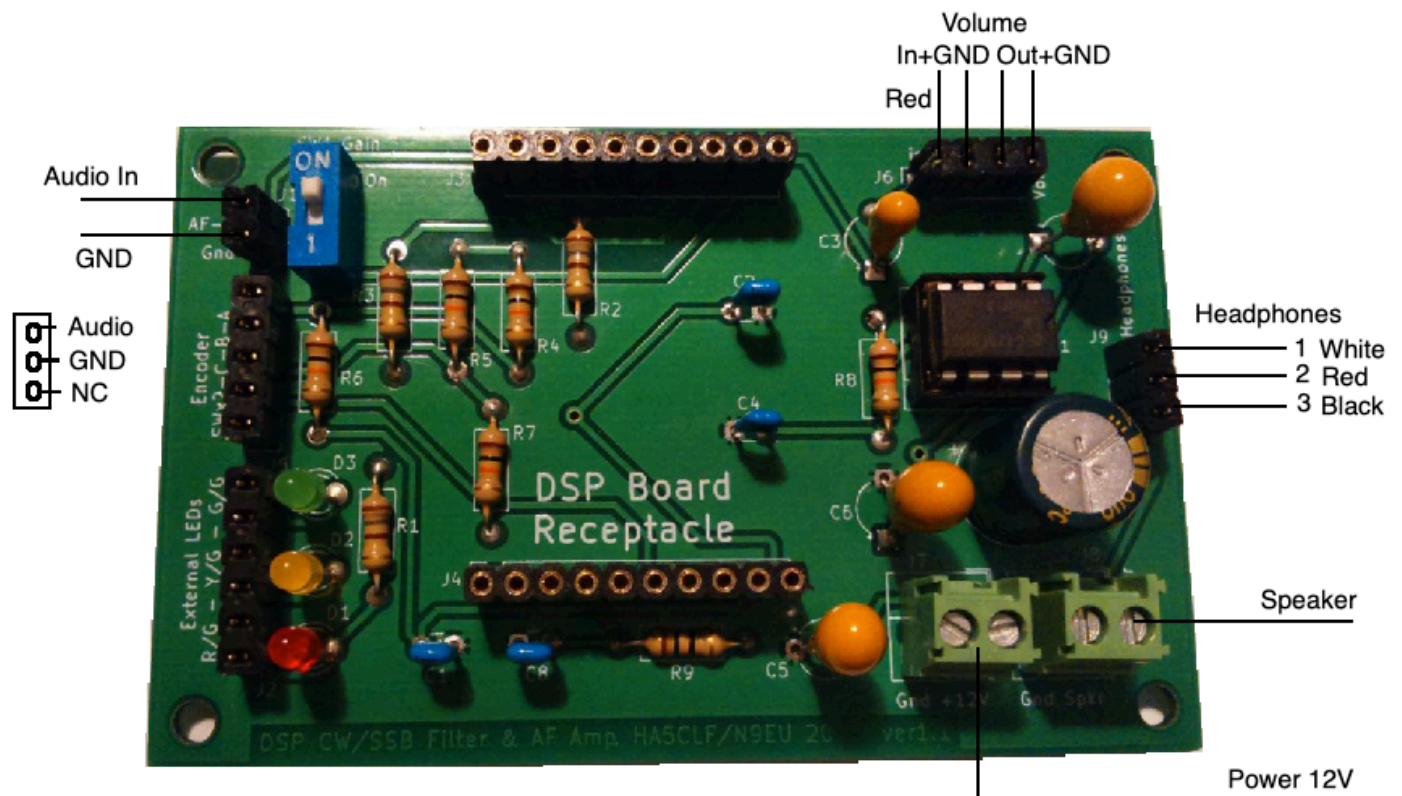
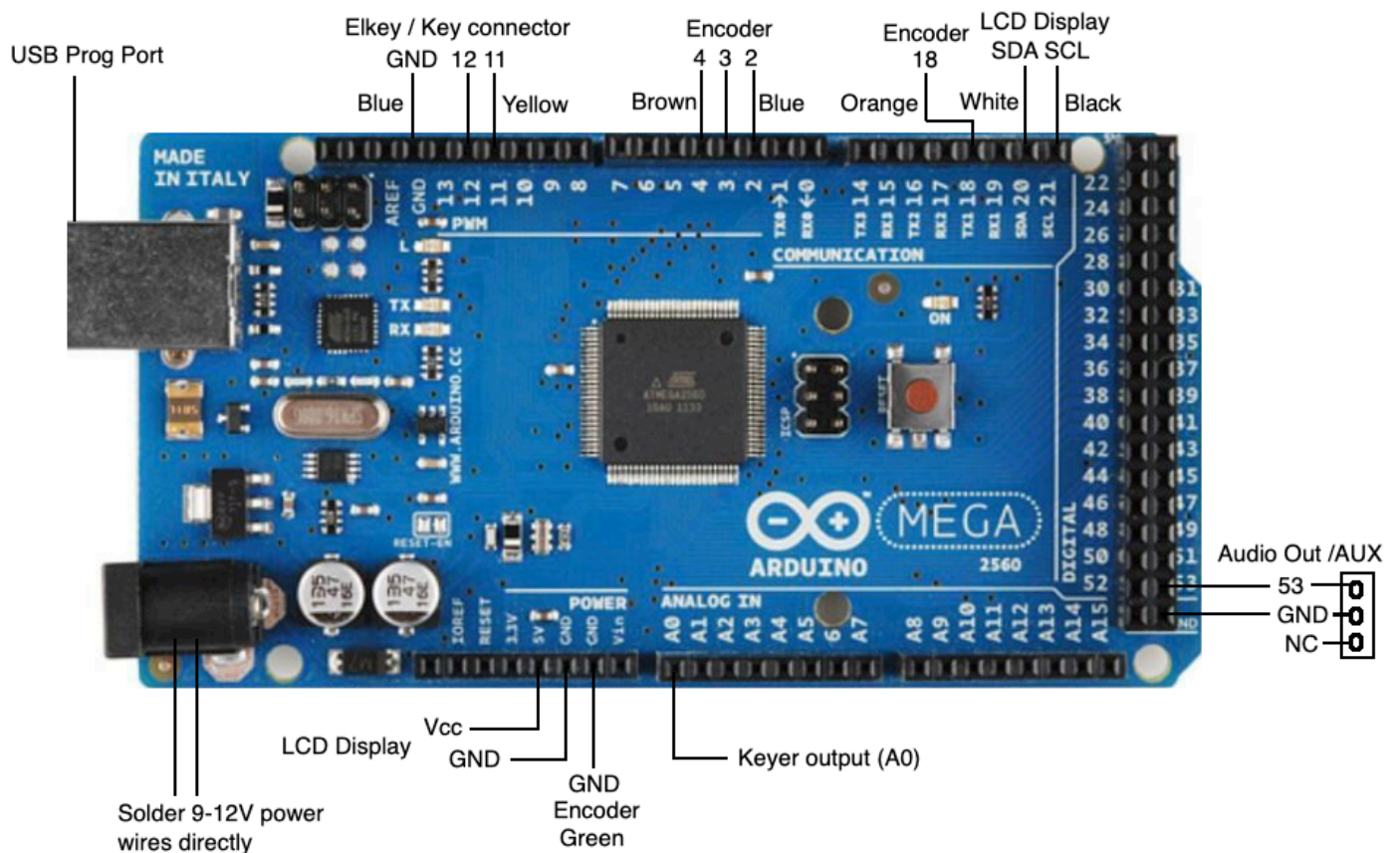


# MORSE TRAINER WIRING, CIRCUITS & ENCLOSURE

Arduino MEGA 2560 board is used. The following wiring is provided for the board connections:

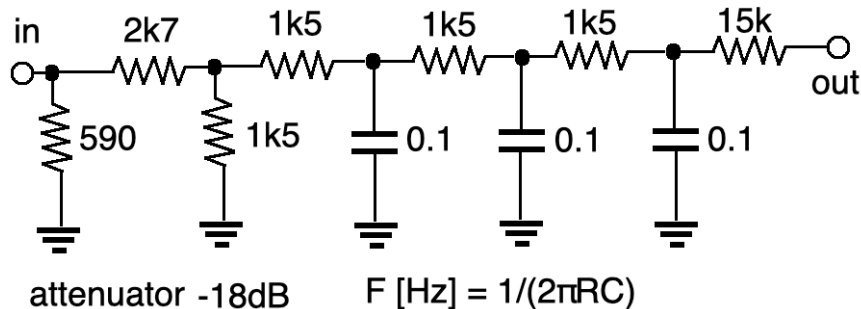


## SUPPORT CIRCUITRY

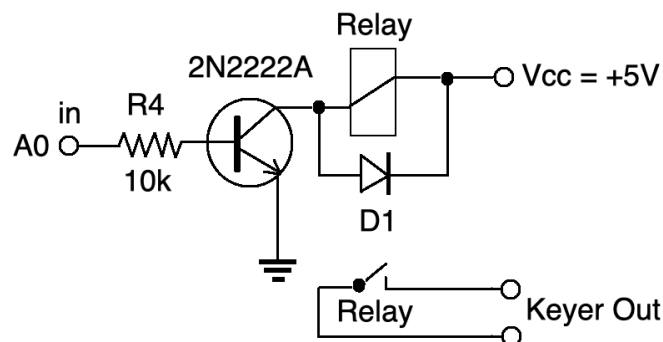
There is a set of support circuitry that is provided on an auxiliary printed circuit board. The previous board is repurposed from another project, temporarily used as the amplifier circuit.

### Filter the Square Wave Output

The audio signal is square wave that is not pleasant to listening to. An RC filter is employed to convert it approximately to sine wave to feed the audio amplifier. Also, the signal level needs to be adjusted for the audio amplifier.



### Keyer Output Circuit

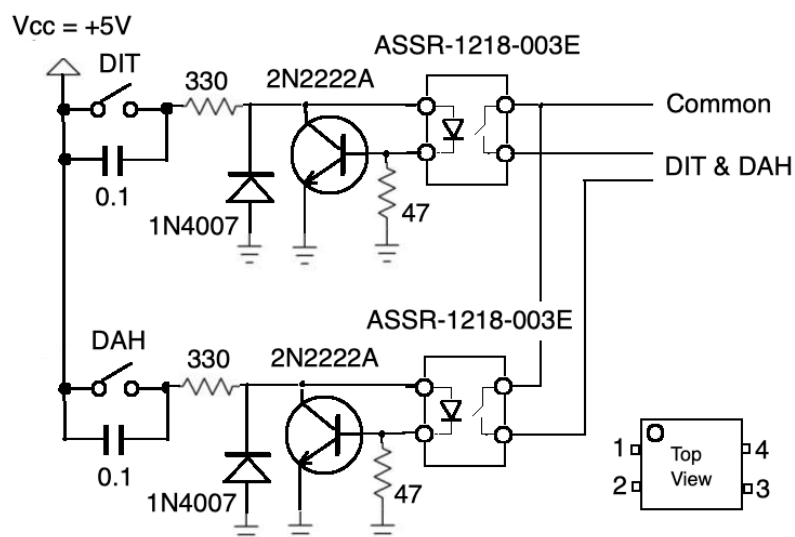


### Amplifier Circuit

This circuit already exist in the PCB circuit designer, using an LM386 AF amplifier. That circuit will be reused here for the purpose of amplifying the practice Morse code into an audible signal (speaker). It has a volume control and a head-phone output connector for silent training or to be used as an auxiliary output.

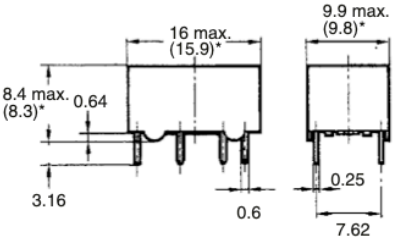
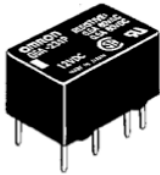
### Elkey-Paddle & Straight Key Input

This is the opto-coupler to separate the external elkey/key contacts from the Arduino input circuitry to protect from static voltages.



References

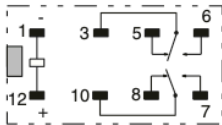
**G5A-234P**



16 max.  
(15.9)  
8.4 max.  
(8.3)\*  
0.64  
3.16  
0.6  
9.9 max.  
(9.8)\*  
0.25  
7.62

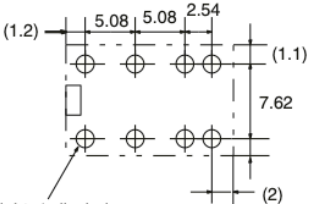
\*Average value

**Terminal Arrangement/  
Internal Connections  
(Bottom View)**



**Mounting Holes  
(Bottom View)**

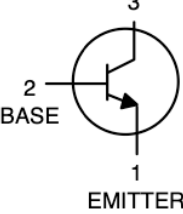
Tolerance:  $\pm 0.1$



(1.2) 5.08 5.08 2.54 (1.1)  
7.62 (2)

Eight, 1-dia. holes

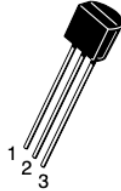
COLLECTOR  
3



2N2222A

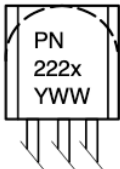
2 BASE

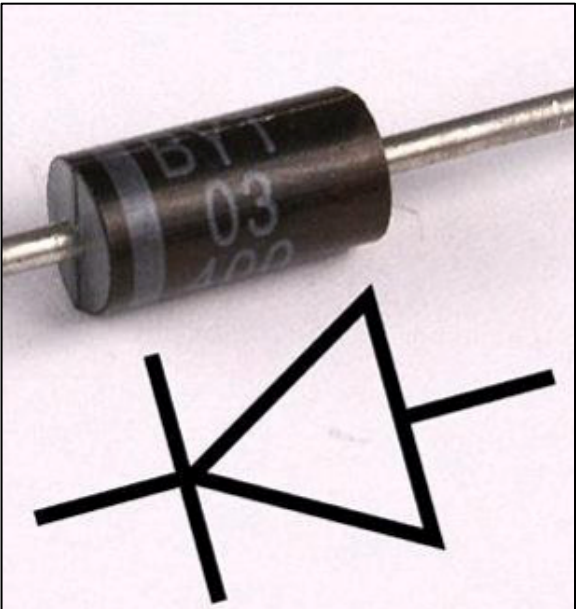
1 EMITTER



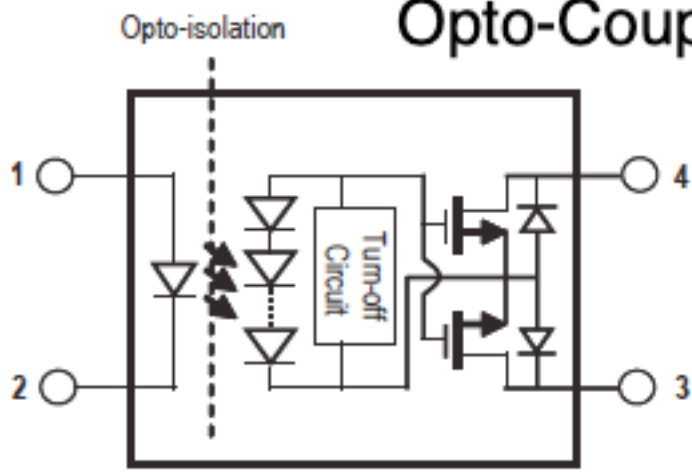
TO-92

**MARKING DIAGRAM**





**Functional Diagram**



Opto-isolation

1 2 3 4

Single Channel, SPST Relay,  
1 Form A in 4-Pin SO Package

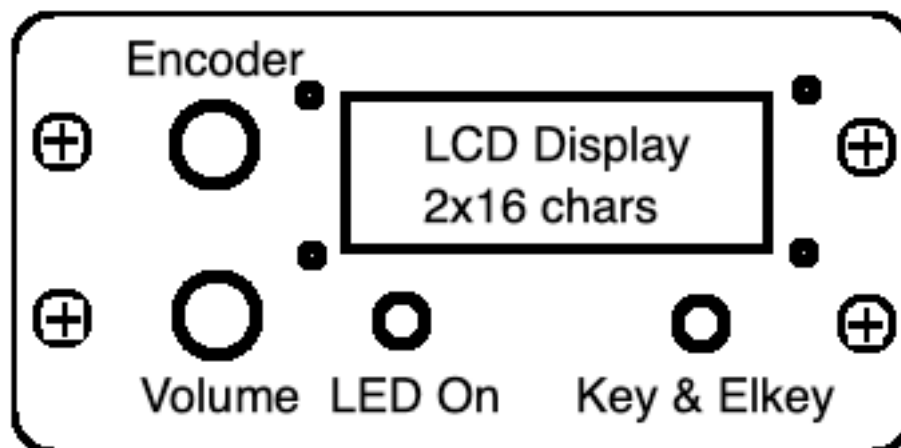
**ASSR-1218-003E  
Opto-Coupler**

**Truth Table**

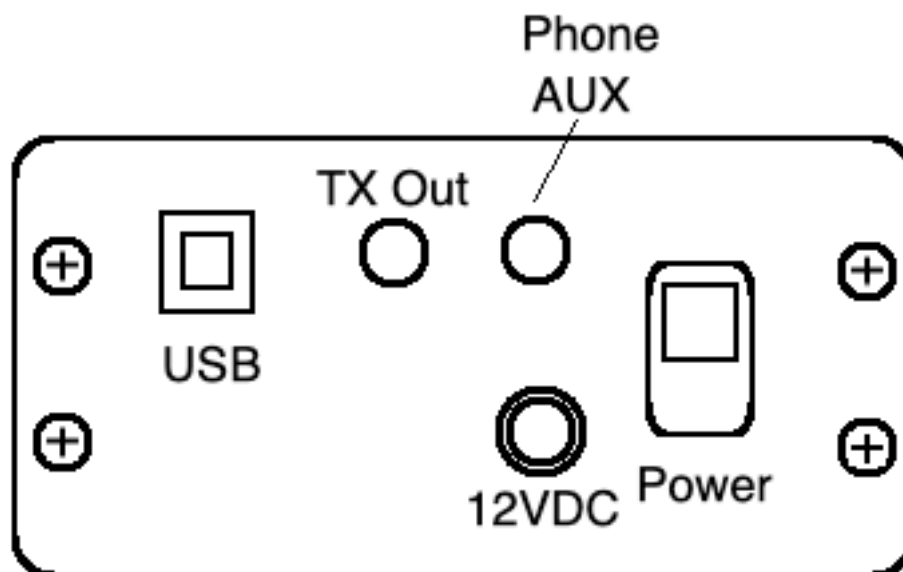
LED	Output
Off	Open
On	Close

## Enclosure Layout

Front panel layout:



Back panel layout:



## Miscellaneous D/A Converter Circuit

