors.....	144
Approved SCSI Drives.....	137
Audio Connections.....	28
audio inputs.....	14
audio outputs.....	14
Auto Input.....	107

---

## B

Back Panel Connections.....	26, 27
Backup.....	62, 73
Backup Function.....	73
Backup Functions.....	73
<b>Backup</b> state.....	18
Backup State Display.....	53
Backup Status Display.....	77
Basic Operation.....	69
Biphase Chase.....	96
Biphase Connections.....	30
Biphase Connectors.....	144
Biphase Frame Rate.....	103
Biphase Input.....	104
Biphase Operations Board.....	13
Biphase Pulse Rate.....	104
biphase pulse rates chart.....	125
Biphase Setup Menus.....	126
Broadcast Wave Format.....	122
BUSY LED.....	49

---

## C

Cable Information.....	141
CAL LED.....	49
<b>Capt</b> .....	65
Capturing the Current Time Code.....	78
Cleanup.....	109
<b>Clear</b> .....	80
Clip LED on Play.....	107

Clip Names.....	72
<b>CLR</b> .....	65
Configuration Settings .....	48
Control Mode .....	96
Control Panel Command Summary.....	133
<b>Copy</b> .....	80
Crossfade .....	107
Crossfades in OMF.....	76
<b>Cut</b> .....	80

---

## D

Dailies Mode .....	103
Date and Time .....	110, 111, 112
Default Record Drive .....	72
Delete.....	61
Mac Disks.....	114
deleting audio files for Pro Tools Sessions.....	118
Deleting Tracks .....	71
Delta ( $\Delta$ ) Trim .....	57
DESTRUCTIVE LED.....	49
DEVA Files.....	122
DIG IN LED.....	49
<b>Digital I/O Cables</b> .....	25
Digital In/Out Connections.....	28
Digital Input Delay .....	108
Digital Input Ref Track .....	108
Digital Output Delay .....	108
DIO.....	13
Disabling Pro Tools Volume Automation .....	120
Disk Cleanup.....	109
Mac Disks.....	114
Disk Encoding .....	108
Disk Initialization .....	72
Disk Initialize .....	69, 109
Disk Low Format.....	69, 109
Disk Time Chart .....	154
disk volume will not mount.....	114
Disks Mounted .....	109
<b>Down Arrow</b> .....	56
Drive Compatibility Chart.....	137
DVD RAM.....	37
<b>Dynamic Voice Allocation</b> .....	116

---

## E

Edit .....	82
Edit commands.....	59
<b>Edit Sync Mode</b> .....	84, 103
Editing .....	80
Editor.....	97
Editor Auto EE.....	104
Editor Chase.....	106
Editor Connector.....	142
Editor Device.....	104
Sony BVU-950.....	104
Sony PCM-7030.....	104
TASCAM MMR-8.....	104
Editor Edit Field .....	105
Auto.....	105
Field 1 .....	105
Field 2 .....	105

Editor Port.....	97
Editor Track Arm.....	105
Entry Register.....	78
ERROR LED.....	49
<b>Error</b> state.....	18
Error State Display.....	54
Event.....	60
Export.....	75
Export As.....	77
Export function.....	75
External Controllers & Bus Connections.....	31
External Drives.....	131
External SCSI Media.....	33

---

## ***F***

Factory Default Settings.....	42
Fade File folder.....	115
fade files.....	116
Fairlight MFX3 support.....	124
<b>Fast Forward Key</b> .....	56
file system errors.....	114
Film Post Production.....	125
Format Chart.....	124
Formatting Disks.....	131
formatting Macintosh disks.....	72, 113
Formatting Macintosh Disks.....	72, 113
frame rate/sample rate support.....	117
Frame Reference.....	98
Automatic.....	98
Video.....	98
Free.....	64
Front Panel Controls.....	55
Front Panel Controls and Indicators.....	48

---

## ***G***

Gapless Punchout.....	108
Glossary.....	148
Grounding.....	25

---

## ***H***

Hardware Overview.....	13
Head.....	65
Headphone Jack.....	85
Headphone Volume.....	85
Hybrid Protocol on Serial Port.....	98

---

## ***I***

Ident Assigned.....	88, 100
Ident Request.....	88, 100
In Point.....	64
<b>Input</b> .....	60
Input Level Calibration.....	128
Input Source.....	107
<b>Insert</b> .....	81
Installation.....	22
Installing Multiple MMR Units.....	24

Intel Pentium™ .....	13
INTERLOCK LED .....	49
Introduction .....	12
IP	
Gateway .....	111
NetMask .....	111
IP Address Format .....	111
IP Address Rules .....	111

---

## *J*

Jaz drive .....	37
<b>Jog</b> .....	57

---

## *K*

Keyboard Operation .....	38
Keypad Group .....	63
<b>Keys</b> .....	44
Keys & Definitions .....	44
Kingston Carrier .....	13
Kingston Frame Configuration .....	34
Kingston removable drive carrier .....	22

---

## *L*

LCD .....	14
LED Indicators .....	48
LED peak meters .....	14
LIM/DOW .....	37
LIMDOW .....	37
Liquid Crystal Display (LCD) .....	50
<b>Load Track</b> .....	60
<b>Load Track</b> state .....	17
Load Track State Display .....	52
Loading a Project, Session, or Composition .....	70
Loading and Mounting Drives .....	69
Loading Individual Tracks .....	70
<b>LOC (Locate)</b> .....	68
Local/Bus .....	96
LOCK LED .....	49
<b>Loop</b> .....	67
Loop Mode .....	102
Loop Record .....	102
Low Format .....	72, 109
Lynx Bus .....	85, 100, 127
Lynx Bus / KCU Connection .....	31
Lynx Bus Address .....	100
Lynx Bus V500 Mode .....	100
Lynx Connector .....	142
<b>Lynx KCU</b> .....	38
LYNX KCU 900 software .....	85
Lynx Sync .....	63

---

## *M*

Machine Name .....	110
Machine Settings	
000 Basic Setup .....	96

100 Bus Control.....	100
200 Transport.....	101
300 Biphase.....	103
400 Remote.....	104
500 Audio.....	107
800 Tracks/Project.....	109
900 System.....	110
Machine Status LEDs.....	49
Macintosh data block sizes.....	118
<b>Macintosh File System Errors</b> .....	114
<i>Macintosh Files</i> .....	114
Magneto-Optical.....	37
Maintenance & Service.....	128
Materials Kit Box.....	22
Meter Calibrate.....	107
Meter LEDs.....	48
Meter Reference Level.....	107
MIC.....	13
MIDI Connections.....	31
MIDI Device ID.....	106
MIDI In/Thru/Out Connector.....	142
MIDI LED.....	49
missing files.....	114
MMR Bus.....	88
MMR Bus Request.....	88, 100
<b>MMR Bus Sync Cable</b> .....	22
MMR Sync Bus Connections.....	31
MMR-8 Front Panel.....	46
MMR8 Projects Folder.....	114
MMR-Bus Connector.....	145
MM-RC Remote Control.....	38
MOC.....	13
MOC Calibration Procedure.....	129, 130
Mon.....	60
Monitoring.....	85
Monitoring Connections.....	28
Mount.....	55
mutes in Session files.....	116

---

## N

<b>NARROW SCSI</b> .....	34
Next / Previous Mode.....	102
Next Edit.....	65
Nikon Beluga AV.....	37
Non-Destructive.....	101
<b>Normal state</b> .....	17
Normal State Display.....	50
Norton Disk Doctor.....	114
Numeric Keys.....	63

---

## O

Offset.....	64
OFFSET LED.....	49
OMF Export.....	75
OMF Files.....	121
OMF import to Pro Tools.....	76
<b>Online Key</b> .....	55
<b>Open</b> .....	82
Optical Drives.....	37
Out Point.....	64
Output Level Calibration.....	128



---

## P

<b>Panel/Display State Chart</b> .....	19
Panel/Display states .....	17
Parallel I/O .....	106
Parallel Track Arm.....	106
Parallel Tracks.....	32
Parallel Transport .....	32
<b>Paste</b> .....	81
PC Keyboard .....	39
PC-AT style keyboard.....	38
<b>Play Key</b> .....	55
Post-roll.....	102
Powering Up.....	40
Pre-roll.....	102
Previous Edit .....	64
Pro Tools.....	76
Pro Tools Export.....	76
Pro Tools Session Export .....	76
Pro Tools Session file .....	115
Pro Tools Session folders.....	115
Pro Tools Volume and Mute Automation.....	119
Pro Tools® Session Files .....	115
Project Name .....	109
PRX (DSP) card .....	13
PRX Connector.....	147
Pull Up / Pull Down.....	117
punch in restriction .....	117

---

## R

Rack Ears .....	23
<b>Rack Ears Kit</b> .....	22
<b>RCL (Recall)</b> .....	66
Reader .....	64
<b>REC (Record) Key</b> .....	56
Recall User Settings.....	110
Recalling Registers.....	78
Record Disk SCSI ID.....	108
record doesn't work.....	114
<b>Record Enable</b> .....	58
Record Key.....	102
Record Mode.....	101
Recording a New Project.....	71
Recording Format.....	108
<b>Redo</b> .....	82
Reference Tone.....	107
Registers .....	77
<b>REH (Rehearse) Key</b> .....	56
Rehearse Key.....	102
Remote Meter Source.....	108
Removable Media.....	131
Rename .....	74
<i>Restrictions on Pro Tools support</i> .....	117
<b>Reverse Play Key</b> .....	55
<b>Reversed Text</b> .....	44
<b>Rewind Key</b> .....	55

---

## S

SAFE LED .....	49
----------------	----

Sample Rate .....	99
Sample Reference .....	98
AES/EBU Input .....	98
Automatic .....	98
Ext Wordclock .....	99
Sample Reference Connections .....	30
SCSI .....	13
SCSI Cables .....	33
SCSI Connector .....	147
SCSI Drives.....	36
SCSI Termination .....	34
<b>SEL (Track Select)</b> .....	59
Serial Connectors.....	147
Serial Editor Connection .....	32
Serial Transport .....	97
Serial Transport Connection .....	32
Service .....	128
session start time restrictions .....	117
<b>Setup</b> .....	56
Setup and Wheel Group .....	56
Setup Menu Chart.....	91
Setup Menus.....	89
Setup Operation .....	90
<b>Setup</b> state .....	17
Setup State .....	89
Setup State Display .....	51
<b>Shift</b> .....	66
<b>Shift Key</b> .....	44
<b>SHTL (Shuttle)</b> .....	57
<b>Slip</b> .....	62
Slip Commit .....	103
<b>Slip Track</b> state.....	17, 18
Slip Track State Display.....	52
SMPTE/EBU Time Code In/Out .....	29
Software updates.....	41, 132
Sonic Solutions File Support .....	123
Sony P2.....	97
Sound Designer II .....	121
sound designer II files .....	115
<b>STO (Store)</b> .....	66
<b>Stop Key</b> .....	55
Store User Settings.....	110
Sync card.....	13
Sync Group.....	100
SyQuest.....	37
System Software .....	132
System Specifications .....	20

---

## T

Tail .....	64
Tape Mode .....	101
Tape Mode backup.....	62
Tape Mode Length.....	103
Tape Mode Start .....	103
TapeMode Convert .....	74
TapeMode Convert function.....	74
TapeMode recording with Pro Tools.....	118
Tascam DA-88.....	14
Tascam MM-RC .....	15, 38
<b>TDM Plug-Ins</b> .....	116
Technical Support.....	132
Testing MMR-8 Installation .....	42
<b>Text Above Keys</b> .....	44

Time Code Chase.....	96
Time Register .....	65
Time Stamp.....	120
Timecode.....	29
Timecode In Connector.....	146
Timecode Out Connector.....	146
Timecode Type.....	99
TimeLine Lynx Keyboard Control Unit.....	15
TONE LED.....	49
<b>Toolkit</b> .....	22
<b>Track</b> .....	62
Track Group.....	58
Track Mode keys.....	17
track number limitation.....	117
Track Prefix.....	109
Track Status Indicators.....	48
Transport (Sony 9-pin) Connector.....	143
Transport Group.....	55
<b>Trim</b> .....	57
Trimming Time Code Values.....	78

---

## U

UI/B.....	13
<b>Undo</b> .....	82
Unload.....	62
Unloading Tracks.....	71
Unmount.....	55
<b>Up Arrow</b> .....	56
<b>Using TapeMode with ProTools Sessions</b> .....	118

---

## V

Varispeed.....	97
Varispeed Rate.....	99
<b>Verify</b> state.....	18
Verify State Display.....	54
Verifying MMR-8 Installation.....	40
Video In/Out.....	29
Video In/Out Connector.....	146
Video Post Production.....	127
Video Reference Signals.....	29
<b>View Track</b> state.....	18
View Track State Display.....	51
Viewing Tracks.....	71
ViewNet Audio.....	16
<b>Voice Output Assignments</b> .....	117

---

## W

WaveFrame Compatibility.....	139
WaveFrame Export.....	75
Wheel.....	58
<b>WIDE SCSI</b> .....	34
Wide SCSI Cards.....	35
Word Clock.....	30
Word Clock In Connector.....	146
Word Clock Out Connector.....	146
World Wide Web.....	132

---

**Z**

Zaxcom DEVA ..... 121, 122

