_____
_____
_____
Return Address

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

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, or internet 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.

Visit us at: www.macklabs.com

MACKENZIE

MacFi®-V4

PUBLIC ADDRESS / MASS NOTIFICATION /
EMERGENCY COMMUNICATION SYSTEM

User's Manual

Version 1.5, Revised 27, Mayl 2021
Doc 99-20-208

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

Tel: (909) 394-9007
Email: info@macklabs.com
Web: www.macklabs.com

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 install during lightning storm.
10. Never touch un-insulated wires or terminals unless the unit is disconnected from both power and the rest of the phone system.
11. Use Caution when installing or modifying configuration switches or control lines.
12. The unit must be securely attached to a wall board, rack or table mounted.

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

Warranty & Registration Card for the
MacFi-V4 – Audio Notification / Management System

Date:_____ Serial No.: _____

Purchaser: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Seller: _____

Address:_____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Return warranty card via:
FAX: (909) 394-9411
MAIL: Address on reverse side
ONLINE: www.macklabs.com/registration.html

NOTES

Table of Contents

Shipping Container Contents

The following items should be found in the MacFi-V4 shipping container

- MacFi-V4 System
- Installation and User Guide
- Set of four rubber feet

Hardware Configurations

- MacFi-V4; 500+ messages, 100+ hours of MP3 playback / recording, RS-232 control, Playing relay, USB Port

Optional Accessories:

- Power Pack, 12 VDC, 1.0 amp, 115 V 50/60Hz, Order: MacFi-V4-PS
- Rack Mount Kit, Order: MacFi-V4 RM-KIT
- RS-232 Interface Cable, Order: RS232-CBL
- Weather Resistant Speaker with Mount, Order: TRP470(B/W)
- Small Monitor Speaker with Mount, Order: CS-4
- Microwave Motion Sensor, Order: MS-2
- Input Control Module, 25 start inputs to RS-232, Order: ICM-25-V4
- Input Control Module, 50 start inputs to RS-232, Order: ICM-50
- USB Memory Key (<x>GB), Order MUSB-<x>GB

9.2 What we ask you to do:

To get warranty service for your MacFi-V4 system, you must provide proof of the date of original purchase. In the event you need to ship your MacFi-V4 system to the factory for service, call us for a return authorization number. When you ship your MacFi-V4 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-V4 system. When sending your MacFi-V4 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-V4 system, we will ship it to your return address at no cost to you within the USA. Repair or replacement of your MacFi-V4 system at our factory is your exclusive remedy.

9.3 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.

9. WARRANTY, SERVICE & RETURNS

The industrial grade housing and quality construction of the Mackenzie MacFi-V4 virtually eliminates the need for service or maintenance. There are no user-serviceable components within the Mackenzie MacFi-V4. Refer all servicing to the factory.

9.1 Warranty Coverage:

The Mackenzie MacFi-V4 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
(909) 394-9007
www.macklabs.com

1. OVERVIEW

1.1 Features and Capabilities

The Mackenzie MacFi-V4 family is the most cost effective series of MP3 Digital Audio Record / Play Systems available for industrial usage. Backed by Mackenzie's years of system design experience, MacFi-V4 has been packed with all the functionality necessary for most every Audio Notification System.

The MacFi-V4 offers over 500 message playback and hundreds of hours of MP3 audio on a user accessible SD Card. MP3 supports up to 15 kHz bandwidth and 80 dB of dynamic range. All messages can be previewed from the user interface through an internal speaker.

Messages are user recordable via microphone or line input through a straight forward user interface located directly on the unit. Messages are downloaded from a USB memory key, or via optional Internet connection. 6 message start inputs and a stop input are provided on the base unit with 500 more Start inputs available via expansion modules. A playing relay provides status to other gear.

The MacFi-V4 offers different playback modes, including: Standard, Play once per closure, Play while active, and Retrigger Mode. The number of times a message plays and the delay between plays for each trigger event are configurable via dip switch as well.

An efficient class D power simplifier provides up to 10 watts of power through either a 4 ohm or an 8 ohm speaker network eliminating the need for an external amplifier in many applications.

The MacFi-V4'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.

The MacFi-V4 also includes RS-232 (Serial) control of playback and system configuration.

Enhanced functionality available on the MacFi-V4E includes: Time based message playback, Background music feed, Internet based control, and six relays to indicate a particular message (1-6) is playing.

1.2 General Specifications

Audio Coding:

Recording:	MPEG 1, Layer 3 (128kbps)
Playback:	MPEG 1, Layer 3 (32-320 kbps, VBR)
	WAV (16 bit mono, 44.1kHz)

Audio Quality:

Dynamic Range:	80dB, Typical
Signal to Noise:	80dB, Typical
Freq. Resp.:	50Hz to 15kHz
THD:	< 0.5% at 1kHz, Typical

Audio Input:

Line:	Transformer Isolated, 600Ω
Mic:	Internal Electret, panel mounted
Level:	+15dBv max., adjustable potentiometer

Audio Output:

Line:	Transformer Isolated 600Ω
Amplified:	Up to 10 watts into 4Ω or 8Ω
Level:	Adjustable via potentiometer

Audio Memory:

Type:	SD Card
Capacity:	32GB maximum

USB Interface:

Type:	Type A, for memory keys
Capacity:	32GB

Power Requirement:

Input Voltage:	9-32VDC (12/24VDC nominal)
Current:	3A (max) for Power Amp, 250mA w/o Amp

Control Inputs / Status Outputs:

Control Inputs:	6 individual message Start & Stop contacts.
ICM-50 (Option):	Provides 50 message start inputs per module.
Status Outputs:	System Playing, Message #1-6 Playing.
Output Type:	Dry relay contact, 1A @ 24VDC non-inductive load

Mechanical:

Package:	3 Way wall mount chassis, 1U-Rack adapter (optional)
	10" W x 6.5" D x 1.6" H
Material:	CRS chassis; black painted finish, white silkscreen

Regulatory Agency Approvals:

FCC, Part 15, Class A; UL/CSA approval on power Pack (sold separately)

Serial Interface:

Type:	RS-232
Mode:	1.2k, 9.6k, 57.6k or 115.2k baud, 8 data bits, 1 stop bit, no parity, no flow control

8. TROUBLESHOOTING GUIDE

Before contacting the factory, please review the following answers to some common problems.

No LEDs are active on the unit.

- Verify the power source is active by checking that the Power LED is on.
- If the Power LED is not on, using a voltmeter, verify that power is present and polarized correctly, at the power connector.

Can't play a specific message.

- Verify the unit is powered on, and is loaded with messages by pressing the Select button and verifying that a message number is displayed. If no message is displayed, there are no messages on the system.
- Verify there is a message in the location attempting to be played, by pressing the select button a number of times to verify the message exists. If the message number attempting to be played isn't shown, it doesn't exist. Try playing a message that is loaded on the unit.
- If activating from Control Inputs, verify that the activating unit is properly grounding the Start input, by measuring the input with a voltmeter.

Can't hear anything from the audio output

- If nothing is indicated on the Message # LEDs, there is nothing playing.
- Verify that the audio output being used is connected properly to the euro connectors, and that the screws are tight.
- Turn the appropriate output level adjustment clockwise to increase the Audio output level to the channel being used.
- Try using the speaker output instead of the line level output.
- If the unit is currently being downloaded to from CMAC, messages may not be played.

Can't hear anything through the monitor speaker

- Press the Speaker button to toggle the speaker enable setting, verify the speaker LED is on/blinking.

The CON LED doesn't light after the unit is powered on.

- Verify that the Ethernet connection is plugged in securely to the unit, and to a hub or switch that has access to the Internet.
- Verify that the one LED on the Ethernet jack is lighted, and the second LED on the Ethernet Jack blinks. If no LEDs are lighted, try using a different Ethernet cable, or a different port on the Switch / Hub.
- Verify Internet access is active by running an internet browser on a computer connected to the same LAN as the MacFi-V4 is connected.
- If network settings have changed, contact the provider and inform them of these changes. A new configuration file may need to be loaded onto the unit.

7. Internet Connection (Only on MacFi-V4E)

7.1 Connection to the Local Area Network

The MacFi-V4 needs access to an internet connection for the downloading of new messages. Using the supplied RJ45 to RJ45 cable, connect the Ethernet port on the MacFi-V4 into a hub or switch on the premises LAN that will allow the MacFi-V4 to communicate to the Internet. Once connected, the Green CON LED will blink until a connection is made with the Server, and then will light solid.

7.2 Configuring the MacFi-V4 for DHCP

By default DHCP is enabled. If the users network has a DHCP server, the unit can be simply connected to the LAN and the unit will automatically connect with the providers server system.

7.3 Configuring the MacFi-V4 for Static IP

If the customer's network is not configured for DHCP, or has advanced settings (Proxy Server, Gateway, etc.) then the unit will need to be configured using the Mackenzie NSU software. This software allows a technician to configure the required advanced settings and create a configuration file that can be downloaded into the device through the USB port via a USB memory key.

7.3 Message loading – Remote – Via Ethernet / Internet:

To load new material, verify the unit is connected to the server by verifying the CON LED is lit. If connected, the Provider can download new material into the MacFi-V4.

After messages are downloaded to the unit, the system will reset and upon reinitialization they will be available for playback.

7.4 Automatic message playback of Playlists

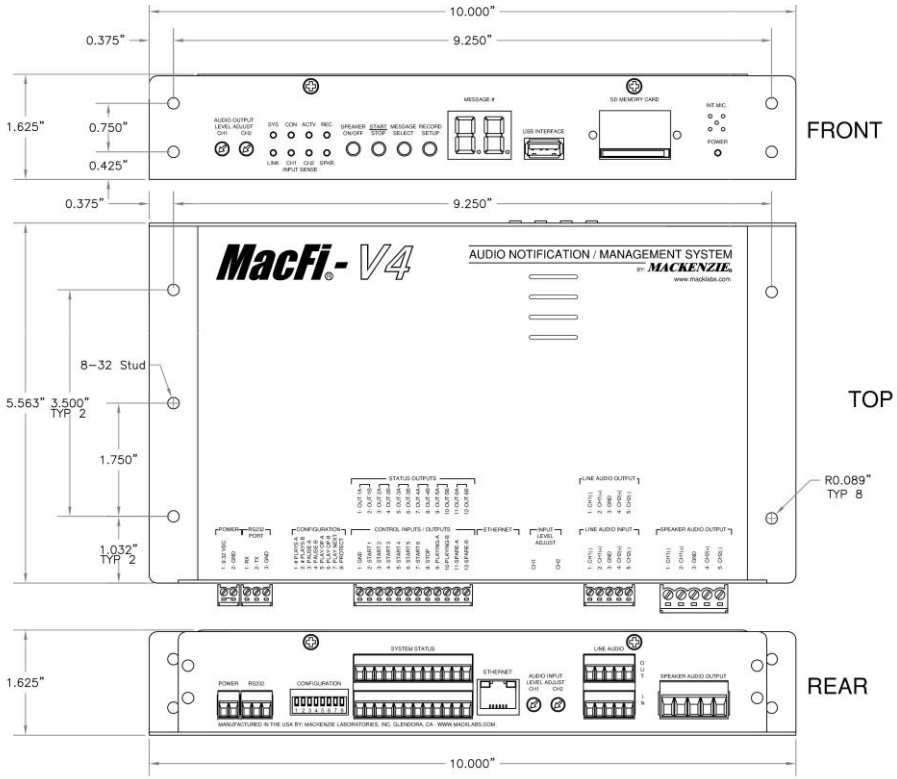
Playlists can be loaded into the MacFi-V4 by the provider. Playlists are a sequence of messages that play automatically based on time of day, or a schedule. Playlist messages play autonomously through either channel 1 or channel 2. Any playlist message playing when a message is triggered via remote contact or serial port command will be stopped and overridden by the triggered message.

2. INSTALLATION, CONNECTIONS AND CONFIGURATION

This section provides details for mounting the MacFi-V4 System, the interfaces to external equipment, and configuration switch settings.

2.1 Installation Steps

1. Find a space on the wall or table. For table top applications, install included rubber feet. Allow 6" in front of both sides of the unit for user access to the controls and wiring.
2. Mount the unit to the selected location with its wiring at least 18" away from power supply or other equipment that generates electrical noise.



3. Connect appropriate audio inputs and outputs.
4. Connect appropriate control inputs and outputs.
5. Set DIP switches to the desired operation.
6. If using the optional power supply, make sure there is a standard, non-switched electrical outlet available.
7. Connect earth ground to 8-32 stud provided. (optional)
8. Connect and apply power.
9. Test unit operation.

2.2 Rear Panel Connector Descriptions

2.2.1. Power Connector

2 pos, 3.81mm pluggable Euro connector
1 12/24 VDC at up to 3 amps
2 Ground

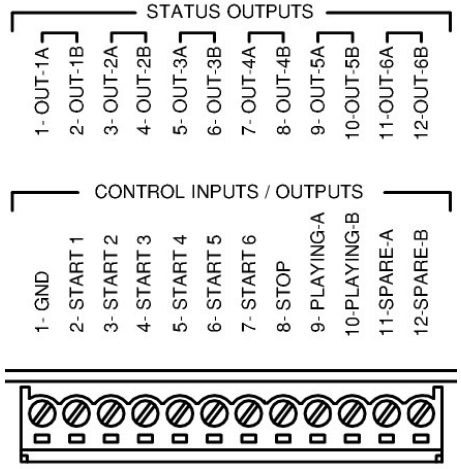
The power supply is connected here with the current requirement contingent on the amount of speaker output power required. The MacFi is internally fused at 3 amps.

2.2.2. RS232 Port Connector

3 pos, 3.81mm pluggable Euro connector
1 RS232 Receive (Input)
2 RS232 Transmit (Output)
3 Ground

Connect this port to computer serial port or external controller to control and configure the MacFi-V4. The RS232 port is configurable to 9,600 (default), 57,600, or 115,200 Baud. The protocol is fixed at 8 data bits, 1 stop bit, no parity.

2.2.3. Control Input / Outputs Connector (Lower 12 Pos)



12 pos, 3.81mm pluggable Euro connector

1 Common
2 Start 1 Input
3 Start 2 Input
4 Start 3 Input
5 Start 4 Input
6 Start 5 Input
7 Start 6 Input
8 Stop Input
9 Play Relay, Common
10 Play Relay, Normally Open
11 Spare Relay1, Common
12 Spare Relay1, Normally Open

12 position pluggable terminal strip. Use for remote activation of message playback, stopping messages, and playing relay output. Activation can be made through mechanical contact or open collector driver - 5mA activation current. Relay outputs are dry contact closures which are rated at 24VDC at 1 amp.

6.3.12 Reset- RST

This command causes a warm reset of the MacFi-V4 system.

Example; RST<CR>

6.3.13 Initialize System - SHP

This command allows the user to format the memory card and reset system settings to factory default. This command will erase the entire memory and reset all of the configurable settings to those specified in the Product Specification. Typically used after testing and before shipping to the end user.

Example; SHP<CR> will trigger Y/N confirmation question "All Msgs & Cfg Data will be cleared". A "Y" entry is required to initiate the process.

The system may take up to 10 sec to finish this process and be ready to receive new commands.

6.3.14 Stop message playback- STP

This command stops the playback or recording of messages and clears the entire message queue.

Example; STP<CR>

Will stop any currently playing message, or recording message on the MacFi system. If nothing is currently playing or recording, this command will have no effect.

6.3.15 System Information- SYS

The SYS command displays the firmware version info as well as a listing of messages stored on the SD Card.

Example; SYS<CR>

6.3.9 Play Message - PLY

This command is to playback messages which have been recorded into the acFi-V4.

Syntax; PLY<msg#>, <repeat>, <pause>, where: msg# is the message location to be played <1-600>, repeat = the number of times to play the message<1-255>, pause = # seconds to pause between repeats <1-255>

Example;
PLY6,10,5<CR> will play message six, ten times with a five second pause between the repeats.

If no message number is given, the system will play the next available message in memory. This defaults to message # 1 at power up. If no repeat is given, the system will play the message one time. If no pause is given, the system delays one second between subsequent message plays.

Repeat may not be entered without message number being entered. Pause may not be entered without repeat being entered. NOTE: Multiple PLY commands may be issued to the unit while it is playing. In this case the MacFi-V4 will queue the messages and play them in the order they are received. The STP command will stop playback and clear the entire queue.

6.3.10 Record Input Selection – INP

Selects which input is to be used for the analog recording process.

Syntax: INP<input#>, where input# = 1-3

Input #1 = Channel 1 Line Input
Input #2 = Channel 2 Line Input
Input #3 = Internal Microphone

6.3.11 Record Message - REC

Messages are recorded using this command.

Syntax; REC<msg#>, <Delay>, <Record Time>, where; msg# is the message location to be recorded <1-599>, delay, is the time in seconds before the recording will start <1-255>, Record Time is the time in seconds of the recording <1-99> in minutes or seconds. If Record time is not provided, the recording run continuously until a STP command is received.

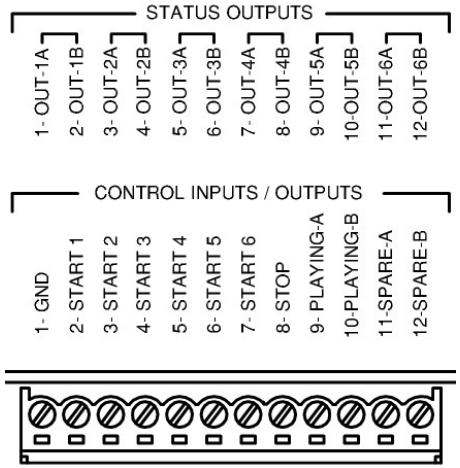
Example; REC5,1,15<CR> will record message #5 after a 1 second pause, and will record for 15 seconds.

Example; REC5,1,-15<CR> will record message #5 after a 1 second pause, and will record for 15 minutes.

2.2.4. Status Outputs Connector (Upper 12 pos) (MacFi-V4E)

12 pos, 3.81mm pluggable Euro connector

1	Msg #1 Playing, Com.
2	Msg #1 Playing, N.O.
3	Msg #2 Playing, Com.
4	Msg #2 Playing, N.O.
5	Msg #3 Playing, Com.
6	Msg #3 Playing, N.O.
7	Msg #4 Playing, Com.
8	Msg #4 Playing, N.O.
9	Msg #5 Playing, Com.
10	Msg #5 Playing, N.O.
11	Msg #6 Playing, Com.
12	Msg #6 Playing, N.O.

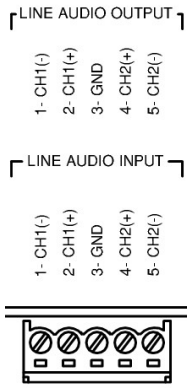


12 position pluggable terminal strip. Use drive/signal downstream gear that a particular message is playing. Only the relay of the message number currently playing will be activated. If a message other than message 1-6 is playing none of these relays will be active. Relay outputs are dry contact closures which are rated at 24VDC at 1 amp.

2.2.5. Line Audio Input Connector (Lower 5 pos)

5 pos, 3.81mm pluggable Euro connector

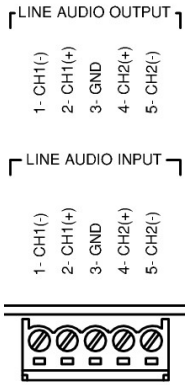
1	Channel 1 (-) Line Level Audio Input
2	Channel 1 (+) Line Level Audio Input
3	System Ground for Shielding
4	Channel 2 (-) Line Level Audio Input
5	Channel 2 (+) Line Level Audio Input



Two channels of line level analog audio can be input to the unit through this connector for recording messages or to be fed through the system when it is not playing a message. Each channel is 600Ω transformer isolated. Analog potentiometers provide sensitivity adjustment for up to +15dBV levels.

2.2.6. Line Audio Output Connector (Upper 5 pos)

5 pos, 3.81mm pluggable Euro connector

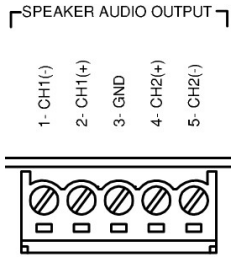


1 Channel 1 (-) Line Level Audio Output
2 Channel 1 (+) Line Level Audio Output
3 System Ground for Shielding
4 Channel 2 (-) Line Level Audio Output
5 Channel 2 (+) Line Level Audio Output

Two channels of line level analog audio are output through this connector to drive external amplifiers, or processors. Each channel is 600Ω transformer isolated and is capable of Driving levels up to +6dBV. The output level is controlled by the potentiometers on the front of the MacFi-V4.

2.2.7. Speaker Audio Output Connector

5 pos, 5mm pluggable Euro connector



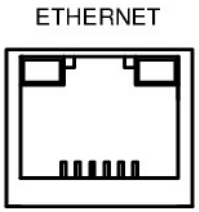
1 Channel 1 (-) Speaker Audio Output
2 Channel 1 (+) Speaker Audio Output
3 System Ground for Shielding
4 Channel 2 (-) Speaker Audio Output
5 Channel 2 (+) Speaker Audio Output

Two channels of bridged speaker outputs for direct connection to speakers. Each channel is capable of delivering 10W into 4Ω or 8Ω, dependent on the input power.

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 output.

2.2.8. Ethernet Connector (MacFI-V4E)

For Standard Ethernet RJ45



Connect the MacFi-V4 to the LAN with internet access to allow for update and control remotely using Mackenzie's CMAC software package.

The default configuration for the unit is DHCP.
If the on-site network does not allow DHCP, then configuration of the network settings will be required.

6.3.5 Delay before play - DLY

This command configures the delay (in seconds) before first play value. This setting only effects start triggers generated by contact closure.

Syntax: DLY<value>, where value = 1-255

Example: DLY5<CR> configures delay before first play for 5 seconds.

6.3.6 Command listing- LST

This command lists the commands available to control the MacFi-V4.

Example; LST<CR> displays a list of serial port commands, fields/values and descriptions.

6.3.7 Pause between play repeats - PAS

This command configures the pause between play repeats value.

NOTE - This setting only effects start triggers generated by contact closure. The configuration of this value overrides the default setting of configuration switches 3 and 4 ON, 30 second delay between plays. This is helpful as the unit may be configured with a custom time via RS-232, but used in the start input remote control mode.

Syntax; PAS<value>, where; value = 0-255 in seconds

Example; PAS60<CR> sets the pause between play repeats at 60 seconds.

6.3.8 Number of Plays per trigger - PLS

This command configures the # of times a message will play per trigger.

NOTE - This setting only effects start triggers generated by contact closure. The configuration of this value overrides the default setting of configuration switches 1 and 2 ON, play message 4 times.

Syntax; PLS<value>, where; value = 1 - 99 repeats. (default = 1)

Example; PLS20<CR> Triggered messages will be played 20 times.

6.3 Command List and Descriptions

At the “MFI>” prompt, various commands may be issued to control the MacFi-V4 . Each command and associated fields are described below. Note that each command string must be terminated by a Carriage Return <CR>.

6.3.1 Bad Block Test (Format Memory) - BBT

This command formats the SD Card, erasing all messages on it.

Example: BBT<CR> will trigger Y/N confirmation question “All Msgs wil be cleared”. A “Y” entry is required to initiate the process.

6.3.2 Restore Default Configuration - CFG

This command restores the user configurable settings: DLY INP, PAS and PLS to their default setting and sets baud rate to 9600.

Example: CFG<CR> will trigger Y/N confirmation question in order to restore the default configuration.

6.3.3 Message Directory Listing - DIR

The configuration of each memory location will be displayed to the user when this command is issued. The display will show each of the 600 available message locations with either a number or an "xx" in the location

Example: DIR<CR>

If a number is in the location, the message is valid and available for automatic playback. If an "xx" is in the location, it is empty.

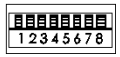
6.3.4 Delete Message - DEL

This command will delete a message from memory.

Syntax: DEL<msg number> Where msg number = 1 - 599

Example: DEL5<CR> triggers the response: “Message #002 will be deleted, Are You Sure <Y/N>. A “Y” entry is required to actually delete message number 5.

2.3 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-V4 to meet the needs of the application.

NOTE: Dip switch settings are only read at system power up. To change settings, disconnect power, change the dip switch settings, then re-apply power.

2.3.1 Number of Plays

The unit can be configured to play a programmed number of times. This is a global setting for all messages activated through the remote activation connector. RS232 activated messages are not affected by this setting.

1	2	
▯	▯	Play activated message one times
▯	▮	Play activated message two times
▮	▯	Play activated message three times
▮	▮	Play activated message four times*

*This selection may be customized by users of the MacFi-V4 by using the RS232 “PLS” command for a range of 1 – 255 plays.

2.3.2 Pause Between Plays

When the number of plays configured above is more than one, this setting specifies the pause time between each of the message plays in that sequence.

3	4	
▯	▯	One second pause between plays
▯	▮	Five second pause between plays
▮	▯	Ten second pause between plays
▮	▮	Thirty second pause between plays*

*This selection may be customized by users of the MacFi-V4 by using the PAS command for a range of 0 - 255 seconds.

2.3.3 Play Method

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

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

* See details for each mode of operation below:

2.3.3.1 Standard Operation: A **momentary** contact closure at a start input causes the device to play one sequence of the message associated with that input. A sequence is specified by the number of message plays and the amount of pause between each message, as selected by the dip switches and/or RS232 command. If a contact is maintained active, the system will continuously play that sequence repeatedly until the input is released, and the unit 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, based on the order which they were activated. The message associated 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 an already activated message, while a sequence is playing or is queued, and it is released prior to that messages playback, it will be ignored.

2.3.3.2 Play one sequence per closure: If an activation input is maintained, the system will only play the message sequence one time. The MacFi-V4 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 while another input is held active indefinitely.

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.

6. MacFi-V4 SERIAL PORT CONTROL

The MacFi-V4 includes an RS-232 (Serial) control port allowing the unit to be manually or automatically controlled via ASCII commands.

6.1 RS-232 (Serial) Command List

CMD	Fields and allowed values	Description
BBT		*Format SD Card
CFG		*Restore Default Configs.
DIR		Directory of recorded messages
DEL	<1-599>	*Delete Message
DLY	<0-255 >	Delay Before 1st Play Start.
LST		This Commands Listing.
PAS	<0,255>	Pause Between Play Repeats.
PLS	<1-255>	Number of Plays per Trigger.
PLY	<1-599>,<1-255>,<0-255>	Play Message,Repeat,Delay.
INP	<1-3>	Sets the audio input to Record
REC	<1-599>,<1-255>,<0-(-)99>	Record Message, Record Start Delay, Record Time (- = min)
RST		Warm Reset System
SHP		*Set all user configs to default & Format SD Card
STP		Stop Message Playback.
SYS		Display System Information.

* = Confirmation Required

6.2 Setting the Baud rate of the Serial Port

The MacFi-V4 supports four RS-232 (Serial) port speeds, 1200, 9600, 57,600 and 115200. The baud rate can be changed by pressing and holding the Start/Stop button for one second. The Status Display will indicate the current port speed (12, 96, 57, or 115) upon entering this mode. If the current port speed is correct, wait for 5 seconds and the display will blank without changing any settings. If the speed needs to be changed, press the Message Select button, and the available port speeds will be displayed: 12 for 1200 baud, pressing Message Select again will display 96 for 9,600 baud, the 57 for 57,600 and 115 for 115,200. Once the display shows the desired speed, wait for 5 seconds and the setting will be changed, saved into non-volatile memory, and the display will blank.

5.3 Special Memory Operations

5.3.1 Complete Memory Erase

Should the MacFi-V4 be moved from one location or application to another, the messages may no longer be relevant. To clear system memory of previously loaded messages, perform the following:

1. Remove power from MacFi-V4
2. Depress and hold Record Setup button while restoring power to MacFi-V4. Continue to hold Record Setup button until Record Indicator remains ON, at which time it may be released. Record Indicator will remain ON and Status Display will read FC while system runs audio memory check. This process could take several minutes.
3. Wait until the Record Indicator turns off, indicating memory check is complete and unit will operate as if it has no messages loaded.

5.3.2 Erase Individual Message

Should an individual message no longer be relevant, it can be erased by simply recording a short (<1 second) message to that location. This short recording will instruct the system to erase the data from that message location. See Section 5.1.1 for details of the recording process.

2.3.3.3 Play while active: Upon receiving a **maintained** input control signal, the message starts and continues 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 stop playing that message.

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 of the highest priority and then repeat. This mode does not support queuing.

2.3.3.4 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 of the highest priority will be played. This mode does not support queuing.

2.3.4 Play Next — 7

Enabling Play Next allows Start 6 input (Lower 12 position connector, Pos.7) to initiate playback of the next message sequence. The first start activation after power on will play the first numerical message in memory. All operation modes are supported and other start inputs (1 - 5) are disabled.

- Disable
- Enable

2.3.5 Memory Protect — 8

Allows the user to lock message memory so that messages may not be accidentally overwritten locally via analog recording or USB download.

- Disable
- Enable

NOTE: CMAC update of the unit is still enabled when the memory protect switch is enabled.

3. User Interface Descriptions

The MacFi-V4 can be controlled and monitored locally through the provided user interfaces on the front and back panel of the system.

3.1 Pushbutton Descriptions

Pushbuttons are located on the front side of the MacFi-V4 allowing local control of the system during normal operation, and also provides configuration control of the system.

3.1.1 Speaker On/Off – Black

Toggles (enable/disables) the operation of the internal speaker for monitoring audio playback on each of the two channels.

NOTE: The speaker is automatically set to ON whenever playing a message from the front panel pushbuttons. The Speaker is automatically set to OFF when playing messages from contact closure or RS232.

3.1.2 Start / Stop – Black

This button will start or stop the current operation, either in record or play mode. If a message is selected for record or playback, with its number displayed on the Message # display, pressing this button will initiate the operation. Pressing it again, while the message is playing or recording, will stop the operation.

If during the record process, the recording button is pressed two times quickly (within 1 second) the recorded message will be aborted, and the message deleted.

Pressing and holding this button while the MacFi-V4 is idle will enter baud rate select mode. See Section 6.2.

3.1.3 Message Select – Black

This button selects the message to be recorded or played. Pressing this button sequences through the individual message positions, as shown on the Message # display. When selecting a message to play the display only shows locations of stored message numbers.

NOTE: Pressing and holding the Select Button while selecting a message will jump ten positions, expediting navigation.

4. Adjust the audio output level potentiometer for the desired level through downstream audio equipment.
5. Press the Start/Stop button to stop playback and return to the idle state.

NOTE: Playback Setup will time out after 15 seconds of inactivity.

5.2.2 Play Activation – Contact Closure / Open Collector Driver

Playback of a message can be initiated by external equipment using contact closure, or open collector driver using the Control Input Connector on the back panel of the MacFi-V4 unit. The base unit allows access to the first six messages on the system. To access more than six messages use ICM50, Input control modules, which provide access to 50 additional messages, up to 500. Playback of message will include selected repeat and delay parameters.

1. When the unit is idle, provide a momentary or maintained contact closure between the message start input to be played and ground. If a valid message resides at that location in memory, playback will start and the Message # display will display this message number for the duration of playback.
2. To stop playback and return to idle mode, provide a momentary or maintained contact closure between the Stop input and ground.

The MacFi-V4 will ignore an input which corresponds to an empty or corrupt message location.

The Playing relay will be activated and maintained for the duration of play sequence (a sequence being the message and repeats and any delay between the repeats). When multiple messages are queued via multiple Start activations, or from a maintained start activation, the system will deactivate the Playing relay for approximately 100mS between each sequence.

5.2.3 Play Activation – Serial port command

Playback of messages can be initiated by external equipment using the RS232 Serial Port. This method can activate all 599 messages using a serial port command.

Reference section 7 for a complete listing of the serial port protocol.

5.1.3 Transfer – USB Memory Key

The simplest, and quickest method of transferring files onto the MacFi-V4 is through use of a USB memory key. The transfer method is specified by using one of three folder names placed on the USB Memory Key.

5.1.3.1 - "Complete": Place the files required by the application into a folder named "Complete". When the USB Memory Key is inserted into the MacFi-V4, the SD Memory Card will be formatted and the audio and configuration files in the Complete folder will be transferred into the SD Memory Card.

5.1.3.2 - "Delta": Place any files to be updated, or added to the unit, into a folder named "Delta". When inserted, files on the MacFi-V4 with the same name as those in this folder will be replaced, and any new files added.

5.1.3.3 - "Upload": When the MacFi-V4 detects a memory key with an empty Upload folder, all audio files will be copied from the SD Memory card into this folder.

Note: If more than one folder above exists on the key, no files will be transferred and an error will be indicated.

After the file transfer process has completed, the MacFi-V4 will reset, load the current set of files, and reinitialize.

See Section 4 for the file types supported by the MacFi-V4.

5.2 Audio file playback activation

The MacFi-V4 will play any valid audio file stored in its memory when activated by user interface, contact closure, or serial port command.

5.2.1 Play Activation - Local

Local playback can be performed using the buttons on the front panel of the unit. Note that playback configurations (repeats, delays, etc.) are not used in this mode.

1. Press the Select button and the unit will display the first message stored on the unit on the Message # display.
2. Continue pressing the Select button to increment the message number until the message to be played is shown on the display.
3. Press the Start/Stop Button to begin playback of the selected message number.

3.1.4 Record Setup – Red

This push button configures the MacFi-V4 for record mode. Pressing this button will cause the record LED to blink, verifying the MacFi-V4 is in record setup mode. Depressing this button while in record setup mode will exit the mode and turn off the record LED. Pressing the button in the middle of a recording will have no effect.

NOTE: If you have difficulty recording, verify Memory Protect, Configuration Switch 8 is OFF (▯).

When pressed and held for while powering up the MacFi-V4, the SD Card will be formatted

When pressed and held during normal operations, the user can select which audio input to use for analog recording. From the idle mode, press and hold the Record Setup pushbutton. After pressing for one second, the display will show L1, L2, or cc.

L1 = Record from Line Audio Input Channel 1
L2 = Record from Line Audio Input Channel 2
cc = Record using Internal Microphone

To change which input to use during recording, press the Message Select button while the unit is displaying L1, L2, or cc. Each time the Message Select button is pressed, the system will move to the next input. When the proper input is displayed wait for 2 seconds and the setting will be stored in non-volatile memory.

3.2 Potentiometers

Two sets of potentiometers are provided on the MacFi-V4 for setting audio levels, one set on the front panel and one on the rear panel. Each potentiometer lowers the level when turned counterclockwise, and increases the level when turned clockwise.

3.2.1 Audio Input Level (x2)

Two potentiometers are located on the rear panel to adjust the input audio level for each of the two channels.

3.2.2 Audio Output Level (x2)

Two potentiometers are located on the front panel to adjust the output audio level for each of the two channels. This adjustment affects both Line Level and Speaker Outputs simultaneously.

3.3 LED Indicators

LEDs are provided on the front panel of the MacFi-V4 to give the operator current system status.

3.3.1. "SPKR" Speaker Indicator

This yellow LED signifies that the internal speaker is active and blinks to indicate which channel the speaker is monitoring.

Off – Monitor Speaker Disabled
Blink 1x – Monitor Speaker monitoring Channel 1 output (V4E)
Blink 2x – Monitor Speaker monitoring Channel 2 output (V4E)

Note: Operation of the speaker is set automatically based on activation type.

3.3.2. "CH1", "CH2" Channel 1 & 2 Audio Sense Indicators

A yellow LED for each channel indicates the presence of audio at that particular input. The input level potentiometers should be adjusted so the audio input being recorded is at a high enough level to light the LED.

Off – No audio detected
Blinking – Audio peaks are being detected
On – Audio is at a high level

Note: These indicators are not active when Microphone input is selected.

3.3.3. "REC" Record Indicator

This red LED indicates the recording status of the MacFi-V4.

Off – System not in record setup or recording.
Blink – System is in Record Setup mode
On – System is currently recording

3.3.4. "LINK" Indicator (MacFi-V4E)

This yellow LED indicates that the Ethernet connection is ready

3.3.5. "SYS" Indicator (MacFi-V4E)

This yellow LED indicates that the Ethernet is being configured

3.3.6. "CON" Connection Indicator (MacFi-V4E)

This green LED indicates that the MacFi-V4 is connected to the Mackenzie Cloud Servers and is available for remote download and control functionality.

3.3.7. "ACTV" Playlist Active Indicator

This green LED indicates that a playlist is active and blinks when a playlist message is playing.

3.3.7. "POWER" Indicator

This green LED indicates that the unit has power applied.

5. OPERATION

The primary operation of the MacFi-V4 is to play stored audio messages on command. Audio files must be manually recorded, copied, or transferred into the memory of the unit, and can be then be played using pushbuttons, contact closure or serial port command.

5.1 Audio file loading procedure

The following sections describe each method for loading files onto the unit.

5.1.1 Recording – Local Analog

Local analog recording is achieved through the user interface on the front panel of the MacFi-V4 unit.

1. Connect power, the recording source (through one of the audio input channels), and audio output.
2. Depress Record Setup button, Record LED will blink and the Message # display will show "01". If there is a message already located in the location, the two decimal LEDs will blink.
3. Use Select button to increment the message location to record into.
4. Start the recording source audio and verify the audio sense LED illuminates. Adjust the audio input level potentiometer until the LED is solid.
5. After resetting the recording source to the beginning, press Start/Stop button to begin recording and start the audio source. The Record LED will stay on solid during actual recording.
6. Depress Start/Stop button to end the recording and exit.

NOTE: Record Setup will time out after 1 minute of inactivity.

5.1.2 Copying – SD Card Memory Card

To access the SD Card, remove the SD Card cover plate. Once removed, press the SD Card until a click is heard, and the card will eject allowing it to be extracted.

The SD Card can be accessed by any Windows based system. Apple and Linux environments are not recommended. With Windows Explorer, copy all files into the "DAVE" folder of the SD Card. If no "DAVE" folder is found, create one, and place all audio, and any configuration files into the "DAVE" folder. Delete any files no longer necessary or required by the application.

Once the appropriate files have been copied onto the card, insert the card in the SD Card socket on the MacFi-V4 and press the card until a click is heard. The MacFi-V4 will reset, reload the audio files, and initialize. Verify that the audio files match expectations by playing each, and when satisfied, replace the SD Card cover plate.

3.4 Memory Interfaces

The MacFi-V4 uses an internal SD Card memory card for local storage of audio and configuration files. Data on the card can be accessed directly, or through use of a USB memory key.

3.4.1 SD Card

Located behind a cover plate, the SD card can be removed and loaded with the audio files for the application. The MacFi-V4 supports SD Cards up to 32GB. The SD card can be replaced with power on, as the system will reset and reload the contents of the card when it is inserted into the unit.

3.4.2 USB Memory Key

USB type "A" connector for use with a USB memory key, sized up to 32GB. The MacFi-V4 will upload or download audio files to/or from the USB key. The system will automatically recognize the insertion of a USB memory key, and process the transfer of files as described in Section 5.1.3.

4. AUDIO FILE FORMATTING

The MacFi-V4 can use audio files that are formatted as either *.WAV (44.1kHz, 16 bit) or *.MP3 (44.1kHz, 32-320 kbps, VBR).

- Messages may be mono, or stereo, but unit will only play the left side audio.
- Message lengths can be any size from a couple seconds to several hours.
- Audio files must be named numerically as shown below:
  1.mp3 or 1.wav will be placed in message position 1.
  2.mp3 or 2.wav will be placed in message position 2.
  3.mp3 or 3.wav will be placed in message position 3.
  99.mp3 or 99.wav will be placed in message position 99.
  199.mp3 of 199.wav will be placed in message position 199.
- Messages higher than "599" will be ignored.
- If the card has two files with the same name, but different suffix, the MP3 file will play and the WAV file will be ignored.

3.3.8. Message Number and Status Display

These two seven segment LED's indicate which message is selected and provide a variety of status indications for the MacFi-V4. See the following table for an explanation of the different modes of the display.

Table of seven segment display modes

Display	Definition
Circuitously cycles through all segments	No messages recorded in the system.
Solid: 01 – 99 Alternating: _1, 00-99	Message number 0-99 playing or recording Message number 100-599 playing or recording
Both Decimals Blink while displaying a message number	Displayed when in Record Setup mode and the selected message location already has a message in it.
Right Decimal Solid	Delay, Pause, Repeat or Baud Rate has been set via RS232
CO	Complete folder detected on USB Key
dL	Delta folder detected on USB Key
Er	Error detected
FC	Bad Block Memory Test – Formatting SD Card
nF	No SD Card detected
uP	Upload folder detected on USB Key
xx	Number of messages on the SD Card at boot
115	RS232 baud rate set for 115200
57	RS232 baud rate set for 57600
96	RS232 baud rate set for 9600
12	RS232 baud rate set for 1200
--	Two dashes blink if trying to record a message while system is in memory protect mode

STATUS INDICATIONS

REC = Recording indicator
Flashing: Setup, Solid: Recording
CH1 = Audio Input Sense - Channel 1
Off: No Audio, Solid: Audio Present
CH2 = Audio Input Sense - Channel 2
Off: No Audio, Solid: Audio Present
SPKR = Internal Speaker Status Indicator
Off: Disabled, Blink 1x: Channel 1,
Blink 2x: Channel 2
SYS, CON, ACTV, LINK = Network Status
On "E" version only

OUTPUT LEVEL ADJUSTMENTS

CH1 = Channel one audio output adjust
Turn Clockwise to increase level
Turn counterclockwise to decrease level
CH2 = Channel two audio output adjust
Turn Clockwise to increase level
Turn counterclockwise to decrease level

CONTROL BUTTONS

SPEAKER ON/OFF
Momentary presses toggles mode between: Monitor CH1, Monitor CH2, Speaker off
START / STOP
Momentary press starts or stops currently activated function (e.g.: Record / Play)
MESSAGE SELECT
Momentary press increments the message number by one. Pressing and holding will increment the message number by ten
RECORD SETUP
Momentary Presses enables/disables Record Setup mode,

MESSAGE INDICATOR

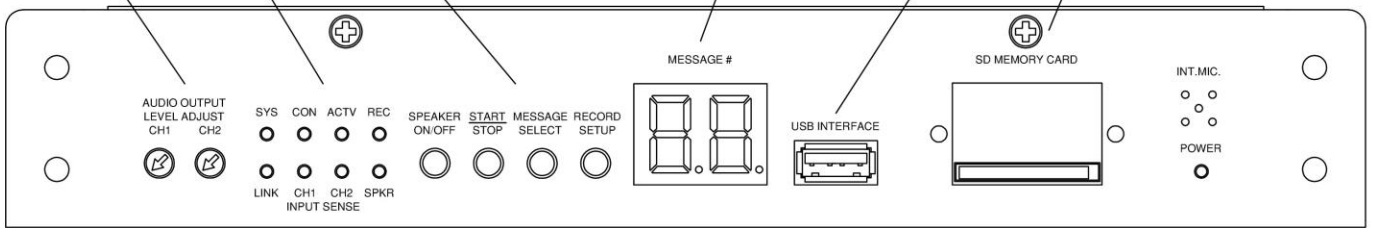
BOOT UP
At power up, this LED will display the number of messages stored on the system
SELECTED MESSAGE NUMBER
Displays the message number currently playing, Set-up for playback, or recording
SPECIAL MODE INDICATION
Displays BAUD Rate, Record Audio Source,
ERROR INDICATION
Codes will be displayed if a system error is detected. Contact Mackenzie for details

USB MEMORY KEY OPERATION

"Complete" Folder
MacFi-V4 memory will be formatted and the audio files in this folder will be stored on the unit
"Delta" Folder
Audio files in this folder will be stored on the unit overwriting any existing files with the same name.
"Upload" Folder
Copies all files stored on the MacFi-V4 into this folder on the USB memory Key
Firmware Update
Firmware placed in the root folder of this drive will be used to update hte firmware on the unit.

SD CARD (Drawing shown without cover plate)

SD Card can be removed/replaced to quickly swap out messages on the system.



CONFIGURATION SWITCHES

OFF ON

1 2 Number of Repeats
- Play Message **One** Time
- Play Message **Two** Times
- Play Message **Three** Times
- Play Message **Four** Times

3 4 Delay Between Plays
- **One (1)** Second Delay
- **Five (5)** Second Delay
- **Ten (10)** Second Delay
- **Thirty (30)** Second Delay

5 6 Operation Mode
- Standard Operation
- Play one Seq per Closure
- Play While Active
- Retrigger

7 Play Next Mode
- Play Next Disabled
- Play Next Enabled

8 Memory Protect
- Memory Protect Disabled
- Memory Protect Enabled

STATUS OUTPUTS

6 independent relays which indicate when message 1 - 6 is playing. On "E" version only.

INPUT LEVEL ADJUSTMENTS

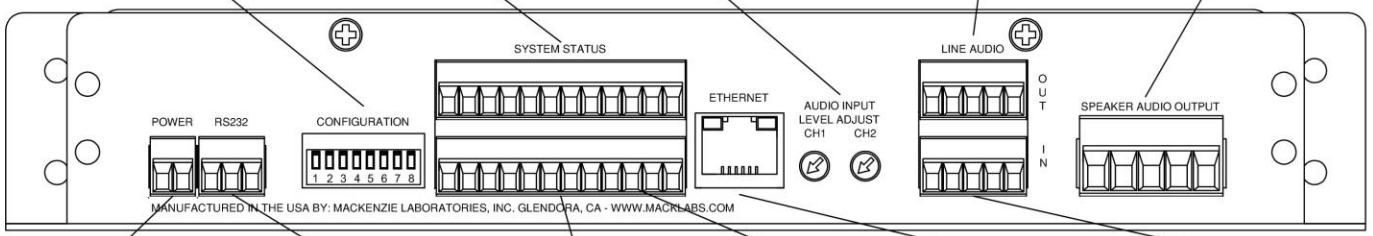
CH1 = Channel one audio input adjust
Turn Clockwise to increase level
Turn counterclockwise to decrease level
CH2 = Channel two audio input adjust
Turn Clockwise to increase level
Turn counterclockwise to decrease level

LINE AUDIO OUTPUT (x2)

Two independent 600 ohm transformer isolated line level audio channels can be used to feed downstream amplifiers..

SPEAKER OUTPUT (x2)

Two independent speaker audio outputs that can drive 4 or 8 ohm speakers up to 10W dependant on power supply capability.



POWER

Connect 12VDC@1A or 24VDC@0.5A for 4W through speaker(s).
Use higher current capacity supplies for higher powers through speaker(s)

RS232 COM PORT

Connect this port to computer or controller. Protocol is 8 data bits, 1 stop bit, no parity, no flow control. Baud rate is set at 9,600, 57.6K or 115.2K.

CONTROL INPUTS

To activate, connect an input to common using contact closure or open collector (12VDC at 5mA)

STATUS OUTPUTS

One set of Relay contacts indicate unit is playing a message.

ETHERNET

Connect to LAN with internet access to allow remote downloading of messages, configuration, and control of the unit. On "E" version only.

AUDIO INPUT (x2)

Two independent transformer isolated audio inputs can be configured for line or microphone level. Use as a record source or for audio feedthrough.