MACKENZIE

MacFi

Eight Message Digital Audio Record/Play System

User's Manual

Version 1.0 Revised 11/25/98

Doc 99-20-038

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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.

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Shipping Container Contents

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

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

Optional Accessories

- 12 VDC, 1.0 amp power pack, 115 V 50/60Hz, Order: MacFi-PS, P/N 40010008-1)
- Rack Mount Kit, Order: MacFi RM-Kit

1 OVERVIEW

1.1 Features and Capabilities

The Mackenzie MacFi system is the most cost effective series of solid state digital audio record / playback systems available to the industry. Backed by Mackenzie's years of system design experience, MacFi offers a great deal of functionality in a compact and inexpensive package.

The MacFi retrieves stored audio data from non-volatile flash memory, eliminating the need for battery backup, and delivers superb sound quality.

The MacFi is offered in either 8 or 16 minute versions and supports up to 6.5kHz bandwidth and 60 dB of dynamic range. System capacity is 8 randomly and instantly accessible messages. Dynamic Message Length (DML) technology has been incorporated in the MacFi allowing each of the messages to be of different duration. DML also provides for replacement messages to be a different length than the original, maximizing memory efficiency and compatibility with future applications.

Messages are user recordable via microphone or line input and straight forward user interface located directly on the unit. Simple parallel controls for the 8 messages are available on terminal connectors. Record and Stop inputs and a Play relay output are also accessible via terminals.

The MacFi offers several different playback modes to accommodate different applications. Play/repeat, Play once per closure, Play while active, and Retrigger allow the MacFi to be used with existing on site control circuitry. Message repetition and delay between messages are user selectable as well.

The space saving built-in 4 watt power amplifier is perfect for most direct to speaker applications as it eliminates the need for additional hardware.

The MacFi's small size, industrial construction and the absence of moving parts make it ideal for automatic unattended operation, especially in harsh environmental or mobile conditions. An optional 1U rack mount adapter is also available.

1.2 General Specifications

Audio Quality:

Performance:	12 bit
Sample Rate:	16kHz
Encoding:	ADPCM
Dynamic Range:	60dB
Signal to Noise:	60dB
Frequency Resp.:	100Hz to 6.5kHz
THD:	<1%

Audio Input:

Line:	RCA, 10k ohm
Mic:	1/8" mini jack, up to 1.5k ohm
Level:	+4dBm max., adjustable

Audio Output:

Line:	RCA, transformer isolated, 600 ohm
Amplified:	Terminal, bridged into 8 ohm
Level:	Adjustable, Line: +4dBm max. Amp: 4 watt max.

Audio Memory:

Type:	FLASH EEPROM

Power:

Input Voltage:	12VDC
Current:	1 amp
Connection:	Terminal

Control I/O:

Control Inputs:	Record, Stop, Individual message Starts
Input type:	Optically coupled, 12vdc @ 5mA to activate
Status Outputs:	Playing
Output Type:	Dry relay contact, 1A @24VDC, non-inductive load
Interface:	Terminal

Mechanical:

Wall mount style standard*
10" W x 8" L x 1.5" H
18 gauge cold rolled steel chassis
Texture coated paint process

*Rack mount kit available

Regulatory Agency Approvals:

UL/CSA approval on external power pack.

1.3 Hardware Configurations

MacFi 8 – 8 messages, 8 minutes

MacFi 16 – 8 messages, 16 minutes

2 INSTALLATION & CONFIGURATION

This section provides complete instructions for mounting the MacFi, 8 Message Digital Audio Record / Play System on a wall or table. It also illustrates all interface requirements to auxiliary equipment, including inputs and outputs. Configuration switch settings are provided.

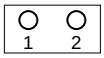
2.1 Installation Steps

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 above the unit for user access to the controls 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 inputs and outputs.
5. Connect control inputs and outputs.
6. Set DIP switches to the desired operation.
7. Connect and apply power.
8. Test unit operation.

2.2 Hardware Configuration

2.2.1 Power



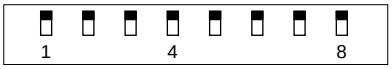
Two terminal pluggable connector.

1 12 VDC at 1 amp
2 Ground

Power LED

Green LED which indicates that power is supplied to the unit and operating correctly	Off	No power supplied to unit
	On	Power on, system OK
	Blink	Power on, system malfunction, see memory test procedure

2.2.2 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 MacFi to meet their demands. **NOTE: This dip switch is read by the system only upon power up. Changing the position of the dip switch while the module is powered up will have no affect on the operation of the system.**

Number of Plays

For applications where messages need to be repeated due to ambient noise or for clarity. 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 Method

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

5	6	
▯	▯	Standard operation - details below
▯	▮	Play one sequence per closure - details below
▮	▯	Play while active - details below
▮	▮	Re-trigger - details below

Standard Operation: A momentary contact closure causes the device to play one sequence of the message corresponding to that input. A sequence is specified by the number of message plays and the amount of delay between each message, as selected by the dip switches. If a contact is maintained active, the system will continuously play that sequence 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 activated. 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, for the same or any other message, while a sequence is playing and it is released prior to the ending of the current message play, it will be ignored.

Play one sequence per closure: If an activation input is maintained, the system will only play the message sequence one time. The MacFi will wait for the input to go inactive for 100ms before it will recognize that input for subsequent message activations. Other play 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 MacFi, causing each of the messages to be played in the order they were received. The queue length is 16 messages maximum, including the message which is playing. A single message may be queued more than once. 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 message sequence once then stop.

Play while active: Upon receiving 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.

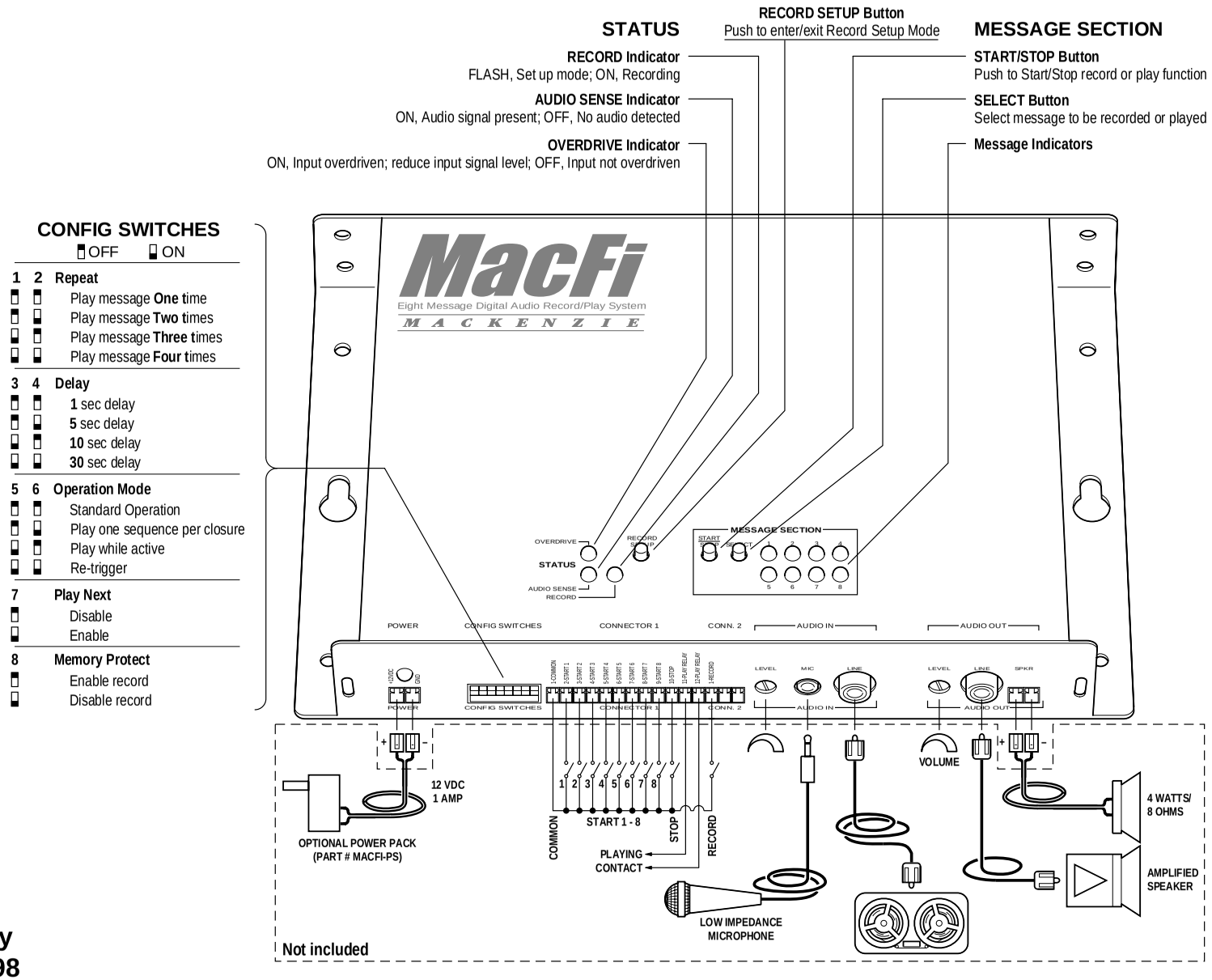
If the input is sustained after the current sequence has completed, another sequence will be initiated. If the input is removed during the delay time after the final message play in the sequence, another sequence activation will not occur.

If multiple inputs are maintained active while in this mode, the system will only play the active message and then repeat. This mode does not support queuing.

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 another message activation is received, the currently playing message will be terminated 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. This mode does not support queuing.

MacFi Eight Message Digital Audio Record/Play System



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V 1.0 11/25/98
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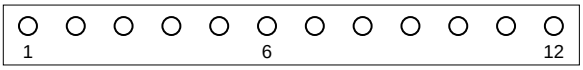
Play Next	**7**	
Enabling Next Message allows Start 8 input(Connector 1, Pos. 9) to initiate playback of next valid message sequence. First input after power on will play message 1. All operation modes are supporated and other start inputs (1 - 7) are disabled.	▪	Disable
	▫	Enable

Memory Protect	**8**	
Allows the user to lock message memory so that messages may not be accidentally overwritten.	▪	Enables record ability
	▫	Disables record ability

This is the one configuration which can be changed without having to reset the system for the function to take effect.

2.2.3 Connector 1



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

1 Common ground for all inputs
2 Start 1 Input, connect to common for message 1 playback
3 Start 2 Input, connect to common for message 2 playback
4 Start 3 Input, connect to common for message 3 playback
5 Start 4 Input, connect to common for message 4 playback
6 Start 5 Input, connect to common for message 5 playback
7 Start 6 Input, connect to common for message 6 playback
8 Start 7 Input, connect to common for message 7 playback
9 Start 8 Input, connect to common for message 8 playback
10 Stop Input, connect to common to stop message playback or recording
11 Play Relay Output, Common
12 Play Relay Output, Form A, connect to position 11 for normally open contacts, closed when playing.

2.2.4 Connector 2

3 position terminal connection. Used for remote control of recording.

1 Record Input, connect to common to enter record setup mode.
2 Future Use
3 Future Use

For remote recording procedure, reference section 3.2.

2.2.5 Audio In Level

Potentiometer to adjust record level. +4dBm maximum input level.

2.2.6 Audio In Mic

Microphone input for recording messages. Mono. 1/8" mini jack. Up to 1.5k ohm impedance. This specification is compatible with most consumer grade microphones(Radio Shack Omnidirectional Dynamic P/N 33-2001). **NOTE: Mic input and Line input may not be used at the same time. Please make sure Line input is disconnected on the unit for the microphone to work properly.**

2.2.7 Audio In Line

Line level analog audio input for recording messages. Mono. RCA connection, 10k ohm impedance. Compatible with the unbalanced analog outputs of most tape decks, CD players, DAT players, etc. **NOTE: Line input and Mic input may not be used at the same time. Please make sure Mic input is disconnected on the unit for Line to work properly.**

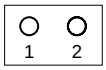
2.2.8 Audio Out Level

Potentiometer to adjust playback level. Range is continuous from -infinity to +4dBm

2.2.9 Audio Out Line

Line level analog audio output for playing messages. Mono. Transformer isolated, RCA connection, 600 ohm impedance. Compatible with the unbalanced analog inputs of most audio equipment.

2.2.10 Audio Out SPKR



Bridged, mono speaker output for playing messages. 2 position terminal connector. 4 watts into 8 ohms. Used for connecting play output directly to a speaker.

CAUTION: Referencing either of the speaker output terminals to ground will cause incorrect operation and may damage the unit. Always connect the speaker directly across the supplied terminal connections.

2.3 Manual Button & LED Configuration

Push buttons and LED's are located on the top of the MacFi allowing easy and convenient message recording and playback. The following describes use of the Status and Message Sections.

2.3.1 Overdrive Indicator

This red LED monitors the level of the recording input. Overdriving the system will cause audio to clip, adversely effecting sound quality. Monitor the input material and set the input level just below overdrive for the best results.

Off	Input is not overdriving the system
On	Input is overdriving the system

2.3.2 Audio Sense Indicator

This green LED monitors the presence of audio on recording input. This is designed to indicate that the audio level is optimum for system performance. It is not an absolute reference that audio is present or not.

Off	No signal present
On	Signal present

2.3.3 Record Indicator

This red LED indicates that the MacFi is in record mode or recording.

		Cause
Off	System not in record setup or recording.	N/A
Blink	Record setup mode	Record setup button
On	Recording	Start/Stop button

2.3.4 Record Setup Button

This push button configures the MacFi for record mode. Depressing this button will cause the record LED to blink, verifying the MacFi is in record setup mode. Depressing this button while still in record setup mode will exit this mode and turn off the record LED. Pressing the button in the middle of the recording process will have no effect. **NOTE: If you have difficulty recording, verify Memory Protect, Configuration Switch 8 is OFF(□).**

2.3.5 Start/Stop Button

This button will either start or stop the current message. This is applicable to either record or play modes. Depressing Start/Stop button while playing or recording will exit the mode and return system to idle.

If a message is selected for playback, with itís LED blinking, pressing this button will initiate the message play. Pressing it again, while the message is playing, will stop the message play.

If a message is setup for recording, with both the record and the message LEDs blinking, pressing this button will initiate the recording process. Pressing it again, with the recording in process, will stop the recording.

Pressing this button with no LEDs blinking will have no effect.

2.3.6 Select Button

This button selects the message for recording or playing. Depressing this button sequences through the individual message positions, represented by the message LED's. The Select button may be used during record setup or to initiate playback mode when the system is idle.

2.3.7 Message LED's

These green LED's indicate which message is selected. The function of the message LED is determined by its activity in relation to the Record LED.

Msg LED	Msg LED		Cause
Off	Off	System idle	N/A
Blink	Off	Select message mode	Select button
On	Off	Message playing	Start/Stop button
Scan All	Off	No messages recorded	Select button
Blink	Blink	Select message to record, location contains message	Record Setup button, Select button
On	Blink	Select message to record, location empty	Record Setup button, Select button
On	On	Recording in progress	Record Setup button, Select button, Start/Stop button

NOTE: In play mode, Select button circulates through only valid recorded message locations.

3 OPERATION

3.1 Recording - Local

Local recording is achieved through the LED's and buttons located on the top of the MacFi unit. Please reference the Manual Button & LED Configuration section of this manual for additional information on functions.

Step 1 – Make all desired power, audio in, audio out, configuration switch and I/O connections to the unit and power up. Unit will initiate self test and default to idle mode.

Step 2 – Depress Record Setup button, Record LED will blink

Step 3 – Use Select button to determine message location to record to. Individual message LED's will be solid when not occupied and blink when message location is occupied.

Step 4 – Listen to record source through monitor and/or reference Overdrive LED to verify level and queue material.
Step 5 – Depress Start/Stop button to begin recording and start audio source. Message and Record LED's will remain solid during recording.
Step 6 – Depress Start/Stop button to end recording and exit Record Setup

Record setup will time out after 1 minute of inactivity.

3.2 Recording - Remote Control

Remote Control recording is achieved through the I/O connections located on the endplate of the MacFi unit. Please reference the Hardware Configuration section of this manual for additional information on available connections.

Step 1 – Make all desired power, audio in, audio out, configuration switch and I/O connections to the unit and power up. Unit will initiate self test and default to idle mode
Step 2 – Provide a maintained input signal to the Record Input(Connector 2 terminal 1), this will blink the Record LED.
Step 3 – Provide a maintained input signal at the message activation input desired(Connector 1, terminals 2-9). Both the Record and corresponding Message LED's will remain solid during recording
Step 4 – Start audio source.
Step 5 – Release message activation input to stop recording.
Step 6 – Release recording input to exit record mode.

3.3 Playing-Local

Local playback is achieved through the LED's and buttons located on the top of the MacFi unit. Please reference the Manual Button & LED Configuration section of this manual for additional information on functions. Playback of messages will include selected repeat and delay parameters.

Step 1 – Make all desired power, audio out, configuration switch and I/O connections to the unit and power up. Unit will initiate self test and default to idle mode.
Step 2 – Use Select button to determine message location to play. Select button will only increment between valid message locations and the individual message LED's will blink. System will scan/blink through all message LED's and exit if no valid messages exist when Select button is depressed.
Step 3 – Depress Start/Stop button to begin playback. Message LED will remain solid during playback.
Step 4 – Depress Start/Stop button to end playback and return to idle.

Playback message selection will time out after 1 minute of inactivity.

3.4 Playing-Remote Control

Remote Control playback is achieved through the I/O connections located on the endplate of the MacFi unit. Please reference the Hardware Configuration section of this manual for additional information on available connections. Playback of message will include selected repeat and delay parameters.

Step 1 – Make all desired power, audio out, configuration switch and I/O connections to the unit and power up. Unit will initiate self test and default to idle mode.

Step 2 – Provide a momentary or maintained signal to the message input(Connector 1, terminals 2-9) desired. Message LED will remain solid during playback.

Step 3 – Provide a momentary signal to the stop input(Connector 1, terminal 10) to stop playback and return to idle mode - or - allow message to play to end at which point, system will return to idle mode.

MacFi will ignore an input which corresponds to an empty or corrupt message location. Play relay contact will be maintained for the duration of play sequence. When playing multiple messages through queued messages or via maintained start activation's, the system will drop the play relay for approximately 100mS between sequences.

3.5 Memory Test

Use this procedure when you wish to clear system memory of previously recorded messages or test/verify system memory.

Step 1 – Remove power from MacFi

Step 2 – Depress and hold Record Setup button while restoring power to MacFi. Continue to hold Record Setup button until Record Indicator remains ON, at which time it may be released. Record Indicator will remain ON and Message LED's will cycle while system runs audio memory check. This process could take up to 15 minutes on the MacFi 8 and up to 30 minutes on the MacFi 16.

Step 3 – Wait until Record Indicator turns off, indicating memory check is complete, and unit will perform as usual.
-or-
Remove then re-apply power to bypass memory check.

3.6 Erase Message

Individual message locations may be erased by simply recording a message to that location with less than 250ms duration. This short recording will instruct the system to erase the data from that message location.

4 WARRANTY, SERVICE & RETURNS

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

4.1 Warranty Coverage:

The Mackenzie MacFi 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

4.2 What we ask you to do:

To get warranty service for your MacFi system, you must provide proof of the date of original purchase. In the event you need to ship your MacFi system to the factory for service, call us for a return authorization number. When you ship your MacFi 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 MacFi system. When sending your Macfi 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 MacFi system, we will ship it to your return address at no cost to you within the USA. Repair or replacement of your MacFi system at our factory is your exclusive remedy.

4.3 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, and acts of God.

Warranty & Registration Card for the
MacFi - Eight Message Digital
Audio Record/Play System

Date: _____ Serial No.: _____

Purchaser: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Purchased From: _____ Date: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Return warranty card to Mackenzie Laboratories Inc., 1163 Nicole Court, Glendora, CA 91740 USA
- or -
Email information to registration@macklabs.com

Notes:

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Return Address

MACKENZIE LABORATORIES, INC.
1163 Nicole Court
Glendora, CA 91740 USA

OTHER MACKENZIE PRODUCT LINES

DYNAVOX - Mackenzie's full line of Digital Autoload Message-On-Hold systems, turn your telephone into a powerful marketing tool. The DYNAVOX series offers maintenance free digital playback and convenient tape download. Crystal clear sound is optimized for playback through telephone systems. Several storage/message varieties are available as well as versions with advanced features such as Music-Thru, individual message enable/disable, message sequencing and night answer.

Digital Message Repeaters - Mackenzie's line of Digital Message repeaters are the ideal audio and video solutions for Information, Amusement, Entertainment, Museum and Exhibit applications. Self contained solid state systems offer unparalleled reliability. A variety of channel, connection, bandwidth and memory configurations are available.

Feedback Eliminators & Page Stackers - Mackenzie's line of Digital Page Stacker/Repeater and Feedback Eliminators offer advanced features for the most difficult paging and intercom applications. The FE series 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.