

# SCARY TERRY'S

## HALLOWEEN PAGES

<http://www.scary-terry.com/kitsinkcoffin/kitsinkcoffin.htm>

### KITCHEN SINK COFFIN



This is a prop I call the "kitchen sink coffin", mainly because it's got nearly everything in it *except* the kitchen sink. It was inspired by WickedBeernut's (WBN's) Computer Controlled Coffin, which in turn, was inspired by other designs in the past.

**Note: The circuit and program have been updated as of 2/2005. See details below.**



Here's what the Kitchen Sink Coffin (KSC) does:



The coffin starts shaking and you hear some groaning sounds from within

The lid slowly rises and in amongst the fog you'll see "Elvis".



With a roar and a scream, Elvis pops up.



He then turn his head toward the tot'ers and says "thank you, thank you very much" (his mouth moves in sync with the audio track).



He then lays back down to the music "Return to Sender" playing.



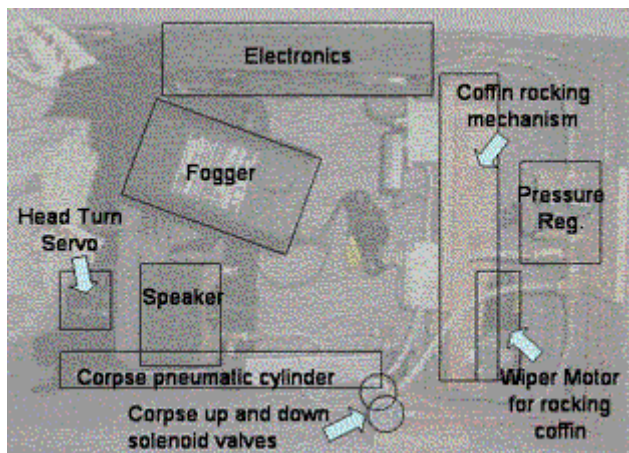
Once the lid closes, the coffin shakes again and the song "I'm all Shook Up" plays.

It concludes with a voice saying "Elvis has left the graveyard".

Here's what's inside:

- 2 pneumatic cylinders controlled by 3 solenoid valves. One cylinder opens the lid, the other cylinder raises and lowers the corpse ([diagram of how it works](#))
- Pneumatic pressure regulator (everything runs at 35 psi)
- 1 wiper motor with a cam that "shakes" the coffin ([diagram of how it works](#))
- 2 servos, one to turn the head, the other to move the corpse's mouth ([how to install a servo in a Bucky skull](#)).
- ISD 2575 Chipcorder which plays 7 different sound effects ([ChipCorder basics](#)).
- An 18 watt amplifier and speakers.
- 1 fogger (so fog comes out when the lid is raised)
- 1 Two channel RF remote control.
- 1 Basic Stamp 2, which is what controls all of the above.





Update 2/2005: In the old version, the corpse mouth was driven directly by the Basic Stamp. It worked fine, but each mouth movement had to be programmed (a time consuming procedure) and I wanted to be able to change what the corpse said. In the new version, the mouth is driven by an audio/servo driver and will respond directly to sounds. A slight modification to the audio/servo driver ([click here for the schematic](#)) allows the driver to be turned on at the appropriate time by the Stamp using the MSE (mouth servo enable) line. I've also linked the end of message (EOM) pulse from the ChipCorder to the Stamp so the program can now be set to wait for the sound to end.

The Basic Stamp program has also been rewritten. Jon Williams of Parallax (the company that makes the Basic Stamp) contacted me and asked if I'd like some help in improving the code. I jumped at the chance as Jon is a well known expert on the Basic Stamp (he writes a monthly column in Nuts & Volts magazine among many other things). The program is now written according to Parallax's "The Elements of PBASIC Style". This is a standardized way of programming to make it easier for others to understand. This kind of support is one of the reasons I choose the Basic Stamp as the microcontroller for my projects.



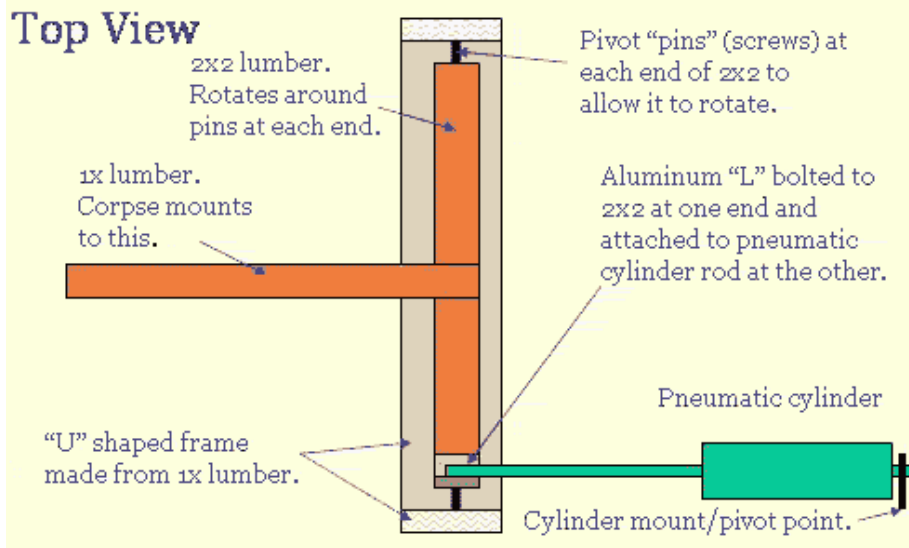
Here's the circuit board that runs the whole thing. That's the ChipCorder in the middle, the Basic Stamp to the right and the audio/servo driver to the left. The audio amp is at the bottom, left.

This is the entire electronics package. The item in the middle is a two channel RF remote that allows us to remotely trigger either of the two routines. The item to the right is a switching power supply that provides 5 and 12 volts.

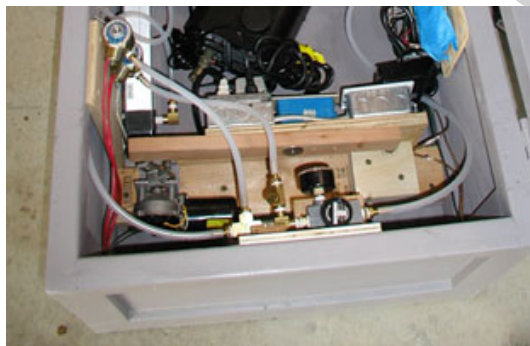
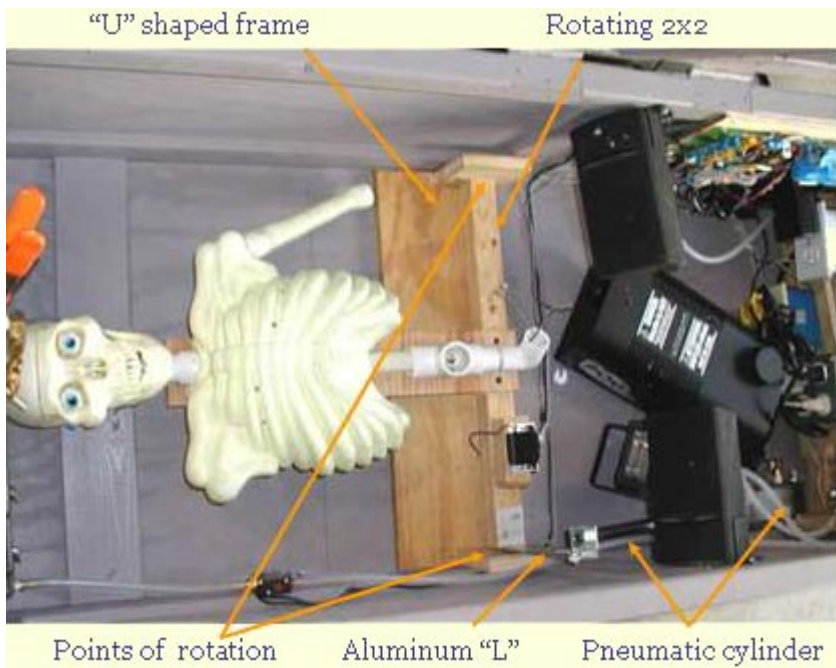
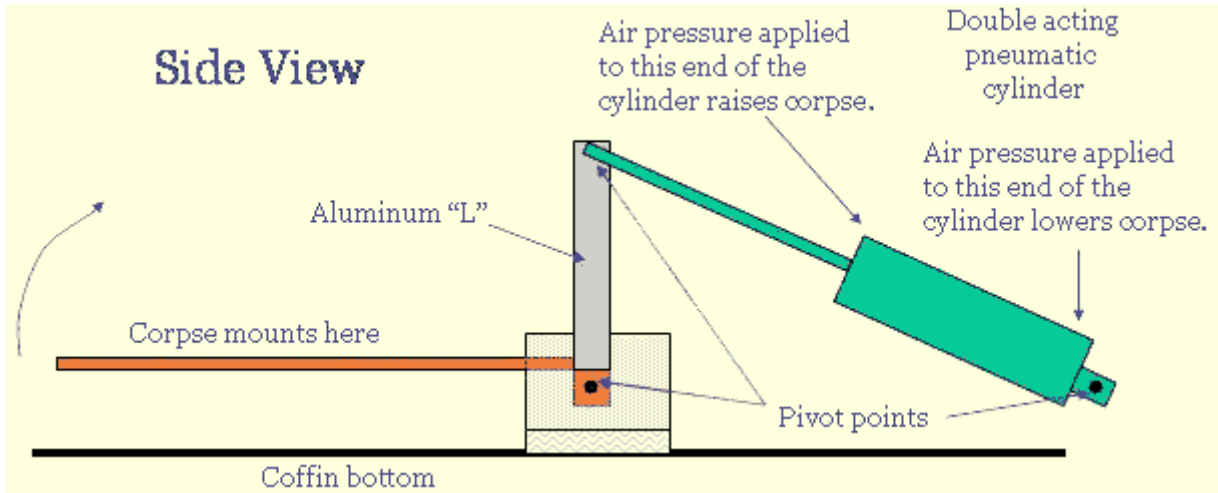
This one is from [All Electronics](#). I don't give a part number on this because they sell surplus equipment and their inventory changes all the time, but they usually have numerous switching power supplies to choose from.



Here are the external connections for power, an external speaker, programming and air.



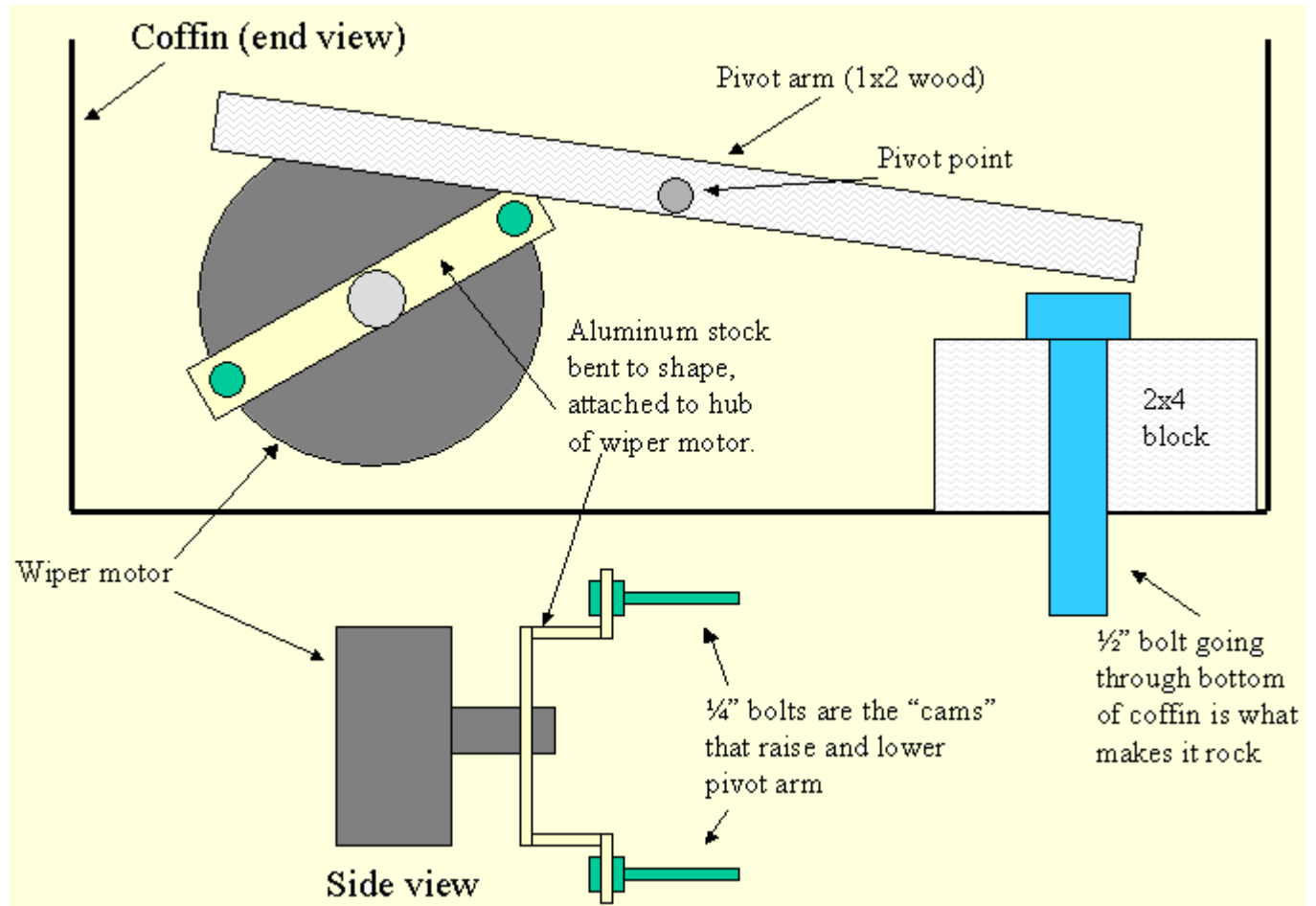
Here are some drawings of the mechanism I used to pop-up the corpse in the [Kitchen Sink Coffin](#). It's a real simple mechanism and if done correctly, the tots cannot see any of the working mechanism. The pneumatic cylinder is housed in the bottom portion of the coffin under the lid that doesn't open. Most of the rest of the mechanism is under the corpse or can be hidden with flat black spray paint.



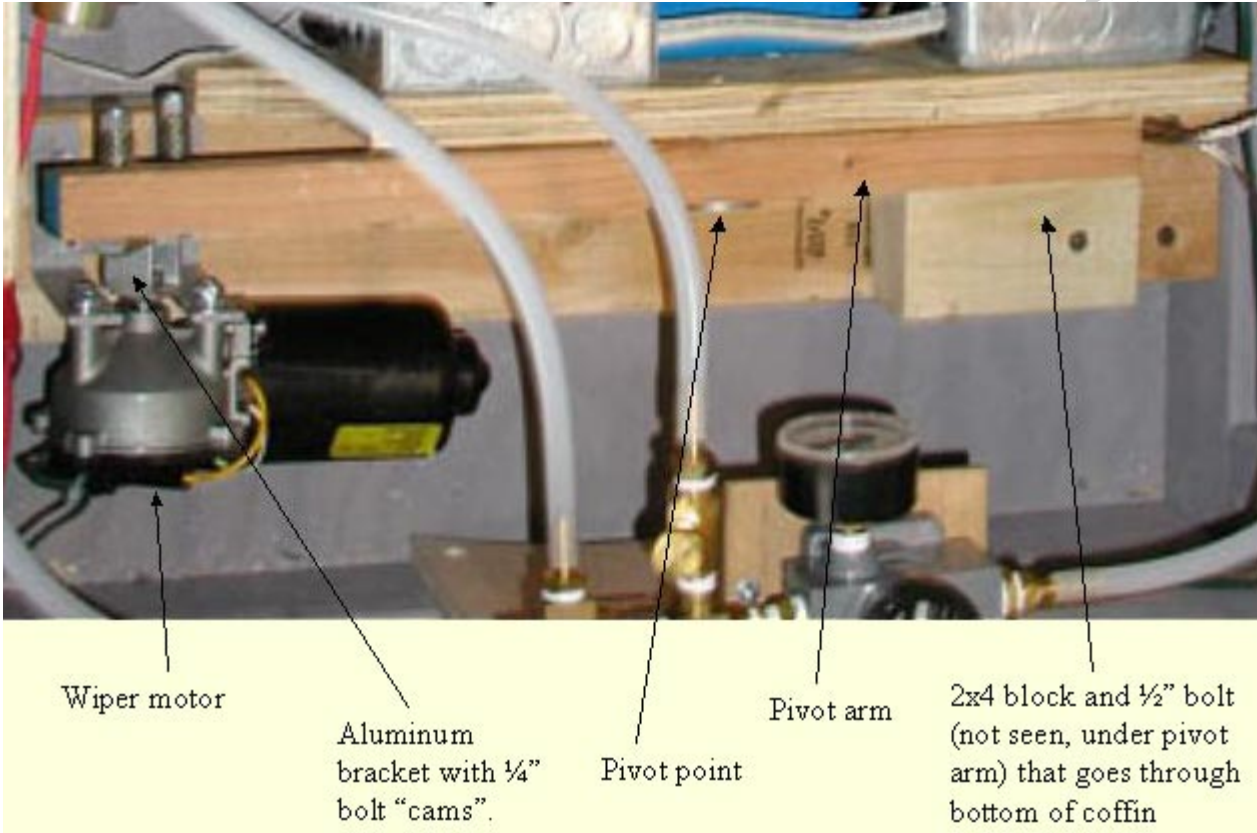
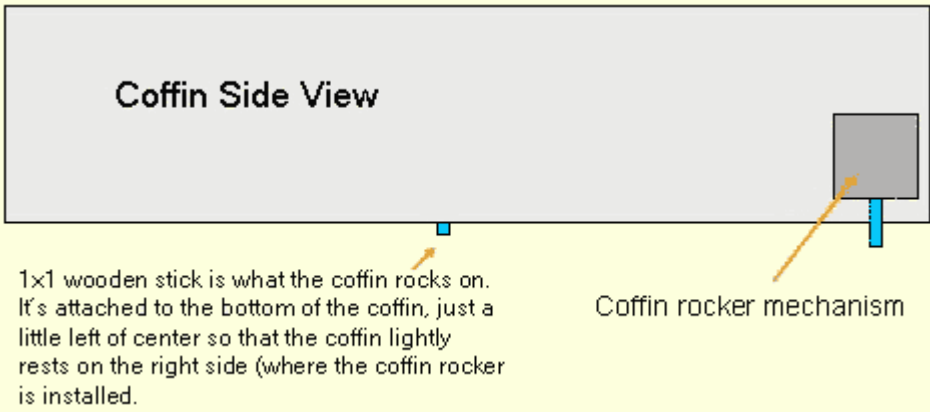
Here are some pictures of the mechanism that makes the Kitchen Sink Coffin rock.....

Wiper motor is from a Saturn. I run it on 5 volts which provides the perfect speed for this application. See my [wiper motor page](#) for more details

Coffin rocker mechanism spans the width of the coffin, making for a long pivot arm and therefore very little stress on the motor. The pivot arm pushes on the 1/2" bolt which goes through the bottom of the box (the bolt is loose in the hole). Because of the way the coffin is "balanced" (see drawing below), this causes the coffin to rock when the motor is turned on.



Wiper motor with "rocking" mechanism. Note plastic tubing added on "cam" bolts to cut down on noise and wear.



# Installing a Servo in a Bucky Skull

By Scary Terry

## Parts Needed:

- **Bucky Skull** (see page 2 for details)
- **Standard servo** (HiTec HS-425BB or equiv. See details at [ServoCity](#))
- **2-3/4" long 1"x1"x1/16" angle aluminum** (available at home centers-Home Depot and Lowes-or hardware stores)
- **0.039" Music wire, aka piano wire** (available at most "real" hardware stores and most hobby shops)
- **1 1/2" #6 screw, nut, washer**
- **Servo mounting hardware** (#4/40 screws and nuts)
- **2-4" Cable ties** (aka: tie wraps, zip ties)



Note: The following procedure has been modified as of 2/2005 to accommodate the newer Bucky skulls, which can be identified by the "Made In China" label on the back. If you have an older Bucky skull, [click here](#) for the original instructions

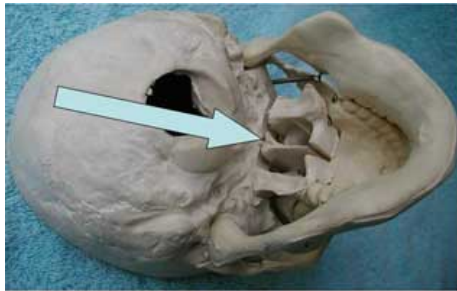


We need to make a bracket that will allow us to mount a servo on the area marked by the dotted line.



Using the appropriate tools (hack saw, tin snips, file, etc.) cut an opening in one side of the aluminum angle to accommodate the servo. Be sure to leave some of the "angle" to maintain strength. Drill holes to match the servo mount for 4/40 screws. This will be our servo bracket.





To mount the servo bracket in the skull, we'll want to drill a hole that comes out in the nasal cavity. We'll need to cut away part of the bone that divides the nasal cavity (the septum) as shown by the arrow.



Using tin snips or diagonal cutters, snip away the rear portion of that bone. I've found that in most skulls, this piece is loose and after you cut it, it is easily removed. This will leave a nice flat surface (right) to accommodate the nut and washer in the next steps.



On the inside of the skull, right above the flat area shown above right, make a mark. Place the servo bracket where it will be mounted and transfer this mark to the bracket.





Using the appropriate size drill bit for a #6 screw, drill a hole through the bracket and skull where they were marked.



Using the #6 screw, nut and washer, mount the servo bracket in the Bucky skull. Tighten securely but don't over tighten as it might bend the bracket.



Bucky's jaw is held in place by a pair of springs. We need to install a permanent pivot for the jaw and also eliminate the springs because they are too much mechanical resistance for the servo. We'll use the cable ties as our pivot.

Using a drill bit the same size as the cable tie, drill a hole through the jaw and into the skull as shown right. Drill a second hole into just the skull, to the rear of the jaw bone as shown far right.

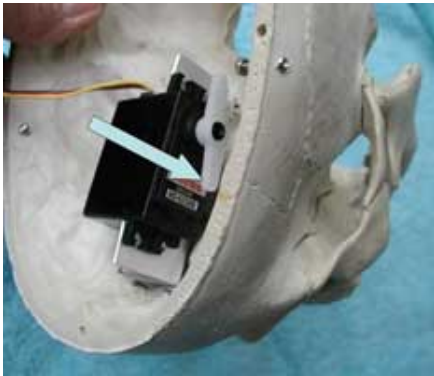




Insert the cable tie from the inside of the skull down into the jaw bone, loop it back inside the skull through the second hole (right) and fasten it inside the skull. In fastening the cable tie, tighten it just enough so the jaw won't flap around but still has freedom to move.



Repeat the same for the other side of the jaw then remove the springs and all associated hardware.



The next step is to drill a hole in the skull that will allow us to connect the servo to the jaw using a piece of the music wire. The wire will run from the front of the servo horn (left) to the hole in the left side of the jaw where the spring was originally mounted (right).



Obtained from [omarsmartail.com](http://omarsmartail.com)



While holding the servo in place, make a mark on the skull in line with the two points described above (left). Drill a 1/4" hole in the skull at this mark. If you were really good (lucky?), the hole will line up perfectly between the two points, if not, you'll have to "modify" the hole slightly to be in line.



Next, using a pair of long nose pliers, create an offset bend, as shown left, in one end of a 6" piece of the music wire. Attach it to the outer hole in the servo horn as shown right.



Feed the wire through the hole and install the servo in the bracket using the #4/40 screws and nuts. I find that using just two screws will hold it securely in place.

In preparation for the next step, position the servo horn as shown right.



With the servo horn in the position shown above and the jaw fully closed, bend the music wire at the point adjacent to the hole in the jaw (left). Complete the installation by inserting the wire in the jaw hole, bending it upward and trimming it off as shown right.



At some point, you're probably going to need to adjust the position of the servo horn on the servo. I recommend drilling a small hole in the side of the skull, as shown left, to accommodate a small phillips screwdriver. Be careful when drilling the hole so as not to slip and drill out the center core of the servo (please don't ask me how I know about this).

There are several ways to drive the servo. I've developed a circuit to drive it with a audio source. [Click here](#) for details.

\*What is a Bucky Skull you ask? It's a very well built plastic skull available from the [Skeleton Store/Bucky's Boneyard](#).

If you've got questions on the above procedure or suggestions on how to improve it, please [contact me](#).

Happy Haunting

## Programming Code

'  
=====

'  
' File..... KSC.BS2  
' Purpose.... Kitchen Sink Coffin Controller  
' Author..... Jon Williams (based on code by Scary Terry)  
' E-mail..... jwilliams@parallax.com  
' Started....  
' Updated.... 1/25/2005 (this version created on 17 JAN 2005)  
'  
' {\$STAMP BS2}  
' {\$PBASIC 2.5}  
'

' -----[ Program Description ]-----

' -----[ Revision History ]-----

' \*KSCJW4; 1/24/2005, first run, changed EOM pin number,  
' revised audio selections, changed timing, changed head servo idx range  
' \*KSCJW5; 1/25/2005, minor timing changes.

' -----[ I/O Definitions ]-----

Trigger1	PIN	0	' inputs
Trigger2	PIN	15	
Head	PIN	1	' head servo
Mouth	PIN	12	' high to enable mouth
BoxShake	PIN	2	' control outputs
Fogger	PIN	3	
Lid	PIN	4	
CorpseUp	PIN	5	
CorpseDn	PIN	6	

IsdA8	PIN	8	' ISD2575 control
IsdA7	PIN	9	
IsdA6	PIN	10	
IsdCE	PIN	11	'100us low triggers ChipCorder
IsdEOM	PIN	13	'EOM is low pulse

'-----[ Constants ]-----

IsHigh	CON	1	
IsLow	CON	0	
IsOn	CON	1	' active-high control
IsOff	CON	0	
IsUp	CON	1	
IsDown	CON	0	
Growl1	CON	0	' audio selections
Growl2	CON	1	
LidSqueak	CON	2	
RoarScream	CON	3	



ThankYou    CON    4

Rtn2Sender    CON    5

ShookUp    CON    7

' ----[ Variables ]-----

audio    VAR    Nib    ' audio select (0 - 7)

idx    VAR    Byte    ' loop control

' ----[ EEPROM Data ]-----

' ----[ Initialization ]-----

Reset:

LOW Mouth    ' make outputs, set to off

LOW BoxShake

LOW Fogger

LOW Lid

LOW CorpseUp

LOW CorpseDn

Obtained from  
Omarshauntedtrail.com

LOW IsdA8                            ' ISD25xx control

LOW IsdA7

LOW IsdA6

HIGH IsdCE

' -----[ Program Code ]-----

Wait\_For\_Trigger:

DO

  IF (Trigger1 = IsLow) THEN Routine\_1

  IF (Trigger2 = IsLow) THEN Routine\_2

LOOP

' \*\*\*\*\*

' Activated by Trigger 1

' \*\*\*\*\*

Routine\_1:

  audio = Growl1

  GOSUB Play\_Audio

  BoxShake = IsOn

Obtained from  
Omarshauntedtrail.com

GOSUB Wait\_For\_Audio

BoxShake = IsOff

PAUSE 1000

audio = Growl2

GOSUB Play\_Audio

BoxShake = IsOn

Fogger = IsOn

GOSUB Wait\_For\_Audio

BoxShake = IsOff

Fogger = IsOff

PAUSE 1000

audio = LidSqueak

GOSUB Play\_Audio

Lid = IsUp

GOSUB Wait\_For\_Audio

PAUSE 1000

CorpseUp = IsOn

BoxShake = IsOn

audio = RoarScream

GOSUB Play\_Audio

Obtained from  
Omarshauntedtrail.com

GOSUB Wait\_For\_Audio

BoxShake = IsOff

PAUSE 500

GOSUB Turn\_Head ' turn to audience

Mouth = IsOn

audio = ThankYou

GOSUB Play\_Audio

GOSUB Wait\_For\_Audio

PAUSE 500

GOSUB Return\_Head ' back to sleep

audio = Rtn2Sender

GOSUB Play\_Audio

CorpseUp = IsOff

PAUSE 2000

CorpseDn = IsOn

PAUSE 400

CorpseDn = IsOff

PAUSE 1500

Obtained from  
Omarshauntedtrail.com

Lid = IsDown

GOSUB Wait\_For\_Audio

Mouth = IsOff

audio = ShookUp

GOSUB Play\_Audio

BoxShake = IsOn

PAUSE 7000

BoxShake = IsOff

GOTO Wait\_For\_Trigger

' \*\*\*\*\*

' Activated by Trigger 2

' \*\*\*\*\*

Routine\_2:

Fogger = IsOn

PAUSE 500

Lid = IsUp

audio = LidSqueak

Obtained from  
Omarshauntedtrail.com

GOSUB Play\_Audio

PAUSE 1000

Fogger = IsOff

audio = RoarScream

GOSUB Play\_Audio

CorpseUp = IsOn

BoxShake = IsOn

PAUSE 2000

BoxShake = IsOff

GOSUB Turn\_Head

Mouth = IsOn

audio = ThankYou

GOSUB Play\_Audio

GOSUB Wait\_For\_Audio

audio = ThankYou

GOSUB Play\_Audio

GOSUB Wait\_For\_Audio

PAUSE 50

Mouth = IsOff

GOSUB Return\_Head

Obtained from  
Omarshauntedtrail.com

CorpseUp = IsOff

PAUSE 1000

CorpseDn = IsOn

PAUSE 400

CorpseDn = IsOff

PAUSE 1500

Lid = IsDown

PAUSE 300

audio = LidSqueak

GOSUB Play\_Audio

GOTO Wait\_For\_Trigger

' ----[ Subroutines ]-----

' This routine plays the selected message.

' -- put audio file (0 - 7) into 'audio'

Play\_Audio:

IsdCE = IsHigh                   ' make sure it's high

IsdA6 = audio.BIT0               ' set audio address

IsdA7 = audio.BIT1

IsdA8 = audio.BIT2

PAUSE 25 ' let bus settle

PULSOUT IsdCE, 50 ' start the audio

RETURN

' This routine holds the program in place until the EOM

' (end of message) signal arrives from the ISD25xx

Wait\_For\_Audio:

DO : LOOP WHILE (IsdEOM = IsHigh)

RETURN

' Turns head to "singing" position

Turn\_Head:

LOW Head ' activate output

FOR idx = 1 TO 50

PULSOUT Head, 350 ' turn head to viewer

PAUSE 20

NEXT



```
INPUT Head          ' deactivate output
RETURN
```

```
' Returns head to "sleeping" position
```

```
Return_Head:
```

```
LOW Head           ' activate output
```

```
FOR idx = 1 TO 100
```

```
  PULSOUT Head, 1075      ' turn head to sleep
```

```
  PAUSE 20
```

```
NEXT
```

```
INPUT Head          ' deactivate output
```

```
RETURN
```

Obtained from  
Omarshauntedtrail.com