

# **Sequencer+ System**

## **Operators Manual**

## **DESCRIPTION:**

The Sequencer+ System consists basically of three items, the Master, the Slave(s) and 12 Position Slats. The Master communicates with each Slave with respect to Slave testing as well as cue testing. It also commences sequential firing both in manual as well as automatic mode. A time interval from .1 to 24 seconds may be programmed into the Master for automatic firing. Additional Slaves may be added in a daisy chain fashion - a total of 63 Slaves may be added increasing the total cues to 1512.

### **Sequencer+ Master**

The Master is housed in a 8.7"X 7.45"X 3.9" rugged, waterproof polypropylene enclosure. It contains a microcontroller and an LCD for user interface. Two 9 volt batteries are used for power - usage varies - but expect 5-8 hours of continual 'on' time. When the On/Off LED fails to illuminate - a new battery should be installed. On top side are two XLR style connectors labeled 'INPUT' and 'OUTPUT' as well as an 'ON/OFF' Power Switch. The 'INPUT' connector is for accessories such as a 'pickle switch'. The 'OUTPUT' goes to a Slave 'INPUT' using a Cat 5 wire cable. Located on the enclosure top is the LCD, two programming/selector pushbutton switches labeled 'UP' and 'DOWN', as well as a 'RUN' and 'STOP' pushbutton switch.

When the Sequencer+ Master Power Switch is turned 'ON', the LCD will exhibit the following:

### **Sequencer+ by ODA Enterprises**

The 'UP' and 'DOWN' buttons are then used to navigate thru the menu, the flow chart on page 10 shows all of the respective actions. Also the 'UP' button represents 'YES' and the 'DOWN' button 'NO'. Turning the Power Switch 'OFF' for a few seconds and then back 'ON' will reboot the microcontroller.

## Sequencer+ Slave

The Slave is housed in a 8.7”X7.45”X3.9” polypro enclosure and also contains a microcontroller. It uses external power for both control as well as firing current. On the topside are two DB15 connectors. One of these connectors is labeled 1 thru 12 and the other 13 thru 24, to connect by cables to respective 12 position slats. Also there are 4 green LED’s. Also on the topside located left to right: First is the On/Off switch which supplies the power for control. Next is the keyed ‘ARM’ switch with respective LED. NOTE: the Slave will not fire any device until it is ‘ARMED’. There are also two XLR style connectors, one labeled ‘INPUT’ and the other labeled ‘OUTPUT’. The Slave(s) must be addressed by means of an internal DIP switch. Refer to page 9 for DIP switch settings.

### Operating Instructions:

Let’s first work with the Master. Go to page 10 that has a flow chart of the menu system, the following will then make more sense. Turn the Power Switch ‘ON’, you will see screen #1 ‘**Sequencer+ by ODA Enterprises**’. This is the starting point for the menu system. The next screens are simply questions to answer either ‘Yes’ or ‘No’. The ‘UP’ button corresponds to ‘Yes’ and the ‘DOWN’ button corresponds to ‘No’. In this first exercise we will be answering ‘No’ to all the questions.

Press the ‘DOWN’ pushbutton once, you will then see screen #2 ‘**Test Slaves**’. This is asking the question ‘Do you want to test the Slaves?’, press ‘DOWN’ which corresponds to ‘No’, this brings you to screen #3 ‘**Test Cues**’. This is asking if you want to test cue continuity, press ‘No’. Takes you to screen #4 ‘**Enter Delay**’, this is where you would enter the time interval between firings. Press ‘No’, the next screen #5 is ‘**Manual Mode**’, whereby no time interval is used, each time you press ‘RUN’ a cue would be fired, hence ‘Manual Mode’. Press the ‘No’ button and the next screen #6 ‘**Auto Mode**’ comes up. This is a straight thru automatic mode - explained later. Press ‘No’ and the last screen #7 ‘**Alternate Mode**’ appears. This is also an automatic mode but in an alternating fashion - explained later. Press ‘No’ and you will be returned to the startup screen #1 ‘**Sequencer+ by ODA Enterprises**’. Again in this exercise we answered ‘No’ to all the questions.

In the next exercise we will answer 'Yes' to all the questions. In screen #2 '**Test Slaves**', press 'Yes', and a new screen #2A appears, press 'Run' and the Master will test the Slave(s) connected in the system. It will report back the first bad Slave. If for example you had 5 Slaves and all were good, the LCD would indicate Slave #6, simply because there is none. You must then press 'STOP' twice to get you out of the 'Slave Test' mode and to the next screen #3 '**Test Cues**'. Press 'Yes' and a new screen #3A appears, press 'RUN' and this will begin testing continuity of all the cues. It will stop at the first 'open' it encounters. This is when you should write down the Slave # and Cue #, then press 'RUN' to continue testing. This is repeated until all 'opens' are found and written down for correcting. If for example you had 5 Slaves and all cues were 'good', then the LCD would indicate Slave #6 Cue #1, because there is none. After this test is completed you need to press the 'STOP' button twice to get out of '**Test Cue**' mode. This will bring up the next screen #4 '**Enter Delay**', press 'Yes', a new screen #4A '**Enter Delay Up Down**' appears. Pressing the 'UP' button will increase the time interval, pressing 'DOWN' will decrease the time interval. You can program from .1 to 24 seconds for the time interval. The LCD indicates this time in tenths of seconds, ie. 1 indicates 1/10th of a second, 5 indicates 5/10ths or 1/2 second, and 240 indicates 240/10ths or 24 seconds. When the desired time interval is shown on the LCD, you must simultaneously press 'UP' and 'DOWN' for the Master to accept that time. This time interval is stored in memory until changed. Press 'STOP' twice to get out of this programming mode and to the next screen #5 '**Manual Mode**'. Press 'Yes'. Now each time you press 'RUN' a sequential cue will be fired, ie. press 'RUN' once, cue #1 will be fired, press 'RUN' again #2 will be fired etc., till you're done.

Let's go back to screen #5 '**Manual Mode**' and answer 'No', this will bring up a new screen #6 '**Auto Mode**', this is straight thru automatic firing. Press 'Yes' and screen #6A appears, then press 'RUN'. Slave #1 Cue #1 is fired first, then Slave #1 Cue #2, then Slave #1 Cue #3, etc. The cues will automatically fire with the preprogrammed time interval. The LCD will show which Slave and Cue is being fired.

If at the '**Auto Mode**' screen #6 we had pressed 'No' then a new screen #7 '**Alternate Mode**' would appear. Press 'Yes' and then screen #7A appears, then press 'RUN'. This is also an automatic firing mode, but in this case Slave #1 Cue #1 will fire first, then Slave #2 Cue #1, then Slave #1 Cue #2, then Slave #2 Cue #2, etc. Back and forth alternating between Slaves.

Pressing the 'STOP' button in either 'Auto' mode will stop the automatic firing. Pressing 'RUN' will start the auto firing where it stopped.

Now let's go to the Slave(s). Each Slave has an internal DIP switch, and must be set to 'address' each Slave. The DIP switch has an 'OFF' and 'ON' position, the down position is 'OFF' and the up position is 'ON'. The DIP switch uses a 'binary counter scheme'. For example, if all switches are in the 'OFF' position, this corresponds to '00000000' - no address. For Slave #1 the DIP switch would be '10000000', ie. the first switch is up. A complete table showing the Slave # and DIP switch setting can be found on page 9 as well as inside cover of each slave. It is a good idea to physically number each Slave after setting. A piece of masking tape with the address on it secured to the Slave cover identifies the Slave as well as easily removed/changed in the future.

### **Example of Single Slave System:**

In a single Slave system the DIP switch would be set to 10000000. Next, connect the communications cable from the Master 'OUTPUT' to the Slave 'INPUT', and connect a power source (12-24 volts) to the Slave 'OUTPUT'. DB15 wire cables are connected to Cues 1-12 and Cues 13-24 and to their respective slats. Turn the power switch ON and the four green LED's will begin to flash, indicating that #1 there is power to the Slave and #2 that the microcontroller registers are being initialized - a good sign. Do not turn the 'ARM' switch on. As a matter of fact it is a good idea not to have the 'ARM' key in place. Next go to the Master and turn it on. The LCD will exhibit:

### **Sequencer+ by ODA Enterprises**

Press the 'DOWN' button and the next screen asks '**Test Slaves**', push the button next to 'Yes', and a new screen #2A appears, press 'Run' and the Master will test the Slave connected. It will report back Slave #2 - in this case indicating that #2 is not connected, because we only have 1 Slave. Next press the 'STOP' button twice - this will get you out of the Slave testing mode and you will see screen #3, asking if you want to '**Test Cues**'.

Press 'Yes' and screen #3A appears, press 'RUN' and this will begin testing of all cues - in this case 1-24. It will stop at the first 'open' it encounters - write it down - and press 'RUN' again to continue testing. This is repeated until all 'opens' are found and written down for correcting. If 'opens' are found, turn the Master power 'OFF', turn the Slave power 'OFF' and check the connections. After correction, turn the Slave power 'ON' and then the Master power 'ON' and retest.

Next press the 'STOP' button twice - this will get you out of the Cue testing mode and you will see screen #4 '**Enter Delay**', press 'Yes' and a new screen #4A '**Enter Delay Up Down**' appears where the time interval for firing is programmed. Pressing the 'UP' button will increase the time interval and pressing the 'DOWN' button will decrease the time interval. The LCD indicates time in tenths of seconds. In this case we will set the time to 010, which is 10/10ths or one second. Then press both 'UP' and 'DOWN' buttons at the same time. This time interval will then be stored in memory until changed. Press 'STOP' twice to get out of this programming mode and to the next screen #5 '**Manual Mode**'. In this example we will answer 'No', and a new screen #6 '**Auto Mode**' appears. It is at this time that the Slave should be armed. A red LED on the Slave will light indicating armed. At screen #6 press 'Yes' and screen #6A will appear. When ready to fire the show, press 'RUN' and the Master will automatically fire the cues sequentially and with the programmed time interval. If you wish to stop the firing, press 'STOP' and the firing will be halted, pressing 'RUN' will resume firing where it had been stopped. When the show is finished turn the Master power 'Off', turn the 'ARM' switch 'Off' and remove key as well as turning the Slave power 'Off'. SUCCESS!

### **Example of 3 Slave System:**

A multiple Slave system is not much more difficult. Assume we have a 3 Slave system. First we set the DIP switches, Slave #1 would be 10000000, Slave #2 would be 01000000, and Slave #3 would be 11000000. (Look on page 9 for the DIP switch chart). Label the Slaves #1, #2, #3, a piece of masking tape with their respective #'s on the cover is a good idea, can easily be removed/changed in the future. Next a communications cable is connected from the Master 'OUTPUT' to Slave #1 'INPUT'. Then a communications/power cable is connected from Slave #1 'OUTPUT' to Slave #2 'INPUT'. A communications/power cable is connected from Slave #2 'OUTPUT' to Slave #3 'INPUT'. This is a 'Daisy Chain' style

connection. On the last Slave in the system, in this case Slave #3, a power source (12-24 volts) is connected to the 'OUTPUT'. DB15 wire cables are connected to Cues 1-12 and Cues 13-24 and to their respective slats. On each Slave turn the power switch ON and the four green LED's will begin to flash, indicating that #1 there is power to the Slave and #2 that the microcontroller registers are being initialized - a good sign. Do not turn the 'ARM' switch on. As a matter of fact it is a good idea not to have the 'ARM' key in place. Next go to the Master and turn it on. The LCD will exhibit:

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Press the 'DOWN' button and the next screen asks '**Test Slaves**', push the button next to 'Yes', and a new screen #2A appears, press 'Run' and the Master will test the Slaves connected. It will report back Slave #4 - in this case indicating that #4 is not connected, because we only have 3 Slaves. Next press the 'STOP' button twice - this will get you out of the Slave testing mode and you will see screen #3, asking if you want to '**Test Cues**'. Press 'Yes' and screen #3A appears, press 'RUN' and this will begin testing of all cues - in this case 1-72. It will stop at the first 'open' it encounters - write it down - and press 'RUN' again to continue testing. This is repeated until all 'opens' are found and written down for correcting. If 'opens' are found, turn the Master power 'OFF', turn the Slave power 'OFF' and check the connections. After correction, turn the Slave power 'ON' and then the Master power 'ON' and retest.

Next press the 'STOP' button twice - this will get you out of the Cue testing mode and you will see screen #4 '**Enter Delay**', press 'Yes' and a new screen #4A '**Enter Delay Up Down**' appears where the time interval for firing is programmed. Pressing the 'UP' button will increase the time interval and pressing the 'DOWN' button will decrease the time interval. The LCD indicates time in tenths of seconds. In this case we will set the time to 010, which is 10/10ths or one second. Then press both 'UP' and 'DOWN' buttons at the same time. This time interval will then be stored in memory until changed. Press 'STOP' twice to get out of this programming mode and to the next screen #5 '**Manual Mode**'. In this example we will answer 'No', and a new screen #6 '**Auto Mode**' appears. It is at this time that the Slaves should be armed. A red LED on the Slaves will light indicate armed. At screen #6 press 'Yes' and screen #6A will appear.

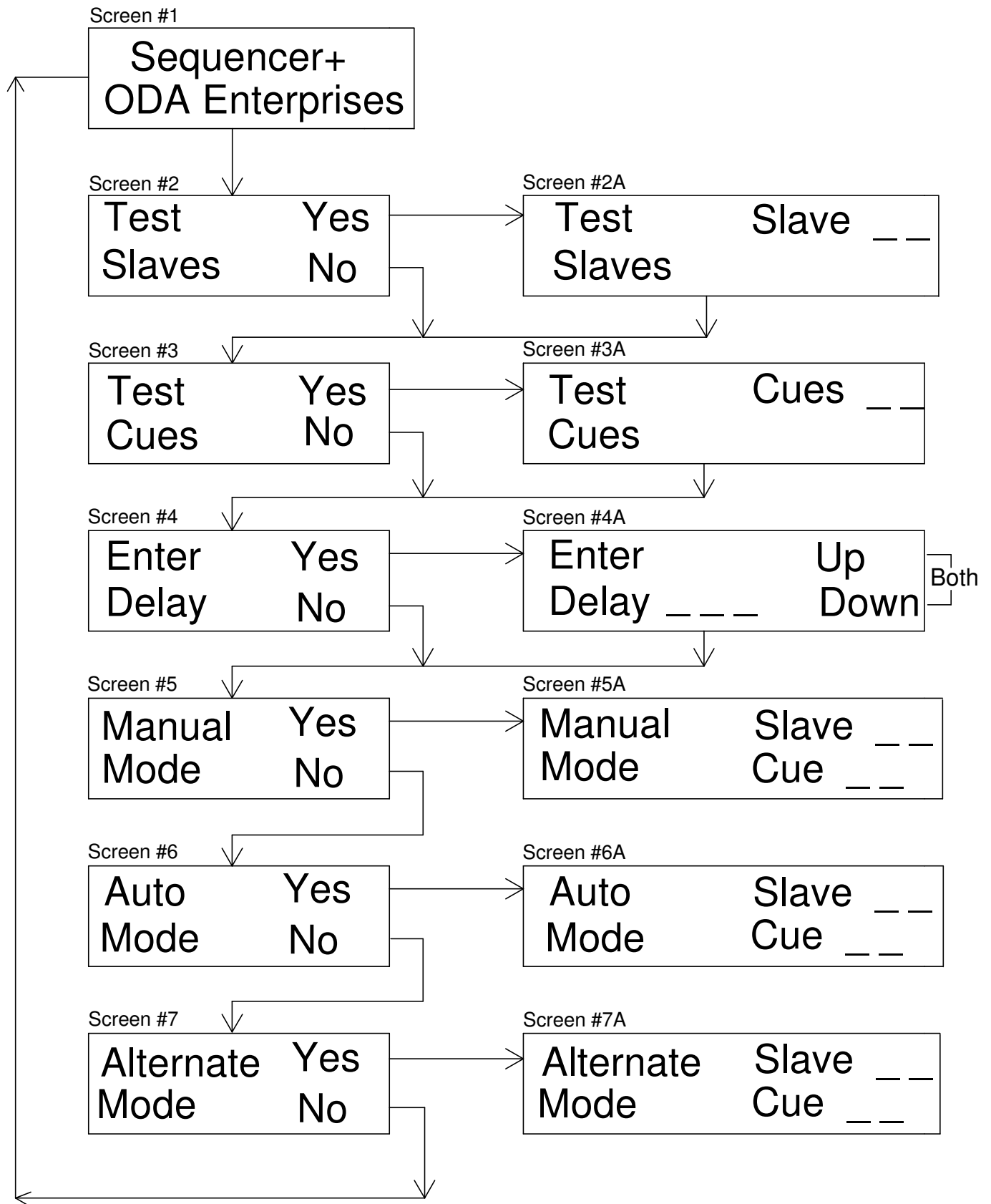
When ready to fire the show, press 'RUN' and the Master will automatically fire the cues sequentially and with the programmed time interval. If you wish to stop the firing, press 'STOP' and the firing will be halted, pressing 'RUN' will resume firing where it had been stopped. When the show is finished turn the Master power 'Off', turn the 'ARM' switch 'Off' and remove key as well as turning the Slave power 'Off'. SUCCESS!

We recommend learning and testing the system using light bulbs as cues. The least expensive bulbs we have found are the Christmas Tree variety, you can get 100 bulbs for a couple of dollars. However, use only 12 volts for the firing or they won't last long.

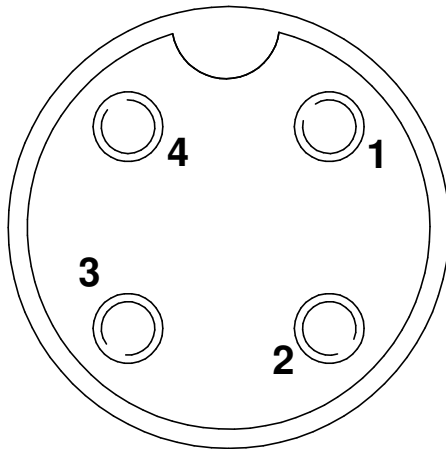
On page 11 you will find the wiring diagram for the cables.

Thank you for your purchase of the Sequencer+ firing system.

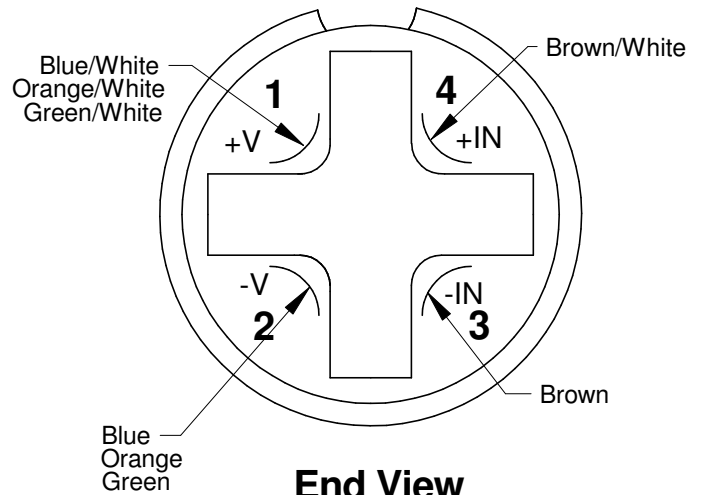
<b>Slave #</b>	<b>Dip Switch</b>	<b>Slave #</b>	<b>Dip Switch</b>
1	10000000	33	10000100
2	01000000	34	01000100
3	11000000	35	11000100
4	00100000	36	00100100
5	10100000	37	10100100
6	01100000	38	01100100
7	11100000	39	11100100
8	00010000	40	00010100
9	10010000	41	10010100
10	01010000	42	01010100
11	11010000	43	11010100
12	00110000	44	00110100
13	10110000	45	10110100
14	01110000	46	01110100
15	11110000	47	11110100
16	00001000	48	00001100
17	10001000	49	10001100
18	01001000	50	01001100
19	11001000	51	11001100
20	00101000	52	00101100
21	10101000	53	10101100
22	01101000	54	01101100
23	11101000	55	11101100
24	00011000	56	00011100
25	10011000	57	10011100
26	01011000	58	01011100
27	11011000	59	11011100
28	00111000	60	00111100
29	10111000	61	10111100
30	01111000	62	01111100
31	11111000	63	11111100
32	00000100		



## XLR Style Female Connector



**End View  
Frontside**



**End View  
Backside  
Solderside**

### Communications/Power Cable:

Used to connect Master to Slave and Slave to Slave.

Use CAT 5 or CAT 3 cable (4 twisted pairs) one pair is for communications the other three pair for power.

Generally the color code on the wires is as follows:

#1 twisted pair is Brown and Brown/White #2 twisted pair is Blue and Blue/White  
#3 twisted pair is Orange and Orange/White #4 twisted pair is Green and Green/White

The connector is wired as follows:

Brown is soldered to pin #3, Brown/White to pin #4

The Blue, Orange and Green wires are twisted together and soldered to pin #2.

The Blue/White, Orange/White and Green/White are twisted together and soldered to pin #1.

### Power Cable-

Used to connect power source (12 to 24 Volts) to last Slave.

Use a minimum of 18 gage twin lead wire.

It is important to label the positive and negative wires.

Solder the positive wire to pin #1 and the negative to pin #2.

Connectors- Female XLR style may be obtained from Radio Shack P/N 910-0894.