

DAR Digital Audio Repeater



User's Manual

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Marilyn
Systems, llc.

Table Of Contents

Table of Contents

Introduction	1
Disclaimer.....	1
Warranty.....	1
Use and Care	1
Contact Information	1
Overview.....	2
Device Layout.....	3
Front Panel.....	3
Left Panel	4
Right Panel.....	5
Wiring Examples	6
Power.....	6
Speakers-stereo	7
Speakers-mono.....	7
Inputs with negative common	8
Inputs with positive common.....	8
Outputs with negative common.....	9
Outputs with positive common	9
Serial to PC.....	10
Serial to Other Marilyn Systems Equipment	10
File Names	11
Configuration File.....	12
INI file overview	12
[StartUp] Section.....	13
[Audio] Section	14
[Serial] Section.....	15
[Input] Section.....	16
[InputxMake] Section.....	17
[InputxBreak] Section.....	18
[ButtonMake] Section	19
[ButtonPress] Section.....	20
[ButtonBreak] Section	21
[ButtonRelease] Section	22
[UserPot] Section.....	23
[VolumeControl] Section.....	23
[UserLed] Section.....	24
[PlayLed] Section.....	24
[StatusOutput] Section.....	24
ButtonxMake, ButtonxBreak, VolumeControl, PlayLed, and StatusOutput Examples	25
Configuration File Application Examples	26
CONFIG.001	26
CONFIG.002.....	27
CONFIG.003.....	28
CONFIG.004.....	29
ASCII Serial Protocol	30
Firmware Upgrade	31
Technical Specification	32
Mechanical Drawings.....	33

Introduction

Thank you for purchasing the DAR digital audio repeater. This rugged, versatile, player should provide years of reliable service. The following user manual will provide the information needed to install and use this device.

Disclaimer

Marilyn Systems equipment is neither designed nor intended for use in safety critical applications where the potential for personal injury or property damage is present. The customer assumes full responsibility and liability for any consequences arising from such use. Marilyn Systems, LLC. makes no assertion that this product is suitable for any specific application and will not be held responsible or liable in any way for improper use.

Marilyn Systems strives to ensure the accuracy of the information provided in this manual. Should you find an error, please bring it to our attention so that we may correct it in a future revision.

Warranty

Unless stated otherwise, all products manufactured by Marilyn Systems are warranted to be free from defects in material and workmanship for a period of one year from date of purchase. Products that fail during the warranty period will be repaired or replaced at the discretion of Marilyn Systems.

The warranty does not cover return shipping charges to Marilyn Systems or physical product damage due to improper configuration or application, abuse, accidents, or shipping damage. Marilyn Systems will however cover reasonable return shipping charges for products repaired or replaced under the conditions of this warranty.

All products manufactured by others and sold as such by Marilyn Systems shall be governed by the terms of said manufacturer's warranty.

Use and Care

The DAR should be mounted securely a clean, dry environment with an operating temperature range of 0° to 38°C (32° to 100°F). Always operate the DAR within specified parameters. Clean with a soft cloth.

Customer Support

You may contact Marilyn Systems for technical or service support by phone or email:

Phone: 210.200.8451 between the hours of 9am-6pm Central Standard Time
Fax: 210.200.8487

Email: support@marilynsystems.com
www.marilynsystems.com

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Device Overview

The DAR is a solid-state device that plays MP3 and WAV audio files. It directly drives loudspeakers with a powerful, built-in amplifier.

Up to 500 audio tracks are stored on an SD or SDHC flash memory card and called up using the eight optically-isolated inputs or internally. A simple, plain-English configuration file allows the user the flexibility to modify all operating parameters to suit their needs. Being a standard text file, the user needs only a text editor on the platform of their choice to quickly make configuration changes - no specialized software is required. Status LEDs and a volume control potentiometer are provided on the front of the unit.

Out of the box, the DAR can be surface-mounted in multiple orientations. An optional DIN-rail mount kit is available for standardized integration into industrial panels.

Updating the firmware on the DAR is a snap and ensures that you always have the newest features. The latest firmware is always available on our website at www.marilynsystems.com.



Figure 1 – Top View

Unit Layout

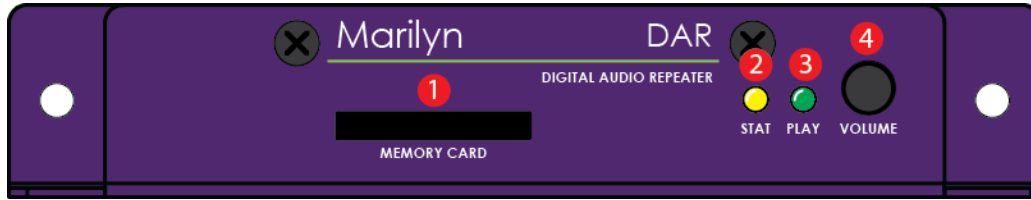


Figure 1 – Front View

1 MEMORY CARD slot

All sound files and configuration information are stored on a SD or SDHC flash memory card. The card is inserted by gently pushing it into the socket, with the contacts down and towards the DAR, until a “click” is heard. To remove the card, push it in slightly until a “click” is heard. The card is now unlocked and will be ejected from the socket.

2 STATUS Indicator

The yellow STAT indicator provides unit status.

Indication	Function
Slow blink	No flash memory card inserted or no usable configuration file/media found on the card
Fast blink	DAR is reading the configuration file and analyzing any media present on the flash card
short flash every second	Unit is operating normally
1/2-second flash	Indicates input activity

Table 1

3 PLAY LED

The green PLAY indicator lights to indicate that the unit is playing audio.

4 VOLUME Potentiometer

This programmable potentiometer provides control over upper and lower limits or can be disabled. Please refer to the configuration section for more details. You can set a lower limit to ensure that the audio is never turned too low and/or an upper limit to ensure that it is never set too high.

Unit Layout Continued



Figure 2 – Left View

5 INPUTS Connector

Eight non-polarized, optically-isolated inputs are available for triggering tracks and performing other actions. The entire group shares a single common. The inputs can accept 12-24VDC and draw a maximum of 10mA. Please refer to figures 7, 8 & 9 for wiring examples.

Terminal	Function
-	Power ground
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8
C	External input common

Table 2

6 INT/EXT Switch

Select internal or external connection of the opto-isolator common.

If internal, the opto-isolator commons are connected to +24V internally and the "-" power ground terminal on the input connector is used to activate the inputs. This configuration simplifies wiring if input isolation is not required.

If external is selected, the inputs are isolated from the DAR and an external power source must be provided via the "C" terminal on the input connector. The opto-isolators are bi-polar and current flow in either direction is acceptable. **Do not use the "-" power ground terminal when the inputs are configured for external.**

Unit Layout Continued

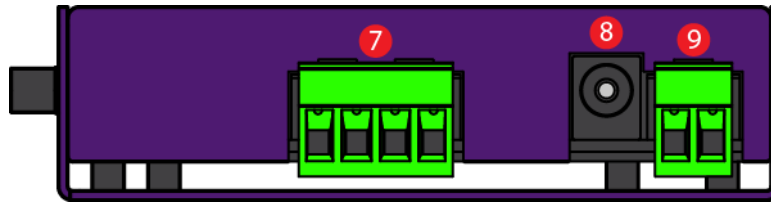


Figure 3 – Right View

7 AMPLIFIER OUT Connector

A 40W-per-channel, stereo amplifier which can directly drive a 4 to 8-ohm loudspeaker load (see figure 5). Optionally, the outputs may be paralleled for a single, 80W output by jumping together both positive terminals and both negative terminals respectively (see figure 6 for a wiring example). **PLEASE NOTE** that a mono audio file *must* be used when the outputs are paralleled. The amplifier can be disabled if it will not be used. Please refer to the configuration information below for more details.

Terminal	Function
L-	Left channel negative terminal
L+	Left channel positive terminal
R-	Right channel negative terminal
R+	Right channel positive terminal

Table 3

8 LINE-LEVEL AUDIO Connectors – *Not present on this model*

9 24VDC IN Connector

The DAR can operate on a little as 12VDC however for optimal amplifier performance, 24VDC should be provided. With the amplifier enabled, a minimum 100Watt supply should be used. **Do not** use an unregulated supply as this could damage the player. See figure 4 for a wiring example.

Terminal	Function
+	Power supply positive
-	Power supply ground

Table 4

Power Wiring Example

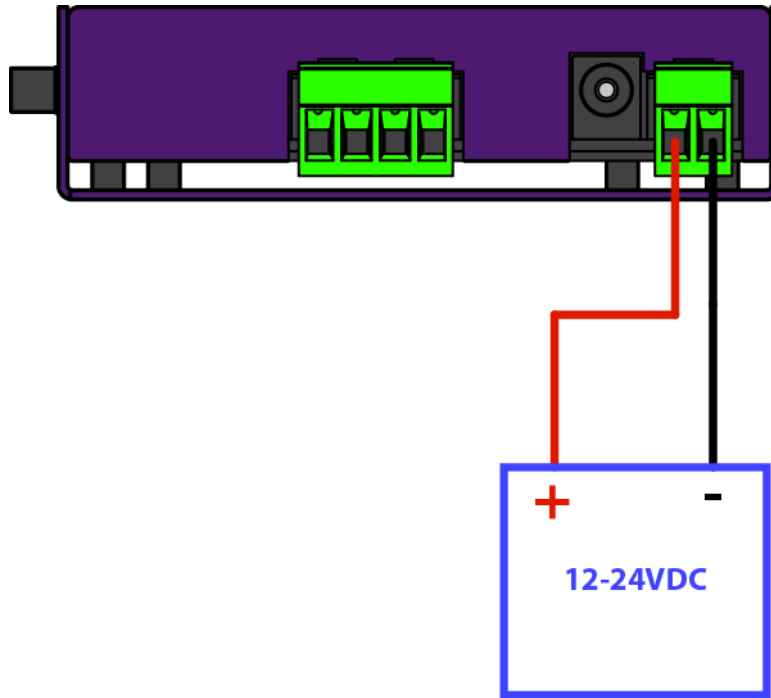


Figure 4 – Power wiring example

Speaker Wiring Examples

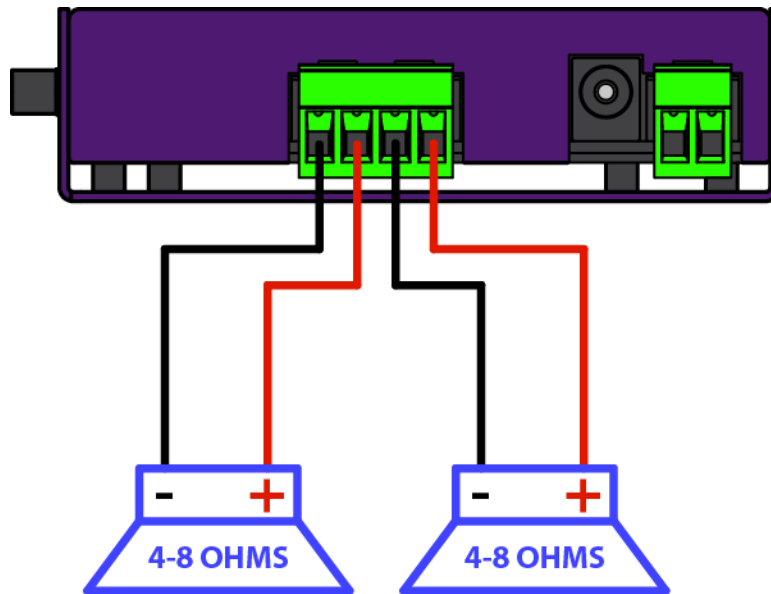


Figure 5 – Stereo speaker wiring example

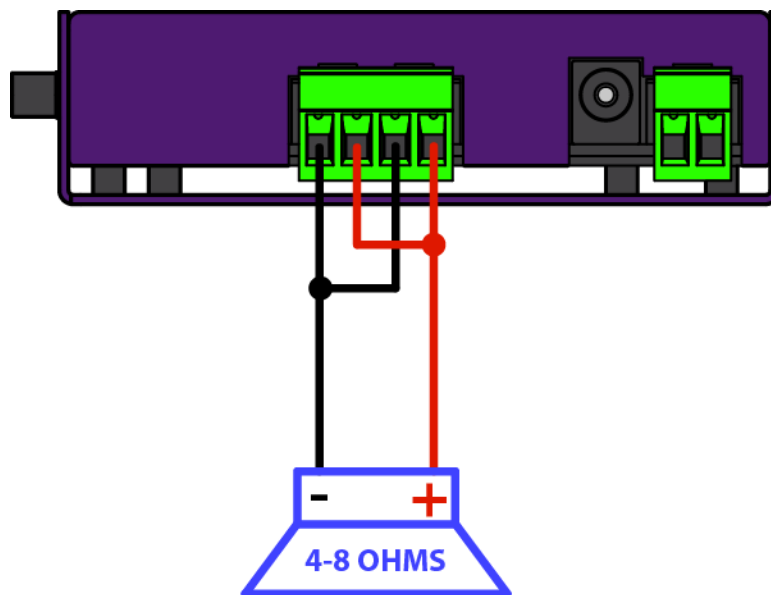


Figure 6 – Mono speaker wiring example (amp paralleled)
Audio files must be mono in this configuration!

Input Wiring Examples

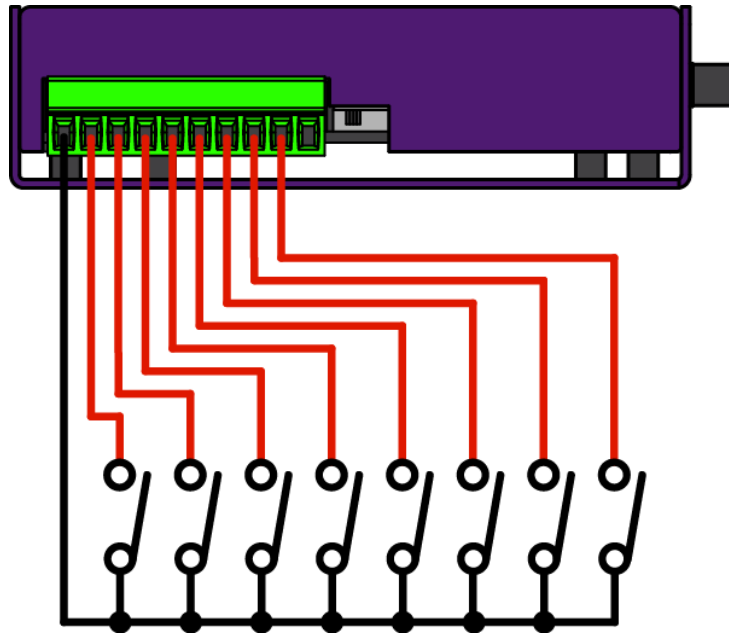


Figure 7 – Inputs with internal common wiring example
Switch must be in the "INT" position towards the input connector.

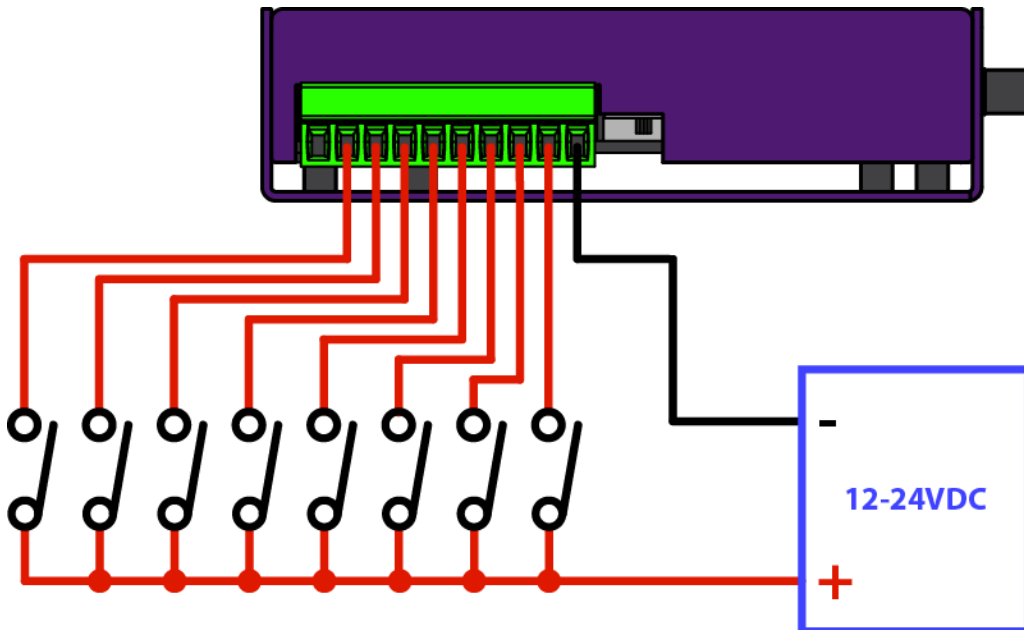


Figure 8 – Inputs with external negative common wiring example.
Switch must be in the "EXT" position away from the input connector.

Input Wiring Examples Continued

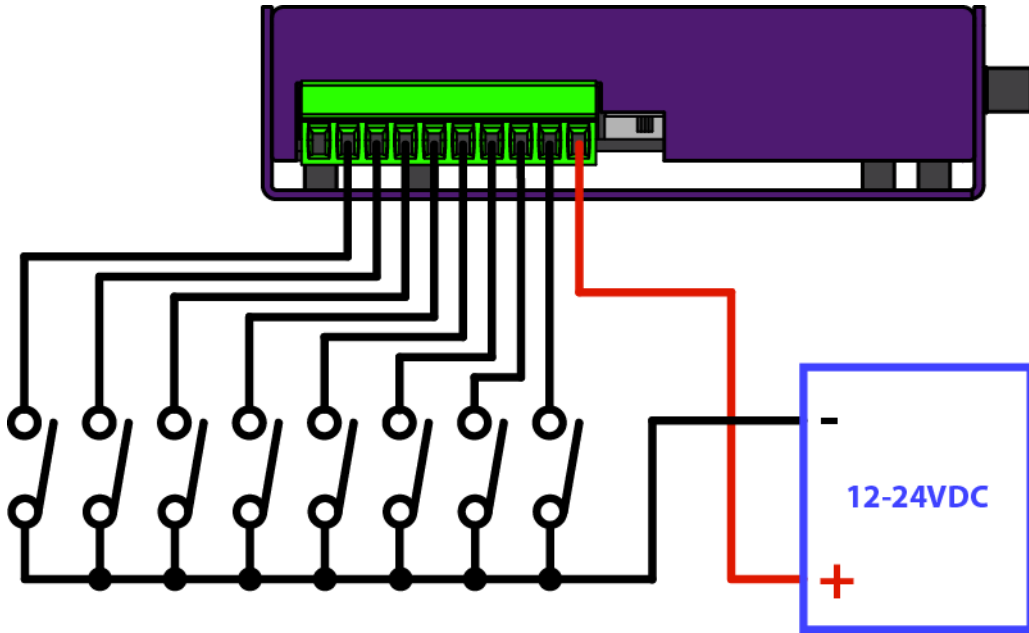


Figure 9 – Inputs with external positive common wiring example
Switch must be in the "EXT" position away from the input connector.

File Names

All DAR files are named in the standard 8.3 format. This consists of an eight-character file name and a three-character extension separated by a '.' period.

Example:

filename.ext

Audio files on the DAR must be named in a specific format so that the unit can find and access them. The first 5 characters of the filename are always 'sound' followed by a 3-digit decimal number representing the track number. This number shall be in the range of '001' to '500' to represent the track number. All leading zeros must be present. To ensure correct playback, MP3 sound files will always have an 'mp3' extension and WAV files will always have a 'wav' extension. Numbers cannot overlap between MP3 and WAV files meaning that there cannot be sound001.mp3 and sound001.wav on the same card.

Example:

sound001.mp3 An MP3 file which will be referred to simply as "1" within the player.

sound255.wav Track 255 is a WAV file.

Configuration File

The DAR configuration file specifies all operating parameters for the player. A simple text format allows for editing from any computer or operating system.

This file must be named "config.txt" so that the player can find it on startup.

The configuration file for the DAR is based on the standard INI file format.

Each operating parameter of the DAR consists of a name and value separated by an equal sign (=).

```
name = value
```

Parameters are grouped by section. The section name appears on its own line in square brackets.

```
[section]
```

Comments may be added and are preceded with a semicolon. Comments are for documentation purposes only and are ignored by the DAR.

```
; comment text
```

Please note: Default values are assumed on all parameters if the parameter is not defined or defined incorrectly.

[Startup] section

The Startup section defines the behavior of the DAR immediately after power-up or card insertion.

Startup section parameters:

Action - Describes what the player should do when powered up.

Value	Function
DoNothing	Take no action (Default)
Play	Play the specified track(s).
PlayToEnd	Plays the specified track(s) uninterrupted.
Loop	Loops the specified track(s).
BGM	BGM mode. In BGM mode, the selected tracks are played in a sequential loop. Whenever another event is triggered, the current BGM track is paused until the end of the interrupting track at which time the BGM track resumes. Using the FadeRate allows for the BGM track to fade back in slowly. Stop is the only event that can stop BGM mode.

Table 5

FirstTrack – Specifies the first track to be played by the startup action. Must be an integer in the range of 1-500. This number corresponds to the three-digit number in the file name of an audio track.

LastTrack – Specifies the last track to be played by the startup action. Must be an integer in the range of 1-500. LastTrack must be greater than or equal to FirstTrack.

Retentive – Track count is retained for this action when enabled.

Value	Function
Yes	Do not retain track count (Default).
No	Retain track count.

Table 6

Volume – Volume level for this action. 0-100%. If this is not defined, the volume will not be affected.

FadeRate – Defines how long the volume should take to ramp from the current level to the new level defined by this action. 10mS increments (10= 1 second). If zero, then no fade occurs. Zero is default. No fade if volume is not defined.

Example:

```
; In this example, we will loop tracks 1 through 5 at  
; full volume on startup
```

```
[Startup]  
Action= Loop  
FirstTrack= 1  
LastTrack= 5  
Volume= 100  
FadeRate= 0
```

[Audio] Section

Describes the audio configuration of the player.

Audio section parameters:

AmpBoost – When enabled (Yes), the audio signal gain is boosted to provide full power to 8-ohm speaker loads. Make sure to disable this if you are using 4-ohm speakers as the amplifiers may shut down to prevent damage.

Value	Function
Yes	Amp gain boost is enabled – 8-ohm speakers attached
No	Amp gain boost is disabled (default) 4-ohm speakers attached

Table 7

Example:

```
; Enable amp boost
```

```
[Audio]  
AmpBoost=Yes
```

[InputxMake] Section

Defines a make (on) action for the specified input *x*.

InputxMake section parameters:

Action - Describes what the player should do when the defined input is made (power is applied).

Value	Function
DoNothing	Take no action (Default)
Play	Play the specified track(s)
PlayToEnd	Play the specified track(s) uninterrupted
Loop	Loop the specified track(s)
Stop	Stop the currently playing track

Table 8

EvaluateAtStartup – Evaluate input make on startup

Value	Function
Yes	Evaluate input make on startup
No	Ignore input on startup (default)

Table 9

FirstTrack – Specifies the first track to be played by the input make action. Must be an integer in the range of 1-500. This number corresponds to the three-digit number in the file name of an audio track. If not defined, FirstTrack will default to the input number of the defined action (eg. Input4Make means that FirstTrack=4).

LastTrack – Specifies the first track to be played by the input make action. Must be an integer in the range of 1-500. If not defined, this parameter will default to the value defined in FirstTrack. LastTrack must be greater than or equal to FirstTrack.

Retentive – Track count is retained for this input make event action when enabled. This enables multiple "lists" to be played in order regardless of other triggered actions.

Value	Function
Yes	Retain track count when interrupted by another action
No	Track count will be reset to FirstTrack each time this action is interrupted by a different action (default).

Table 10

Volume – Volume level for this action. 0-100%. If not defined, the volume will not be affected by this input action. Note that volume control is still active regardless of the defined action. This allows for an input to perform a duck or mute function without affecting the currently playing track.

FadeRate – Defines how long the volume should take to ramp from the current level to the new level defined by this action. 10mS increments (10= 1second). If zero (default value), then no fade will occur. Fading is disabled by default if volume is undefined. Fading is still active regardless of the defined action. Maximum value is 255 (25.5 seconds).

Example:

```
; Play tracks 1 through 5 when input 1 makes. One track will be played on  
; each make. Playback is interruptible. Once LastTrack has been played, the count  
; will jump back to FirstTrack. Note that if volume is not specified, the current  
; volume level will be used.
```

```
[Input1Make]  
Action= Play  
FirstTrack= 1  
LastTrack= 5
```

[InputxBreak] Section

Defines a break (off) action for the specified input *x*.

InputxBreak section parameters:

Action - Describes what the player should do when the defined input breaks (power is removed).

Value	Function
DoNothing	Take no action (Default)
Play	Play the specified track(s)
PlayToEnd	Play the specified track(s) uninterrupted
Loop	Loop the specified track(s)
Stop	Stop the currently playing track

Table 11

EvaluateAtStartup – Evaluate input break on startup

Value	Function
Yes	Evaluate input break on startup
No	Ignore input on startup (default)

Table 12

FirstTrack – Specifies the first track to be played by the input break action. Must be an integer in the range of 1-500. This number corresponds to the three-digit number in the file name of an audio track. If not defined, FirstTrack will default to the input number of the defined action (eg. Input4Make means that FirstTrack=4).

LastTrack – Specifies the first track to be played by the input break action. Must be an integer in the range of 1-500. If not defined, this parameter will default to the value defined in FirstTrack. LastTrack must be greater than or equal to FirstTrack.

Retentive – Track count is retained for this input break action when enabled. This enables multiple "lists" to be played in order regardless of other triggered actions.

Value	Function
Yes	Retain track count when interrupted by another action
No	Track count will be reset to FirstTrack each time this action is interrupted by a different action

Table 13

Volume – Volume level for this action. 0-100%. If not defined, the volume will not be affected by this input action. Note that volume control is still active regardless of the defined action. This allows for an input to perform a duck or mute function without affecting the currently playing track.

FadeRate – Defines how long the volume should take to ramp from the current level to the new level defined by this action. 10mS increments (10= 1second). If zero (default value), then no fade will occur. Fading is disabled by default if volume is undefined. Fading is still active regardless of the defined action. Maximum value is 255 (25.5 seconds).

Example:

```
; Play tracks 12 through 25 uninterrupted when input 5 breaks. One track  
; will be played on each break. Once LastTrack has been played, the count  
; will jump back to FirstTrack. Note that if volume is not specified, the  
; current volume level will be used.
```

```
[Input5Break]  
Action= PlayToEnd  
FirstTrack= 12  
LastTrack= 25
```

[VolumeControl] Section

Defines the function of the volume control potentiometer

VolumeControl Section Parameters:

Enabled – enable or disable the volume control

Value	Function
Yes	The volume control is enabled (default)
No	The volume control is disabled and the DAR volume level is fixed at the defined Max level

Table 14

Min - Sets the minimum volume. Defined as 0 to 100% of full scale. 0 is default.

Max - Sets the maximum volume. Defined as 0 to 100% of full scale. 100 is default.

Examples:

```
; Volume control enabled to set volume from 0 to 100 percent.
```

```
[VolumeControl]  
Enabled= Yes  
Min= 0  
Max= 100
```

```
; Alternately we can set different end points to limit the overall  
; range
```

```
[VolumeControl]  
Enabled= Yes  
Min= 50  
Max= 75
```

Configuration File Application Examples

Following are various examples of configuration files for common applications. These files are available for download at www.marilynsystems.com. Any of these files can be used as a template for your own application by saving a *copy as CONFIG.TXT* and editing as needed.

File: CONFIG.001

```
; Example DAR Configuration File
; -Tracks 12 through 27 will loop endlessly on startup.
; -Amp Boost is disabled by default
; -Volume control controls volume from 0 to 100 percent.
;
; **NOTE** The inputs and buttons do not have any assigned actions and
; therefore do not need to be specified.

[Startup]
Action= Loop
FirstTrack= 12
LastTrack= 27
Volume= 100

[VolumeControl]
Enabled= Yes
Min= 0
Max= 100
```

File: CONFIG.002

```
; Example DAR Configuration File
; -Tracks 12 through 27 will be looped endlessly in BGM mode.
;  each time the BGM loop is interrupted, the volume will take 2
;  to ramp up to the set level of 80 percent.
;
; -Play one track at a time from 1 through 5 each time input 1
;  is made.
;
; -Amplifier is enabled for an attached 8-ohm speakers.
; -Volume control enabled from 0 to 100 percent.
;
```

```
[Startup]
Action= BGM
FirstTrack= 12
LastTrack= 27
Volume= 80
FadeRate= 20
```

```
[Audio]
AmpBoost= Yes
```

```
[Input1Make]
Action= Play
FirstTrack= 1
LastTrack= 5
```

```
[VolumeControl]
Enabled= Yes
Min= 0
Max= 100
```

File: CONFIG.003

```
; Example DAR Configuration File
;
; -Tracks 12 through 27 will be looped endlessly in BGM mode.
; each time the BGM loop is interrupted, the volume will take 5
; to ramp up to the set level of 80 percent.
;
; -Play one track at a time from 1 through 5 each time input 1
; is made. Retentive is enabled which means that the track count will
; be maintained for this input action even if another input action occurs.
;
; -Play one track at a time from 6 through 11 each time input 2
; is made. Retentive is enabled which means that the track count will
; be maintained for this input action even if another input action occurs.
;
; -Boost is disabled for an attached 4-ohm speakers.
; -User Level pot controls volume from 0 to 100 percent.

[Startup]
Action= BGM
FirstTrack= 12
LastTrack= 27
Volume= 80
FadeRate= 50

[Audio]
AmpBoost= No

[Input1Make]
Action= Play
FirstTrack= 1
LastTrack= 5
Retentive= Yes

[Input2Make]
Action= Play
FirstTrack= 6
LastTrack= 11
Retentive= Yes

[VolumeControl]
Enabled= Yes
Min= 0
Max= 100
```


File: CONFIG.004

```
; Example DAR Configuration File  
; Written by: JLP  
;  
; -Track 1 will play each time input 1 is made.  
; -Amp boost is disabled by default  
; -User Level pot controls volume from 0 to 100 percent.
```

```
[Startup]  
Action= DoNothing
```

```
[Input1Make]  
Action= Play  
FirstTrack= 1
```

```
[VolumeControl]  
Enabled= Yes  
Min= 0  
Max= 100
```

Firmware Upgrade

The firmware on the DAR can be upgraded by simply inserting a memory card with the update file present. The latest firmware will always be available from our website at www.marilynsystems.com.

To upgrade the firmware in your player, please use the following procedure:

1. Copy the firmware file (DAR01.MSF) to the root directory of the card. DO NOT place it in a folder as it will not be found by the bootloader. Do not rename the file or change any file attributes.
2. With the DAR powered off, insert the memory card.
3. Power the DAR. Both LEDs will begin to flash. Be patient as the upgrade process can take up to a minute.
4. Once the update is complete, the unit will boot normally.

DAR Technical Specification

Audio

- Plays MP3 files at rates up to 320Kb/s and 16-bit WAV files at up to 44.1KHz
- Class-D stereo amplifier delivers 40Watts-per-channel into a 4 to 8 ohm load at 24VDC

Storage

- SD or SDHC flash card

Controls

- Volume control potentiometer
- Status and Play LEDs

I/O

- 8 configurable, optically-isolated, sourcing or sinking inputs

Power

- 12-24VDC @ 100W(amplifier enabled).

Connectors

- Power in:
 - 2-position, 5.08mm removable terminal block
 - 2.5mm DC coaxial jack
- Opto-isolated inputs: 10-position, 3.81mm removable terminal block
- Amplifier out: 4-position, 5.08mm removable terminal block

Physical

- 18-gauge powder-coated steel
- 5.375"Lx4"Wx1"H (136.53mm x 101.6mm x 25.4mm)
- Edge and flat surface-mounting
- DIN-rail mount option

Mechanical Drawings

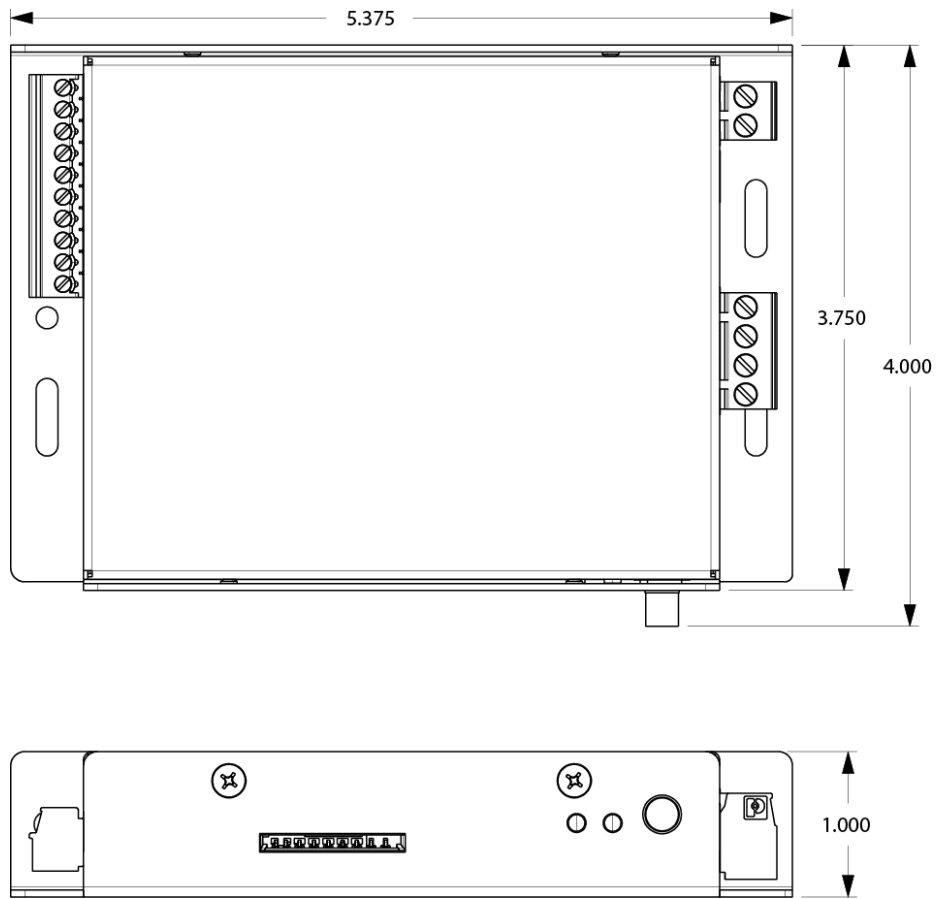


Figure 10 –Mechanical drawing