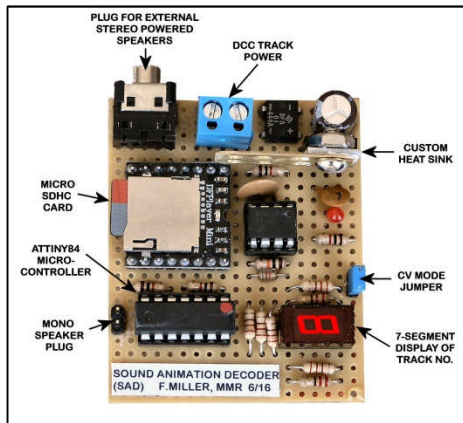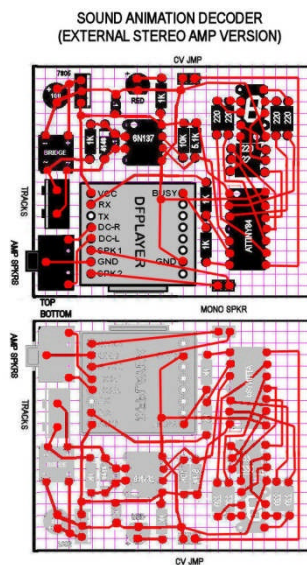# SOUND ANIMATION DECODER
By Fred Miller, MMR

The Sound Animation Decoder (SAD) is another device in a series of animation decoders developed to operate from NMRA DCC function controls and powered from the DCC track circuit. The decoders in this series can be controlled by traditional DCC throttles, JMRI scripts and panels or custom built "time-of-day" controls. This particular decoder plays one of 8 sound tracks initiated by DCC functions 1-8. The tracks can be played individually once, repeated, or in continuous series (1-8) or continuous random selection.

This mode of operation is set with stored configuration variables CVs as is the playback volume, number of tracks to access and the decoder address. The sound tracks are stored on a micro SD card in MP3 or WAV file format (stereo 44khz, 16 bit). The currently playing track is presented on a 7-segment display.

SOUND ANIMATION DECODER

The decoder was constructed along the lines of the other animation decoders but using an Atmel AT-Tiny84 as the microcontroller. The software is simplified from that used in the other animation decoders since the flickering and blinking LEDs and Servo are not included.
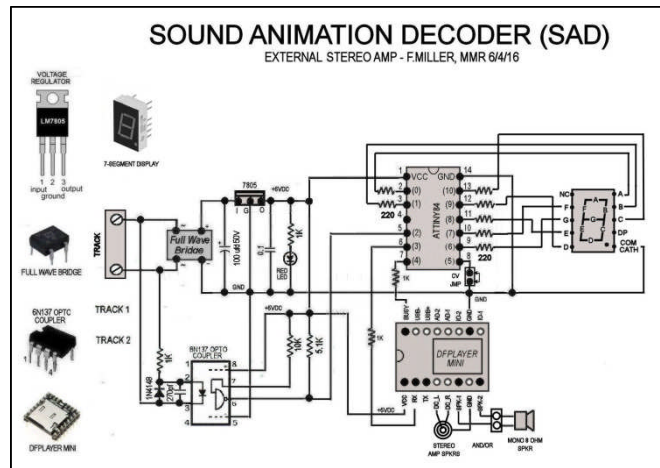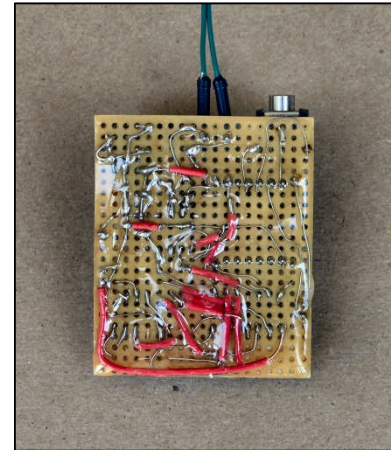

The decoder plays monaural sounds through an attached 8-ohm speaker. The DFPlayer module has an internal amp but only for mono output. However a stereo jack is provided to make use of powered stereo speakers such as used on laptops and PCs. These enhance the use of the great stereo sound files from Fantasonics (ripped from the CDs to 44 kHz, 16 bit wav files)

A graphic wiring aid was used in the construction of the decoder on a small perf board. The components were positioned and circuit connections

shown on a "top view" of the perf board which was then graphically flipped to show the "bottom view" where the actual wiring was to be made.

The parts listing shows suggested sources although most standard electronic devices could be acquired from any supply house such as Jameco, Digikey or Mouser.


Bottom view showing wiring (sealed in epoxy

QTY	PART DESCRIPTION	SOURCE	VENDOR #	UNIT PRICE	NOTE
1	0.1 UF 25V DISK CAPACITOR	ALLELECTRONICS	104D50	$ 0.12	(1)
1	100MFD 50V ELECTROLYTIC CAP	ALLELECTRONICS	100R50	$ 0.30	(1)
1	270 pf CAPACITOR	ALLELECTRONICS	271D50	$ 0.06	(1)
1	10K OHM 1/4 W RESISTOR	ALLELECTRONICS	291-10K	$ 0.07	(1)
1	5.1K OHM 1/4 W RESISTOR	ALLELECTRONICS	291-5.1K	$ 0.07	(1)
1	2GB MICRO SD MEM CARD	ALLELECTRONICS	MSD-2GB	$ 2.95	
1	1N4148 HIGH SPEED DIODE	JAMECO	36038	$ 0.05	(1)
1	6N137 OPTO ISSOLATOR	JAMECO	113911	$ 0.75	
1	7805 5V REGULATOR	JAMECO	51262	$ 0.29	
1	8 PIN IC SOCKET	JAMECO	526299	$ 0.12	
1	14 PIN IC SOCKET	JAMECO	112214	$ 0.14	(1)
1	2-POSITION MALE HEADER	JAMECO	112432	$ 0.15	(3)
1	2-POSITION SHORTING JUMPER	JAMECO	2094506	$ 0.35	
1	ATTINY84	MOUSER	556-ATTINY84A-PU	$ 1.79	
1	FULL WAVE BRIDGE	JAMECO	10300	$ 0.29	
1	T1 RED LED	JAMECO	202471	$ 0.10	(1)
1	7-SEGMENT COM CATH DISPLAY	JAMECO	24782	$ 0.99	(2)
1	DFPLAYER MODULE	ALIEXPRESS	-	$ 2.56	
7	330 OHM 1/4 W RESISTOR	ALLELECTRONICS	291-330	$ 0.07	(1)
4	1K OHM 1/4 W RESISTOR	ALLELECTRONICS	291-1K	$ 0.07	(1)
			EXPANDED TOTAL PRICE	$ 11.92	
	OPTIONAL ADD ON PARTS FOR FULL STEREO SOUNDS				
1	STEREO MINI-PHONE JACK	ALLELECTRONICS	SMJ-7	$ 0.55	
1	STEREO POWERED SPEAKERS	-	-	-	
	ALTERNATE PARTS FOR SINGLE MONO SPEAKER				
1	1" SPEAKER IN ENCLOSURE	ALLELECTRONICS	SK-61	$ 2.00	
1	2-POSTION MALE HEADER	JAMECO	112432	$ 0.15	(3)
	NOTES:				
	(1) MINIMUM ORDER QTY OF 10				
	(2) NOT SAME PINOUT AS CIRCUIT DIAGRAM				
	(3) PORTION OF 10 POSITION STRIP				

The Arduino program sketch was developed on an Arduino UNO with breadboard shield using the standard Arduino IDE. The sketch includes the NMRA DCC library developed by Alex Shepherd. The sketch was then copied to the ATTiny84 chip.

The program sketch for this decoder is available upon request (tractionfan@aol.com).
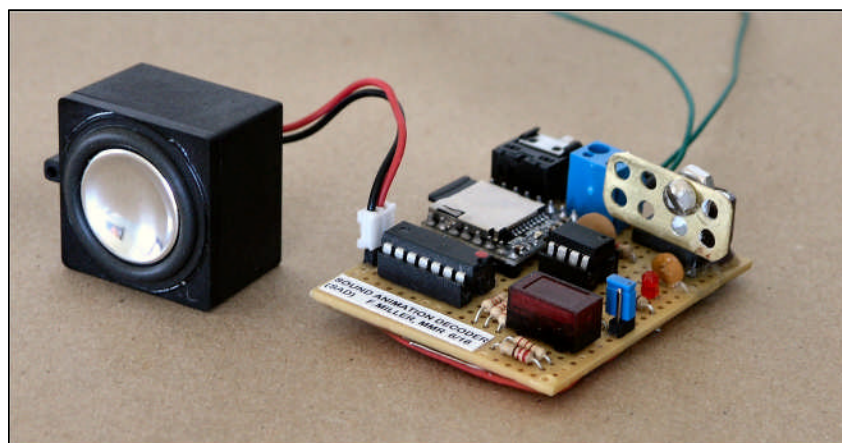
Sound Animation Board with an attached Allelectronic's mono speaker