

MACKENZIE

MB

**HIGH FIDELITY MULTI-CHANNEL
DIGITAL AUDIO PLAYER**



User's Manual

Version 1.3 Revised 19, January 2016

Doc 99-20-088

General Safety Instructions

Always follow these basic safety precautions when using the system:

1. Read carefully and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. DO NOT block or cover ventilation slots and openings.
4. DO NOT place the product in a closed enclosure or cabinet unless proper ventilation is provided.
5. Never spill liquid on the product or drop objects into the ventilation slots and openings. Doing so may result in serious damage to the components.
6. Repair or service must be performed by a factory authorized repair facility.
7. DO NOT staple or otherwise attach the power supply cord to building surface.
8. DO NOT use the product near or in wet or damp places, such as wet basements.
9. DO NOT use extension cord. Install within 6 feet of a grounded outlet receptacle.
10. DO NOT install during lightning storm.
11. Never touch un-insulated wires or terminals unless the unit is disconnected from both power and the rest of the phone system.
12. Use Caution when installing or modifying configuration switches or control lines.
13. The unit must be securely attached to a wall board, rack or table mounted.



CAUTION: If any wiring from the system leaves the building premises, you must use proper electrical protectors.

Regulations:

FCC (Part 15) Radio Frequency Interference

The M3 generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. Unit complies with the limits for Class A devices in accordance with the specifications in Subpart J of Part 15 of the FCC Rules. This testing is designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient the radio or TV receiving antenna.

-Relocate the unit with respect to the radio or TV receiver or vice-versa.

-Plug the unit into a different outlet so that it and the radio or TV receiver are on different branch circuits

-If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

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Shipping Container Contents

The following items should be found in the packaging of the Digital Audio Record/Play System:

- M3 System
- Installation and User Guide
- Set of four rubber feet

Optional Accessories:

- M3-PS - 12VDC 1.0 amp power pack
- M3-SW, Composer software
- Larger capacity SD Card memories
- M3-RM-x - M3 rack mount packaging. 1U package contains power supply and houses up to 4 M3 modules. Must be ordered as a system, not field upgradable.

1 OVERVIEW

1.1 Features and Capabilities

The Mackenzie M3 system is the most flexible series of high fidelity, multi-channel solid state digital audio playback systems available to the industry. The M3 is backed by Mackenzie's years of system design experience.

The M3 retrieves MPEG (MP3) or WAV audio data from non-volatile SD Card memory, eliminating the need for battery backup, and delivers superb full bandwidth sound quality.

The M3 is offered in the following configurations:

Model #	Description
M3.1	Single Balanced Stereo audio channel, 10 message input selections, RS232, wall mount package
M3.1+1	Dual Balanced Stereo audio channels, 10 message input selections each, RS232, wall mount package
M3.2	Single Balanced Stereo audio channel, 20 message input selections, RS232, wall mount package
M3-RM-x	M3 Rack Mount packaging. 1U package contains power supply and houses up to 4 M3 modules. Must be ordered as a system, not field upgradable.

Messages are stored on SD Card memory cards (1GB included). Messages are randomly and instantly accessible. Messages are stored as FAT formatted, allowing each of the messages to be of different duration and allows replacement messages to be a different length than the original, maximizing memory efficiency and compatibility with future applications.

Messages can be stored in MPEG I, Layer III, or WAV file formats. Composer software allows a Windows computer to create entire programs with .WAV files then converts them to MPEG. The MPEG files then may be copied to the SD card from the computer or downloaded directly to the M3 over the RS232, or USB port.

Message playback is controlled by simple contact closures or by RS232 commands. Audio outputs are balanced and level is controlled via potentiometers. Form C relay connections are provided to indicate that the M3 is playing on each audio channel.

The M3 offers several different playback modes to accommodate different applications. Play/repeat, Play once per closure, Play while active, and Retrigger allow the user to customize input logic. Message repetition and delay between messages is user selectable as well.

The M3's small size, industrial construction and the absence of moving parts makes it ideal for automatic unattended operation, especially in harsh environmental or mobile conditions.

1.2 General Specifications

Audio Quality

Sample Rate: 44.1kHz
Dynamic Range: 85dB
Frequency Resp.: 20Hz - 20kHz
THD: <0.1% at 1kHz

Audio Output

Type: Balanced, analog
Mode: Stereo or dual mono
Connection: Pluggable euro terminals
Level: +4dB max., 150 ohm
Adjust: Potentiometer

Audio Memory

Type: FAT formatted SD Card

Power

Input Voltage: 12VDC @ 1 amp
Connection: 2 pin, 3.81mm euro terminal

Audio Data Formats

Compressed: MPEG 1, Layer III
Rates(mono): 7kHz = 32k bits per sec.
15kHz = 64k bits per sec.
20kHz = 128k bits per sec.

Audio File Naming

First Message: 1.mp3 **or** 1.wav
Second Message: 2.mp3 **or** 2.wav

Control I/O

Control Inputs: Individual message start, stop
RS232: 115.2kbaud (9.6k optional),
8 data bits, 1 stop bit, no parity
Relay Outputs: Playing
Interface: 2.5mm spring terminals

Mechanical

Wall Mount/Table top 5.7"W x 6" L x 2.4" H
Rack mount 1U Package
Chassis Aluminum extrusion, painted

1.3 Hardware Configurations

1.3.1 M3.1

Single Balanced Stereo audio channel, 10 message input selections, RS232, wall mount/table top package.

- Channel 1 Left channel balanced audio output
- Channel 1 Right channel balanced audio output
- Channel 1 Playing Relay (Form C)
- Stop contact (Channel 1)
- Start contacts 1 - 10
- Input Common
- Power Connection
- Channel 1 Audio Level Adjustments, L/R
- Channel 1 Playing LED
- Configuration Switches
- RS232 Connection

1.3.2 M3.1+1

Dual Balanced Stereo audio channels, 10 message input selections each, RS232, wall mount/table top package.

The M3.1+1 Interface includes those listed above in section 1.3.1, plus those listed below:

- Channel 2 Left channel balanced audio output
- Channel 2 Right channel balanced audio output
- Channel 2 Playing Relay (Form C)
- Stop contact (Channel 2)
- Start contacts 1 – 10 (Channel 2)
- Input Common
- Channel 2 Audio Level Adjustments, L/R
- Channel 2 Playing LED

1.3.3 M3.2

Single Balanced Stereo audio channel, 20 message input selections, RS232, wall/table top mount package.

The M3.2 Interface include those listed above in section 1.3.1, plus those listed below:

- 2nd Stop contact (Channel 1)
- Start contacts 11 - 20
- 2nd Input Common

2 Installation & Configuration

This section provides complete instructions for mounting the M3 High Fidelity Multi-Channel Digital Audio Player on a Wall or shelf. It also illustrates all interface requirements to auxiliary equipment, including inputs and outputs. Configuration switch settings are provided.

2.1 Installation Steps

These are the general steps for installation.

1. Find a space on the wall or table. For table top applications, install included rubber feet. Allow approximately 6 inches in front of, and 6 inches in back of the unit for user access to memory and wiring.
2. Mount the unit to the selected place with its wiring at least 18" away from power supply or other equipment that generates electrical noise.
3. If you are using the optional power supply, make sure there is a standard electrical outlet available.
4. Connect audio outputs.
5. Connect control inputs and outputs.
6. Set DIP switches to the desired operation.
7. Verify memory is installed. Refer to Section 5 for additional information on checking memory.
8. Connect and apply power.
9. Test unit operation.

2.2 Base model, M3.1, Configuration and Features

This section documents the features and functions common to all versions of the M3.

2.2.1 Power Entry

2 terminal pluggable connector.

- + 12 VDC at 1 amp
- Ground



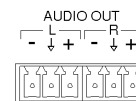
The plug is a rising clamp style termination that accepts up to 16 gauge wire. To insert wire loosen the screw on the top of the plug, insert the wire into the side of the plug, then tighten the screw.

2.2.2 Channel 1, Audio Output

Two 3 terminal pluggable connectors.

- L - Left audio output, inverting
- ↓ Left audio output ground
- L + Left audio output, non-inverting

- R - Right audio output, inverting
- R ↓ Right audio output ground
- R + Right audio output, non-inverting



M3 supports balanced audio output. If unbalanced (single ended) is desired, use audio output non-inverting and audio output ground.

The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

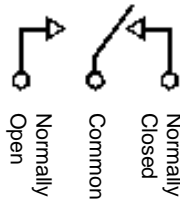
2.2.3 Channel 1, Audio Level Adjustment

Two potentiometers adjust playback level of the left and right channels individually. Range is continuous from -infinity to +3dBm.



2.2.4 Channel 1, Playing Relay

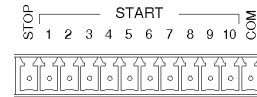
Playing relay is a Form C contact closure. This contact is activated for the length of the playing message and is released when the message ends or is stopped. The playing relay is capable of handling 1A at 24VDC or 0.25A at 110VAC, non-inductive load.



The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

2.2.5 Channel 1, Remote Control

12 position pluggable terminal strip. Use for remote control start of message playback and stopping messages.



Stop	Connect to common to stop message playback
Start 1	Connect to common for message 1 playback
Start 2	Connect to common for message 2 playback
Start 3	Connect to common for message 3 playback
Start 4	Connect to common for message 4 playback
Start 5	Connect to common for message 5 playback
Start 6	Connect to common for message 6 playback
Start 7	Connect to common for message 7 playback
Start 8	Connect to common for message 8 playback
Start 9	Connect to common for message 9 playback
Start 10	Connect to common for message 10 playback
Com	Connecting any input to common activates the function

The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

2.2.6 Channel 1, Playing LED

Green LED which indicates the playing and boot status of the M3.

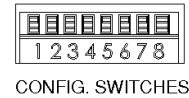


PLAYING

Off	M3 is not playing or no power supplied to the unit
On	M3 is playing on Channel 1
Blink	M3 is executing other functions

2.2.7 Configuration Switches

8 position DIP Switch: **UP**  Position is **OFF**
DOWN  Position is **ON**



This user adjustable dip switch is provided to allow the user to tailor the operation of the M3 to meet their demands. **Note: This dip switch is read by the CPU only upon power up. Changing the position of the dip switch while the module is powered up will have no effect on the operation of the system.**

Number of Plays - 1 , 2

For applications where messages need to be repeated due to noise or for clarity. Repeating messages in this fashion eases system overhead. Global setting for all messages. When message is activated, it will play the programmed number of times.

1

2



Play activated message one time



Play activated message two times



Play activated message three times



Play activated message four times

Delay Between Plays

Messages played immediately after one another can be confusing to the listener. Allowing a delay time can make the playback easier to understand. Global setting for all messages.

3

4



One second delay between plays



Five second delay between plays



Ten second delay between plays



Thirty second delay between plays

Play Mode

Defines playback mode of message sequences. Message sequences are comprised of message material, number of plays and delay between plays

5

6



Standard operation - described in Section 2.2.8



Play one sequence per closure - described in Section 2.2.8



Play while active - described in Section 2.2.8



Re-trigger - described in Section 2.2.8

Play Next

Enabling next message allows Start 10(Remote Control connector, Start 10) to initiate playback of next valid message sequence. First input after power on will play message 1. All operation modes are supported and other start inputs are disabled.

7



Disable



Enable

Memory Protect

Allows user to lock message memory so that messages may not be accidentally overwritten.

8



Unlock message memory



Lock message memory

2.2.8 Play Mode:

Standard Operation: A momentary contact closure causes the device to play one sequence of the message corresponding to that input. A sequence is being the number of plays selected by the dip switches and the selected delay time which separates them. If a contact is maintained active, the system will continuously play that message repeatedly until the input is released at which time the system will finish the current playback sequence and then stop.

If multiple inputs are held active, the system will play one sequence of the first message and then cycle through any other active messages sequentially based on the order which they were input. The message corresponding to the lower input number will have priority should multiple inputs be activated at exactly the same time.

If a momentary contact closure is provided while a message is playing and it is released prior to the ending of the message play, it will be ignored.

The system will only queue messages in this mode when inputs are activated simultaneously. If eight simultaneous inputs are momentarily provided to the system, the device will play all eight message sequences and then stop.

Play one sequence per closure: If an activation input is maintained, the system will only play the message sequence one time. The M3 will wait for the input to go inactive for a preset amount of time before it will recognize that input for subsequent message activation. Other plays activations will be serviced normally even with another input held active indefinitely.

This mode supports message queuing. Message queuing allows the user to input multiple, momentary activation's to the M3, causing each of the messages to be played in the order they were received. The queue length will be 16 messages maximum, including the message which is playing. Any activation issued once the queue is filled will be ignored.

A stop command will stop the message which is currently playing, and when released, the next message in queue will begin playing.

If multiple inputs are held active and maintained, the system will play each of them and then stop.

Play while active: The M3 will be activated upon reception of a maintained input control signal. The message will continue to play for the duration which the control signal is held active. If the input signal is removed prior to the end of the message sequence, the system will immediately abort the playback sequence.

If the input is not removed during the delay time after the last message play in the sequence, another sequence will be initiated. If the input is removed prior to the end of the delay time the message will not be replayed.

If multiple inputs are maintained active while in this mode, the system will only play the lower numbered message and then repeat.

Re-Trigger: This mode allows playing messages to be interrupted by another incoming message, or another activation of the same message. If a message is currently playing and a message activation is received, the currently playing message will be stopped and the new message will be played.

A maintained message activation will only play the sequence one time and then stop. If multiple inputs are activated at exactly the same time, only the lower numbered message will be played.

2.2.9 RS-232 Hardware Configuration:

RS-232 Serial Interface for the control and configuration of the M3. The default port settings are 115.2k baud, No Parity, 8 Bits, 1 Stop Bit. This port is designed for communication with a local user or controller over a short reliable interface. No error detection scheme is implemented over this interface. All command characters and returned information are in ASCII format. When connected properly, the system prompt M3> will be returned.



RS-232
Rx Tx COM

Rx	Receive
Tx	Transmit
COM	Ground

The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

2.2.10 USB Connector

USB type "A" connector for use with a USB memory key. The M3 will upload or download audio files to or from the USB key based on the folder names on the key. See descriptions of supported folder names:

"Complete": ALL files on the M3 will be deleted and replaced with audio files in this folder.

"Delta": Audio files of the same name will be replaced with files in this folder.

If both a "Complete" and a "Delta" folder exist on the key, no audio files will be transferred and an error indication will be displayed on the LEDs.

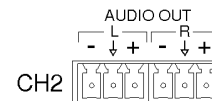
2.3 M3.1+1 Enhanced Configuration and Features:

The M3.1+1 offers all the configuration and features of the base system (as described in Section 2.2) with the addition of a second independent balanced stereo audio output and associated start contacts.

2.3.1 Channel 2, Audio Out:

Two 3 terminal pluggable connectors.

L -	Left audio output, inverting
L ↓	Left audio output ground
L +	Left audio output, non-inverting
R -	Right audio output, inverting
R ↓	Right audio output ground
R +	Right audio output, non-inverting

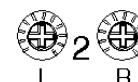


M3 supports balanced audio output. If unbalanced (single ended) is desired, use audio output non-inverting and audio output ground.

The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

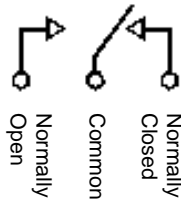
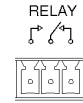
2.3.2 Channel 2, Audio Level Adjust:

Two potentiometers to adjust the playback level of the left and right channels individually. The range is continuous from -infinity to +4dBm.



2.3.3 Channel 2, Playing Relay:

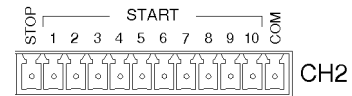
Playing relay is a Form C contact closure. This contact is activated for the length of the playing message and is released when the message ends or is stopped. The playing relay is capable of handling 1A at 24VDC or 0.25A at 110VAC, non-inductive load.



The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

2.3.4 Channel 2, Remote Control:

12 position pluggable terminal strip. Use for remote control start of message playback and stopping messages on channel 2.



Stop	Connect to common to stop message playback
Start 1	Connect to common for message 1 playback on channel 2
Start 2	Connect to common for message 2 playback on channel 2
Start 3	Connect to common for message 3 playback on channel 2
Start 4	Connect to common for message 4 playback on channel 2
Start 5	Connect to common for message 5 playback on channel 2
Start 6	Connect to common for message 6 playback on channel 2
Start 7	Connect to common for message 7 playback on channel 2
Start 8	Connect to common for message 8 playback on channel 2
Start 9	Connect to common for message 9 playback on channel 2
Start 10	Connect to common for message 10 playback on channel 2
Com	Connecting any input to common activates the function

The plug is a spring clamp style termination that accepts up to 16 gauge wire. To insert wire, insert a Jewelers Screwdriver into the upper section of the connection until the spring clamp opens in the lower section. Insert the uninsulated wire, and remove the screwdriver causing the clamp to grab the wire.

2.3.5 Channel 2, Playing LED

Green LED which indicates the playing and boot status of the M3.



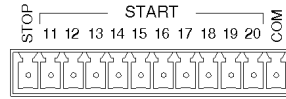
Off	M3 is not playing or no power supplied to the unit
On	M3 is playing on Channel 2
Blink	M3 is executing boot procedure

2.4 M3.2 Enhanced Configuration and Features:

The M3.2 offers all the configuration and features of the base system (as described in Section 2.2) with 10 additional start inputs for Channel 1 control. Start inputs 11 - 20 are located above Start inputs 1 - 10.

2.4.1 Channel 1, Remote Control, 11 - 20:

12 position pluggable terminal strip. Use for remote control start of message playback and stopping messages.



Stop	Connect to common to stop message playback
Start 11	Connect to common for message 11 playback on Channel 1
Start 12	Connect to common for message 12 playback on Channel 1
Start 13	Connect to common for message 13 playback on Channel 1
Start 14	Connect to common for message 14 playback on Channel 1
Start 15	Connect to common for message 15 playback on Channel 1
Start 16	Connect to common for message 16 playback on Channel 1
Start 17	Connect to common for message 17 playback on Channel 1
Start 18	Connect to common for message 18 playback on Channel 1
Start 19	Connect to common for message 19 playback on Channel 1
Start 20	Connect to common for message 20 playback on Channel 1
Com	Connecting any input to common activates the function

The Stop and Common inputs are parallel to the corresponding inputs on the base remote control connector.

3 Audio File Formatting and Naming

The M3 unit can use audio files that are formatted as either *.WAV (44.1 kHz, 16 bit) or *.MP3 (44.1 kHz, 32-320 kbps, VBR).

- Messages may be mono or stereo. Mono messages will play the same through both left and right channels.
- Message lengths can be any size, from a couple seconds to several hours.
- Audio files must be named with the desired message position, as shown below:
 - 1.mp3 or 1.wav will be placed in message position 1, and is controlled by Start Input 1.
 - 2.mp3 or 2.wav will be placed in message position 2, and is controlled by Start Input 2.
 - 3.mp3 or 3.wav will be placed in message position 3, and is controlled by Start Input 3.
 - 4.mp3 or 4.wav will be placed in message position 4, and is controlled by Start Input 4.Etc., etc.

If the SD Card has two files with the same name, but different extension, the MP3 file will play and the WAV file will be ignored.

Important: If the SD Card has a file which has the extension in the file name (e.g.: 3.mp3.mp3 or 3.wav.wav), the unit will neither recognize nor play the file.

4 RS-232 Commands:

Extended control of the M3 system can be performed over the RS232 port. This port can be used to control the device from a Programmable Logic Controller (PLC), or manually from a Terminal style program, such as Hyperterminal. The protocol is human readable, allowing a technician to enter simple control commands. This port provides playback control, diagnostics, system's setting adjustments, and downloading of new messages into the memory card of the M3 system. Each command and associated string must be followed by control, line feed or <CR><LF>.

The RS232 protocol is 8 Data Bits, 1 Stop Bit, no Parity, no Flow Control. The default Baud Rate is 115,200.

The following commands are supported by the M3 system over this port.

4.1 System Functional Commands

Play snippet	PLY (I)
Stop playing	STP (ALL)
System reset	RST
Initiate upload file	ULD
Initiate download file	DLD
Delete file	DEL

4.2 System Configuration Commands

RS232 Baud Rate	SPD
Restore Default Configuration	CFG
Format Memory Card	FMT
Format and Restore Configuration	SHP
Set Delay time before play	DLY
Set Pause time between plays	PAS
Set Number of plays for each trigger	PLS
Set message Priority (Disable message)	PRI

4.3 System Description Commands

Display system information	SYS
List all commands	LST
Display message Listing	DIR

4.4 Enhanced System commands

Set Bass	BAS
Set Treble	TRB
Set Time	TIM
Set Date	DTE

4.5 RS232 Command Syntax

4.5.1 Play Snippet Command

Command Code: PLY(l)

Command Body: <a>, , <c>, <d>

Where <a> = Snippet Number, with a range from 1 to 9,999 decimal

Where = Channel Number, acceptable values: 1, 2, 3 (3=Both CH)

Where <c> = Number of Plays, with a range from: 1-99

Where <d> = Pause Amount, acceptable values: 0 to +/-99 (“+”, or nothing = seconds, “-“ = minutes)

This plays an individual snippet from memory. This command will play snippet <a>, through channel , <c> times, with a <d> pause between plays. Whenever a message is playing through a particular channel, another message cannot be played through that channel.

If no <a> field is provided, the system will ignore the command

If no field is provided, the system will play the message through channel 1

If no <c> field is provided, the system will play the message one time

If no <d> field is provided, there will be a 1 second delay between repeats.

Example 1: PLY20,1<CR> Command Response: Play snippet 20, through channel 1, 1 time, pause: N/A

Example 2: PLY20,1,2<CR> Command Response: Play snippet 20, through channel 1, 2 times, with no pause between plays

Example 3: PLY20,1,2,10<CR> Command Response: Play snippet 20, through channel 1, 2 times, with a 10 second pause between the repeats.

Example 4: PLY20,1,2,-10<CR> Command Response: Play snippet 20, through channel 1, 2 times, with a 10 minute pause between the repeats.

If a play snippet command is received while another message is currently playing on the specified channel, depending on the operating mode of the unit, the system may queue, or ignore the incoming message. Reference the Operating Mode documentation for more details.

The PLY command can be suffixed with an “ l ”, making the command “ PLYl ”. When this command is issued to a particular channel, any currently playing message will be halted, and the snippet specified in this command played immediately. Once this snippet has completed, the interrupted message will be replayed.

Command Response: If accepted: Snippet <a>, playing on Ch , <c> times, <d> pause
If ignored: Invalid value, please re-enter.

End of Play Response: Done playing on Ch

If the data entered in any of the fields is not recognized, the system will output: “Invalid value, please re-enter”, and the command will be ignored.

If the data entered in a Snippet <a> does not exist, the system will output : “Play Snippet Cmd – NAK” and the command will be ignored.

4.5.2 Stop Command

Command Code: STP<a><ALL>

Command Body: <a>, Channel Number, acceptable values: 1, 2, 3 (3 = Both CH)

This command will stop the currently playing message on the selected channel number. If nothing is currently playing on the channel number selected, this command will have no effect. If multiple messages are in queue, the message playing will be stopped, and the next message will be played.

If no <a> field is provided, the system will stop the current message playing on both channels.

The STP command can be suffixed with “ALL”, making the command “STPALL”. When this command is issued to a particular channel, the playing message will be stopped, and the queue will be purged.

Example: STP1<CR>, will stop the currently playing message on channel 1

Command Response: Channel <a> stopped

Example: STPALL<CR>, will stop the playing message on Channel 1 and 2 and clear the queue

Command Response: Channel 1 stopped
Channel 2 stopped

If the Channel Number field is not recognized, the system will ignore the command.

4.5.3 System Reset Command

Command Code: RST
Command Body: None

Will reset the entire system, ceasing any current activity of the M3 system and initiate a warm boot sequence. Any playing messages will be stopped immediately.

Example: RST <CR>, will initiate the system reset function
Command Response: <Start-up banner>

4.5.4 Initiate Upload File (Read from M3)

Command Code: ULD
Command Body: <Filename>

Files can be read from the memory card. The process is initiated using this command, which after received, places the system into a mode awaiting the start of a Y Modem upload process. The actual data transfer is handled using this serial transfer protocol.

The filename provided must match the name of the file to be uploaded.

Special Case: If the ULD command is followed by just a number, the system will assume the file to be downloaded is a snippet and will initiate the download of the snippet number.

Example: ULD 1.mp3 <CR>, will initiate the uploading of 1.mp3 from the M3 to the computer.
Command Response: Begin Y-Modem Upload

4.5.5 Initiate Download File (Write to the M3)

Command Code: DLD
Command Body: <Filename>

Files can be written to the memory card. The process is initiated using this command, which after received, places the system into a mode awaiting the start of a Y Modem download process. The actual data transfer is handled using this serial transfer protocol.

Special Case: If the DLD command is followed by just a number, the system will assume the file to be uploaded is a snippet and will initiate the upload of the snippet number.

Example: DLD 1.mp3 <CR>, will initiate the downloading of 1.mp3 to the M3 memory
Command Response: Begin Y-Modem download.

4.5.6 Delete File

Command Code: DEL
Command Body: <Filename>

Files on the card can be deleted remotely. By sending this command along with a valid filename will cause the system to delete the corresponding file on the memory card. Once the file is deleted there is no way to undelete the file.

Special Case: If the DEL command is followed by just a number, the system will assume the file to be uploaded is a snippet and will initiate the upload of the snippet number.

Example: DEL 1.mp3 <CR>, will delete 1.mp3
Command Response: 1.mp3 deleted

If the file specified does not exist, the system will output: "The file doesn't exist!" no file will be deleted.

4.5.7 RS232 Serial Port Speed

Command Code: SPD

Command Body: <a>, Baud Rate Setting, acceptable values: 0 to 6 (Default: 4)

The speed of the RS232 port may need to be configured for different controllers. This command provides control of this feature. The different settings are described below:

- 0: 9600 Baud
- 1: 19,200 Baud
- 2: 38,400 Baud
- 3: 57,600 Baud
- 4: 115,200 Baud (Default)
- 5: 230,400 Baud (Support to be determined)
- 6: 460,800 Baud (Support to be determined)

The default setting is 4, but once changed, the change will be stored in non-volatile memory and used at every boot up.

Example: SPD0 <CR>, will set the baud rate of the RS232 port to 9,600 baud

Command Response: "Try to Set Baud Rate to 9600", <Change Baud Rate>
"Please input Y to accept Baud Rate 9600!", <y>
"Baud Rate has been set to 9600",

Note: If the baud rate change is not confirmed, the unit will reset to the previous baud rate after 20 seconds. The unit will output "Baud Rate set back to old speed!" at the previous rate.

If the user enters "SPD" with out any suffix, the system will respond with the current setting.

Example: SPD <CR>,

Command Response: Baud Rate is set to 115200

If the Port Speed field is not recognized, the system will output: "Please enter number 0 to 6!", and the command will be ignored.

4.5.8 Restore Default Configuration

Command Code: CFG

Command Body: none

Any settings configured over the RS232 port can be reset to factory default settings through the use of this command. After the command is sent, the unit will reset all configurable settings to factory defaults, then reset the system.

Example: CFG <CR>, will restore all of the settings to their default values

Command Response: This command will reset all configurable settings to their default value. Are you sure? <y/n>

If the user enters "y": Default settings loaded, followed by a system reset and the system start up banner.

If the user enters "n": CFG Command aborted

4.5.9 Format SD Card

Command Code: FMT

Command Body: none

This command will format the entire SD Card, completely erasing the contents of the card. All audio files, configuration files, and all other files will be permanently and irrevocably deleted.

Example: FMT <CR>, will format the SD Card

Command Response: This command will format the SD Card and delete all messages. Are you sure? <y/n>

If the user enters "y": SD Card formatted, followed by a system reset and the system start up banner.

If the user enters "n": FMT Command aborted

4.5.10 Format SD Card and Restore Factory Defaults

Command Code: SHP
Command Body: none

This command will format the entire SD Card, completely erasing the contents of the card. All audio files, configuration files, and all other files will be permanently and irrevocably deleted. After the card is formatted, the unit will reset all configurable settings to factory defaults, then reset the system.

Example: SHP <CR>, will format the SD Card and restore all of the settings to their default values.
Command Response: This command will format the SD Card and reset all configurable settings to their default value.

Are you sure? <y/n>

If the user enters “y”: SD Card Formatted, Default settings loaded, followed by a system reset and the system start up banner.

If the user enters “n”: SHP Command aborted

4.5.11 Set Delay Before Play

Command Code: DLY
Command Body: <a>, Delay Amount, acceptable values: 0 to 99 (seconds), default value: 0

This command sets the amount of time the system will delay after receiving a remote message trigger prior to actually playing the message.

This configuration only affects contact closure message triggers. RS232 message triggers are not affected by this setting.

Example: DLY10 <CR>, will set the delay time before a message play to 10 seconds
Command Response: Delay time set to 10 seconds

If the user enters “DLY” with out any suffix, the system will respond with the current setting.

Example: DLY <CR>,
Command Response: Delay time is set to 0 seconds

If the delay amount field is not recognized, the system will output: “Delay time is 0-99”, and the command will be ignored.

4.5.12 Set Pause Between Plays

Command Code: PAS
Command Body: <a>, Pause Amount, acceptable values: 0 to +/-99 (seconds),
Default Value: 0 (+, or nothing = seconds, - = minutes)

This command sets the amount of pause time the system will add between the repeats of message playback.

This configuration only affects contact closure message triggers. RS232 message triggers are not affected by this setting.

Example: PAS10 <CR>, will set the Pause time between plays to 10 seconds
Command Response: Pause time set to 10 seconds

Should system display a status/countdown message while the Pause time is counting down? <no>

If the user enters “PAS” with out any suffix, the system will respond with the current setting.

Example: PAS <CR>,
Command Response: Pause time is set to 0 seconds

If the Pause amount field is not recognized, the system will output: “Invalid value, please re-enter”, and the command will be ignored.

If the Pause amount field is not recognized, the system will set Pause amount to 0 (Zero) seconds.

If the Pause amount value is less than -99 or greater than +99, the system will output: “Pause time is +/- 99”, and the command will be ignored.

4.5.13 Set Number of Plays

Command Code: PLS

Command Body: <a>, Number of Plays, acceptable values: 1 to 99, default value: 1

This command sets the number of plays that the system will output for each remote message trigger

This configuration only affects contact closure message triggers. RS232 message triggers are not affected by this setting.

Example: PLS2 <CR>, will set the number of plays per contact closure to 2

Command Response: Number of plays set to 2

If the user enters "PLS" with out any suffix, the system will respond with the current setting.

Example: PLS <CR>,

Command Response: Number of plays is set to 2

If the Number of Plays field is not recognized, the system will output: "Number of plays is 1 to 99", and the command will be ignored.

4.5.14 Set Message Priority

Command Code: PRI

Command Body: <a>,

<a>, Snippet Number, acceptable values: any valid Snippet

, Priority Level, acceptable levels: 0 to 1, default value: 1

This command is effectively a snippet enable/disable command that can be expanded to handle more priority levels in the future if necessary.

Any snippet with a priority level of "1", the default setting, is enabled, while any message with a priority level of "0" is disabled and won't play when requested.

The Priority setting of each message is non-volatile and is retained through power cycles.

Note: Sentences are not affected by this command

Example: PRI10,0 <CR>, will set the priority of message 10 to 0 (disabled)

Command Response: Message 10 priority set to 0

If the Priority Level field is not recognized, the system will prompt the last Priority Level that was set on the specific snippet and the command will be ignored; default value: 1.

If the Snippet does not exist, the system will output: "This file not exist!", and the command will be ignored.

4.5.15 Display system information

Command Code: SYS
Command Body: None

Information pertaining to the M3's current configuration can be output for verification. Available information which will be supported by this command will be:

The response will be formatted in the following way:

Manufacturer of unit	<Mackenzie>
Model of unit	<M3>
M3 app version	<x.xx>
Date of app code	<Code release date>
Current Date and Time	<Date / Time>
Size of SD Card	<Memory size>
Number of audio files	<# of audio files in DAVE folder>
Number of sentences	<#of sentence, if configured>
Number of plays	<# of plays>
Delay before play	<Delay amount>
Pause between plays	<Pause time>
Bass Setting	<Bass level>
Treble Setting	<Treble level>

Example: SYS <CR>, will display the system information
Command Response: <See above>

4.5.16 Command Listing

Command Code: LST
Command Body: None

Displays the list of all supported commands available to the user:

The response will be formatted in the following way:

System Functional Commands

Play snippet	PLY (I)
Stop playing	STP (ALL)
System reset	RST
Initiate upload file	ULD
Initiate download file	DLD
Delete file	DEL

System Configuration Commands

RS232 Baud Rate	SPD
Restore Default Configuration	CFG
Format Memory Card	FMT
Format and Restore Configuration	SHP
Set Delay time before play	DLY
Set Pause time between plays	PAS
Set Number of plays for each trigger	PLS
Set message Priority (Disable message)	PRI

System Description Commands

Display system information	SYS
List all commands	LST
Display message Listing	DIR

Enhanced System Commands

Set Bass	BAS
Set Treble	TRB
Set Time	TIM
Set Date	DTE

Example: LST <CR>, will display the command listing
Command Response: <See above>

4.5.17 Display Message Listing

Command Code: DIR
Command Body: None

Displays the list of messages programmed on the internal memory card:

The response will be formatted in the following way:

```
1  2  3  4  5  6  7  8  9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 xx  xx 30
dd dd 33 34 35 36 37 38 39 40
```

If a message number doesn't exist, the location will be marked with "x"s.

If a message has been disabled the location will be marked with "d"s.

The system will insert a blank line every 100 messages. The system will display the entire listing without pauses, as the user can scroll back to see the data within their Terminal program.

Example: DIR <CR>, will display the message directory listing
Command Response: <See above>

4.5.18 Set Time of Day

Command Code: TIM
Command Body: <a><c>
"a", Hours, acceptable values: 1 – 12 Default: 12
"b", Minutes, acceptable values: 0 – 59 Default: 00
"c", AM/PM, acceptable values: AM – PM Default: AM

The time of day is set through the use of this command. The time is formatted as midnight being 12:00AM. If any parameter is invalid, the command is ignored. A delimiter between hours and minutes is required. This delimiter can be a ":", a <space>, or a comma.

Example: TIM 12:59AM<CR> will set the time to 12:59AM
Command Response: Time set to 12:59AM

If the user enters "TIM" with out any suffix, the system will respond with the current setting.

Example: TIM <CR>,
Command Response: Current time is 01:59AM

If any of the fields are not recognized, the system will ignore the command.

4.5.19 Set Date

Command Code: DTE
Command Body: <a><c> - 4 bytes
"a", Day, acceptable values: 1 – 31 Default: 01
"b", Month, acceptable values: 1 – 12 Default: 01
"c", Year, acceptable values: 2000 – 2099 Default: 2000

The date is set through the use of this command. There are 3 fields that are part of this command. The system will validate that the day within the month is valid based on the year. If any parameter is invalid, the command is ignored. A delimiter between the Day, Month and Year is required. The delimiter can be a ":", <space>, or comma.

Example: DTE 10,12,2009 <CR> will set the date to 10 December 2009
Command Response: Date set to: 10 December 2009

If the user enters "DTE" with out any suffix, the system will respond with the current setting.

Example: DTE <CR>,
Command Response: Current date is Jan 01 2000

If any of the fields are not recognized, the system will ignore the command.

4.5.20 Set Bass Amount

Command Code: BAS

Command Body: <a>,

“a”, Bass Setting in dB, acceptable values: 0 – +/-10

Default: 0

“b”, Channel Number, acceptable values: 1 – 2

Default: 1

The bass for the audio playback is set with this command. Each channel will have its own bass setting. The value can be set to plus or minus 10db. If the channel number is not provided in the command string, the value will default to channel 1.

Example 1: BAS 3,1<CR> will set the Bass to +3dB on channel 1

Example 2: BAS +3,1<CR> will set the Bass to +3dB on channel 1

Example 3: BAS -3,2<CR> will set the Bass to -3dB on channel 2

Example 4: BAS 3<CR> will set the Bass to +3dB on channel 1

Command Response: Channel bass set to: <a>

If any of the fields in the command are not recognized, the system will output: “Invalid value, please re-enter”, and the command will be ignored.

4.5.21 Set Treble Amount

Command Code: TRE

Command Body: <a>,

“a”, Treble Setting in dB, acceptable values: 0 – +/-10

Default: 0

“b”, Channel Number, acceptable values: 1 – 2

Default: 1

The treble level for audio playback is set with this command. Each channel will have its own treble setting. The value can be set to plus or minus 10dB. If the channel number is not provided in the command string, the value will default to channel 1.

Example 1: TRE 3,1<CR> will set the Bass to +3dB on channel 1

Example 2: TRE +3,1<CR> will set the Bass to +3dB on channel 1

Example 3: TRE -3,2<CR> will set the Bass to -3dB on channel 2

Example 4: TRE 3<CR> will set the Bass to +3dB on channel 1

Command Response: Channel treble set to: <a>

If any of the fields in the command are not recognized, the system will output: “Invalid value, please re-enter”, and the command will be ignored.

4.5.22 Update Firmware

Command Code: FIRMWARE

Command Body: None

The firmware on the M3 unit can be updated. To do so, enter the raw ASCII data “FIRMWARE”. The header, footer, and CRC are not required for this command.

Once the command is properly received by the unit, the M3 system will respond with “Start 1K-XModem Download...” followed by a “C” every couple of seconds.

The M3, will output the following characters: “C” until a 1K X-Modem download session starts. The system allows approximately 60 seconds to start the 1K X-modem download session or the system will reset.

Use the Send file command in Hyperterminal to send the “M3APP.bin” file to the M3 using 1K X-modem.

Example: Firmware<CR> will initiate the firmware download function

Command Response: “Start 1K-XModem Download”, followed by “C” characters every couple of seconds.

5 Memory Card Removal/Installation:

Although the M3 utilizes a removable SD memory card to store audio and configuration information, replacing is not required for normal applications, as the memory can be updated easily and quickly over the USB interface. If replacement of the SD card is required, please contact the factory for replacement instructions.

5.1 Capacity, Data Rates and Part Numbers:

Larger capacity SD cards are available from Mackenzie. The following table shows the different sizes available, and the amount of MP3 audio that can be stored on each.

Size	Model No.	Approx. recording time (Minutes) Mono			Approx. recording time (Minutes) Stereo or Dual Mono		
		7kHz 32kbps	15kHz 64kbps	20kHz 128kbps	7kHz 64kbps	15kHz 128kbps	20kHz 256kbps
1GB	SD-1GB	4164	2082	1041	2082	1041	502
2GB	SD-2GB	8328	4164	2082	4164	2082	1041
4GB	SD-4GB	16656	8328	4164	8328	4164	2082

6 WARRANTY, SERVICE & RETURNS

The industrial grade housing and quality construction of the Mackenzie M3 virtually eliminates the need for service or maintenance. There are no user-serviceable components within the Mackenzie M3. Refer all servicing to the factory.

6.1 Warranty Coverage:

The Mackenzie M3 is tested and checked before shipment and is guaranteed against defective material or workmanship for a period of one (1) year from the date of purchase. Should trouble ever develop, contact the Factory directly by telephone or in writing. If it is determined that the equipment requires Factory service, return it to the Factory. If our inspection shows that the trouble was caused by defective material or workmanship, we will repair or replace the equipment without charge and return prepaid. Repairs made necessary by abuse, improper use, unauthorized service or maintenance, and/or improper installation, as well as out of warranty repairs, will be charged at our regular repair prices in effect at the time. The obligation under this warranty shall be limited to the replacement, repair or refund of any such defective device within the warranty period, at Mackenzie's discretion.

This warranty is in lieu of and excludes all other warranties, expressed or implied, and in no event shall MACKENZIE be responsible for damage to other equipment or property, for any anticipated profits, consequential damages, loss of item, or other operation or use of this product, and MACKENZIE'S maximum liability shall not ever be greater than the price paid for the equipment. This warranty gives you specific legal rights. Your rights may vary from state to state. Inquiries regarding use, repair and service should be made to:

MACKENZIE LABORATORIES, INC.
1163 Nicole Court, Glendora, CA 91740 USA
Telephone: (909) 394-9007 / FAX No: (909) 394-9411
info@macklabs.com

6.2 What we ask you to do:

To get warranty service for your M3 system, you must provide proof of the date of original purchase. In the event you need to ship your M3 system to the factory for service, call us for a return authorization number. When you ship your M3 system, you must prepay all shipping cost. We suggest that you retain your original packing material in the event that you need to ship your M3 system. When sending your M3 system to the factory, include your name, address, phone number, proof of date of purchase, and a description of the operating problem. After repairing or replacing your M3 system, we will ship it to your return address at no cost to you within the USA. Repair or replacement of your M3 system at our factory is your exclusive remedy.

6.3 What this warranty does not cover:

This warranty does not cover defects resulting from accidents, damage while in transit to factory, alterations, unauthorized repairs, failure to follow instructions, misuse, fire, flood or acts of God.

OTHER MACKENZIE PRODUCT LINES

Storecasting & Message On Hold - Mackenzie's full line of digital Storecasting & Message-On-Hold systems, turn your public address system and telephone into a powerful marketing tool. The DYNAVOX series offers maintenance free digital playback with USB, modem or satellite download. Several varieties are available with advanced features such as Music-Thru, individual message enable/disable, message sequencing and more.

Controls and Peripherals - Many applications require additional equipment to optimize the performance of Mackenzie products. This area focuses on items developed or sourced for their compatibility, ease of use and value. Included are, input/output controllers, speakers, amplifiers, motion sensors and pushbuttons among others.

Transit - Mackenzie is making a difference in transit applications with innovative solutions for ADA compliance and Passenger Information Systems. These products address a variety of audio and text messaging requirements and support both in-vehicle and wayside installations.

Overhead Page Management - Mackenzie's OPM series of Digital Page Stacker/Repeater and Feedback Eliminators offer advanced features for the most difficult paging and intercom applications. A unique design makes feedback virtually impossible by recording then repeating pages which opens the loop between the input microphone and speakers. Various models are available to support simple repetition, multiple page stacking and multiple input channels.

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