Technical Manual

WAV RUNNER 2.0

Triggerable

By HauntBots

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Revision: 1.0

NOTICE

It is the installer's responsibility to determine the suitability of this product for any given application. This device is not intended for use in any life-critical system. An understanding of electronic terminology and practices are required to use this device. The unit must be mounted in a way that prevents exposure to moisture and within the parameters of any applicable codes.

1. Introduction

1.1.1. System Overview

The WAV Runner 2.0 is a stand-alone device to play mp3 or wav files.

Numerous options are available to match your application. The various options are configured through software and on-board dip switches. These options include both hardwire trigger and serial communication modes.

1.1.2. Document Overview

Ground, negative, or (**-**) may be used interchangeably when referring to the power supply connections. I^2C is a trademark of Philips.

2. System Description

2.1.1. Specifications

- 9 optically isolated digital inputs.
- Serial mode- (Must be purchased with RS232 option)
- I^2C mode – (Special order)
- Flexible power options – Low current draw from 9 to 24 volt DC power supply

2.1.2. Applications

The WAV Runner is intended for standalone playback of music or sound effects wherever a solid-state device is required.

3. Hardware

3.1.1. Power Supply

The player operates on 9 to 24 volts DC. Apply power to the 2-pin connector observing the polarity noted on the case.

3.1.2. Output

Audio output is via a standard 1/8" inch stereo jack.

3.1.3. Inputs

There are nine low voltage inputs for triggering various files on the memory card. The trigger mode will depend on the setting of the internal switches. Inputs can be configured for active high or active low trigger.
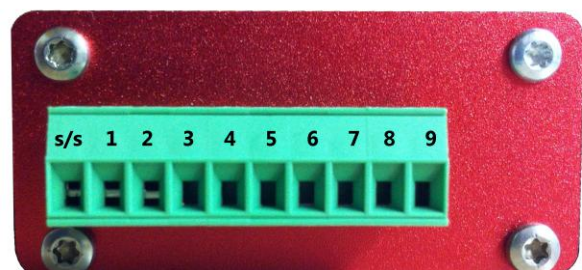
Trigger inputs wired for "Sinking" or "NPN" configuration. Sink/Source (s/s) terminal wired to 9 to 24vdc. Switch provides ground signal when closed.

Up to 9 trigger inputs

+9v to +24v
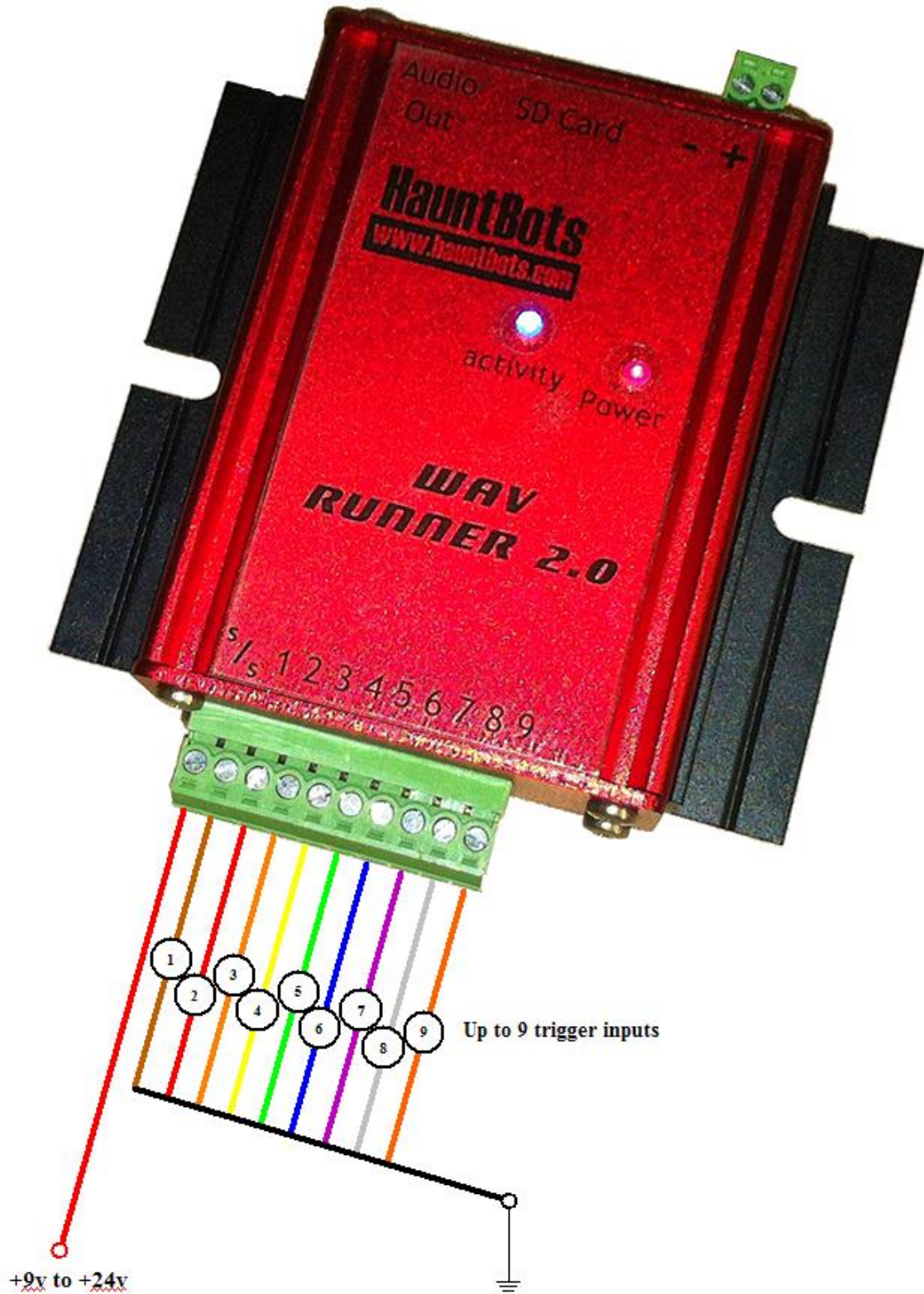
Trigger inputs wired for "Sourcing" or "PNP" configuration. Sink/Source (s/s) terminal connected to (-). Switch provides positive signal when closed.

Up to 9 trigger inputs
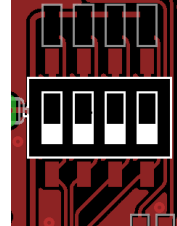
+9v to +24v

System Gnd (-)
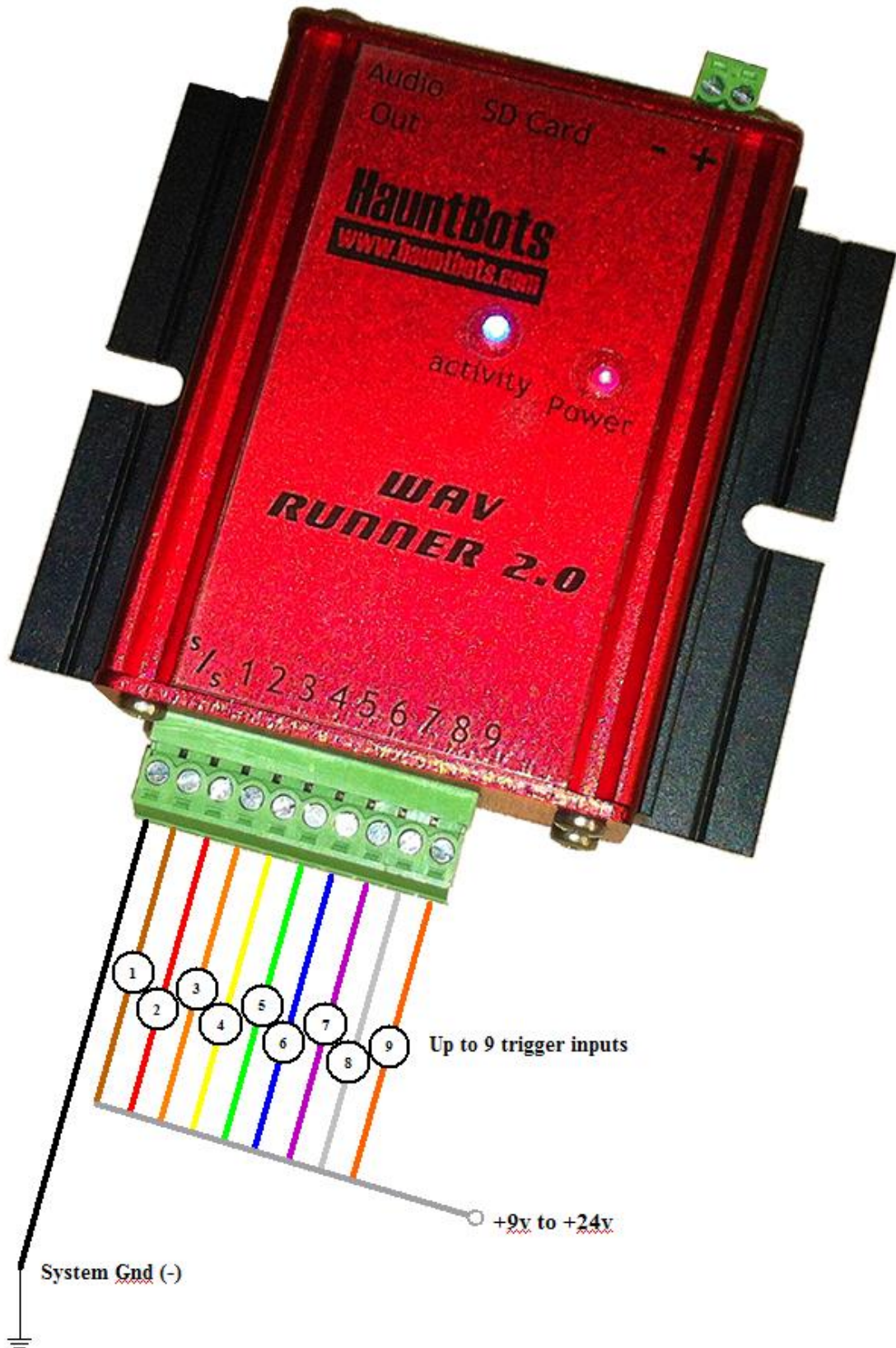
3.1.4. Switch Settings

There are 4 mode select switches in the WAV Runner. The enclosure must be opened to gain access. The following diagrams show the available configurations.
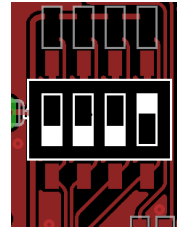
Two Wire Serial Mode (I^{2}C^{TM}):

All switches in off position. This mode enables the microcontroller I^{2}C interface. Contact HauntBots for details on using this option.
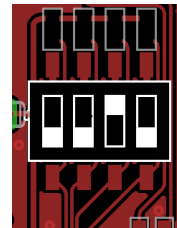
Serial Mode: 9600 baud

Switch 4 on. Operates at 9600-baud rate.

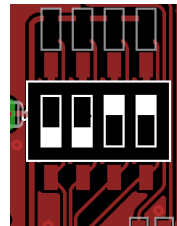*Note:* **The RS232 interface is an option that must be selected at time of order.**

1 of 9 Mode:

Switch 3 on. Triggering inputs 1 through 9 will play file 001 through 009. This is the default mode for the WAV Runner
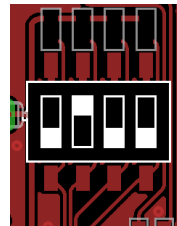
Parallel Mode:

Switch 3 & 4 on. Inputs 1 through 8 represent the binary number of file to play (001 to 255). Input 9 is the enable input.
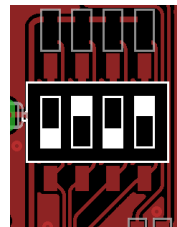
Auto Mode:

Switch 2 on. When powered up, the player will start playing file 000 and automatically increment through all files (up to 999). When last file is reached, player will start over at 000. Inputs have no affect on operation.
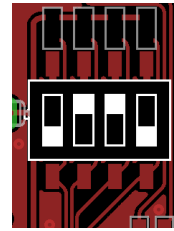
Fade Mode:

Switch 2 & 4 on. Similar to "1 of 9" mode, however, the playing file will fade out rather than abruptly ending if a new file is triggered.
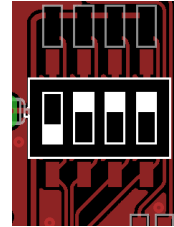
Auto Loop Mode (1 of 9):

Switch 2 & 3 on. Similar to "1 of 9" mode however any file, once triggered will repeat until a new file is triggered.
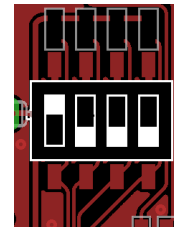
Auto Loop Mode (Parallel):

Switch 2, 3 and 4 on. Similar to parallel mode however any file, once triggered will repeat until a new file is triggered.

Auto Increment 1 of 9:

Switch 1 on. Identical to 1 of 9 mode however after the triggered file ends, the next file in numerical order will play.

Announce Mode:

Switch 1 and 4 on. Files 001 through 009 are triggered as in 1 of 9 mode. When unit is idle, it will automatically select sequential files for playback from 010 through 999.
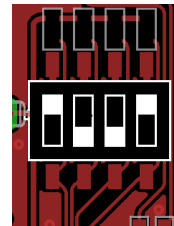
1 of 9 with Ambiance:

Switch 1 and 3 on. Triggering inputs 1 through 9 will play file 001 through 009. When unit is idle, file 000 will automatically play.
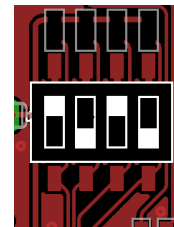
Parallel with Ambiance:

Switch 1, 3 and 4 on. Operates like Parallel mode but when idle file 000 will automatically play.

MP3 Player Mode:

Switch 1 & 2 on. In this mode the inputs function similar to a typical consumer mp3 player.

Input #	Function
1	Play
2	Next
3	Previous
4	Volume Up
5	Volume Down
6	Pause
7	Stop
8	Set Auto Loop (maintain signal)
9	Set Auto Increment Mode (maintain signal)
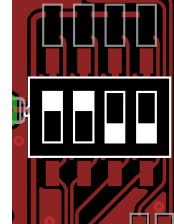
Serial Mode: 2400 baud

Switch 1, 2 & 4 on. Operates at 2400-baud.

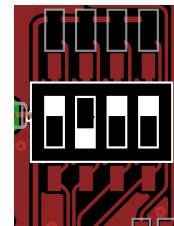*Note:* **The RS232 interface is an option that must be selected at time of order.**
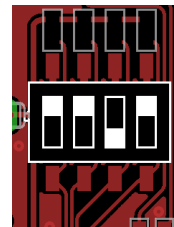
Reserved:

Switch 1, 2 & 3 on. Undefined, reserved for future use
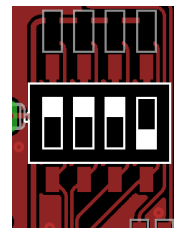
Reserved:

All switches in on position. Undefined, reserved for future use
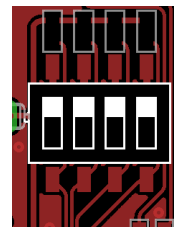
Retrigger Jumper:

The retrigger setting works in all wired modes. It determines whether additional triggers applied to an input that corresponds to a playing track are ignored or if it will cause the track to restart.

Installing the Jumper allows the track to be retriggered.

Note: There are no other valid jumper locations available on this header. Attempting to connect other pins may damage the player.

3.1.5. Serial connections

Two different serial connections are available:

- A serial interface operating at either 9600 or 2400 baud
- An i^2c two-wire interface.

Serial interface: Connect the Rx and Tx lines to the 2-pin connector following the markings on the case. Available serial commands are listed in section 4.1.2

Note: **The RS232 interface is an option that must be selected at time of purchase.**

I^{2}C interface: Contact HauntBots for further information about this control option.

3.1.6. Flash Card

SD or MMC cards must be formatted as FAT32 before copying MP3/WAV files to them. To check the format, insert the card into an appropriate slot on your computer. If your computer does not have this type of slot then an adapter must be used. USB adapters work well and should be available locally. When inserted, the card should be recognized and show up in **My Computer.**
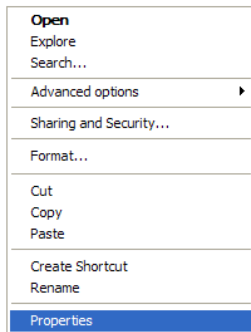
Right click on the card and select properties from the popup menu.
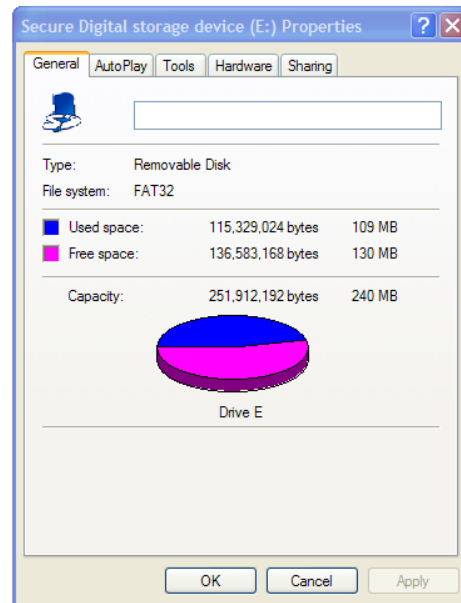
FAT32 should be listed as the File System. If your file system appears any other way, the card must be reformatted. Cards that are 2Gig or less in size are usually **FAT** and must be reformatted as **FAT32**.

Warning: Any files on the card will be lost during format.

To format, close the properties window then right click on the SD Card again, this time choosing **Format…**

The format tool will open. Select **FAT32** from the **File System** drop down then click **Start**.
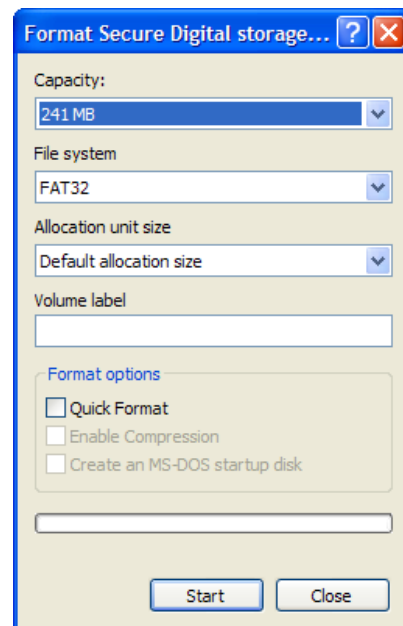
4. Using the WAV Runner

4.1.1. File Naming

All audio files must be in the root directory of the memory card and not in sub-directories or folders. The player expects the file names to be in a particular format. Each file must begin with a three-digit number followed by the file extension (either MP3 or WAV). This number corresponds to its trigger position.

 For example, activating input 2 will play 002.MP3

The player only examines the 3 leading characters of the file name so it is possible to add a more descriptive name. The file extension is NOT case sensitive.

The following naming schemes are all valid.

`001ReallyLoudNoise.mp3`

`010 Some Other Sound.MP3`

`121MyFavoriteSong.wav`

Note: Although it is possible to use these long file names, we recommend sticking to simple names of 8 characters or less and avoid spaces. There have been some isolated cases where long names or names with spaces have caused problems.

Preferred naming scheme

`001Bang.wav`

`000Loop.mp3`

Some care must be taken as a simple typo would cause the following names to appear identical to the player.

`0010.mp3`

`0019.mp3`

The first 3 digits in the name are all that matter. In this case, the file found first in the directory would be the one played. Because of the way the FAT32 file system works, this will not necessarily be 0010.mp3.

4.1.2. Serial Commands

All serial commands are case sensitive and consist of 2 letters. All commands sent to the player are echoed back. The player issues a ">" as a command prompt

Command List:

			TF	Track Fade
EN	Echo On		Tnn	Track Play
EF	Echo Off		TG	Track Get
EG	Echo Get		TN	Track Next
			TP	Track Previous
LF	Loop Off		TS	Track Stop
LN	Loop On			
LT	Loop Toggle		SG	Status Get
LG	Loop Get			
			VLn	Volume Left
PF	Pause Off		VRn	Volume Right
PN	Pause On		VSn	Volume Stereo
PT	Pause Toggle		VG	Volume Get
PG	Pause Get			

EN, EF, EG

Description: The echo commands control whether the player will echo back commands sent to it. With Echo On, all commands sent to the player are sent back to the sending device followed by a carriage return / linefeed and the command prompt >. With the echo off, only the CRLF and command prompt are returned. The EG command returns the echo status with a 1 for echo on and a 0 for echo off.

To turn Echo On

>EN

>

LF, LN, LT, LG

Description: These commands control file looping. The internal looping flag is cleared by the Track Stop command and the New Track command. To enable looping, issue the command to play the desired track first, then send the LN command.

To cause the file to loop:

>LN

>

To get the current loop status send the LG command, the player will respond with 0 or 1:

>LG1

>

PF, PN, PT, PG

Description: These commands control file pausing. The internal pause flag is cleared by the Track Stop command and the New Track command.

To cause the file to pause:

>PN

>

To get the current pause status send the PG command, the player will respond with 0 or 1:

>PG

>

Status:

The Status Get command returns a 0 or 1 to indicate if a track is currently playing.

>SG0

>

TF, Tnn, TG, TN, TP, TS

Description: These commands are used to play, stop and query the current track. To play any track, send the **T*nn*** command to the player where ***nn*** represents two bytes corresponding to the desired track 0 through 999 (hex 0000 – 03E7)

Playing:

To play track 10:

>T0A

>

Note: The T in these commands is the actual Ascii character while the 0 and A are byte values.

 For example, to start track 10 sending hex values the sequence would be:

54 00 0A

Stopping or Fading:

To stop an active track, send the Track Stop command. The Track Fade command operates in a similar manner but causes the current track's volume to fade before stopping

Note: Issuing TS or TF will also reset the status of Looping to off and Pause to off.

Current Track Number:

To get the number of the current track issue the Track Get command.

VL, VR, VS, VG:

Description: This group of commands set the volume of either channel or returns the current volume.

To set the stereo volume send the **VS** command followed by the desired volume value between 1 and 255. The player expects the numeric portion of the value to be a data byte (01-FF)

>VSnn

>

The Volume Get command, **VG** returns the volume for the left and right channels separated by a comma. Issuing a **VG** command will return:

>VGnn,nn

>